MBS MacFrameworks Plugin Documentation

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0.1 Introduction

This is the PDF version of the documentation for the Xojo Plug-in from Monkeybread Software Germany.
Plugin part: MBS MacFrameworks Plugin

0.2 Content

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Chapter 6

Calendar

6.1 class CalAlarmMBS

6.1.1 class CalAlarmMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKAlarmMBS instead.
Function: The class for an Alarm in iCal.
Example:

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar
dim c as new CalEventMBS

dim StartDate as date = new date
StartDate.day = StartDate.day +1 // start tomorrow

dim calendars() as CalCalendarMBS = s.calendars

// set properties
c.Title="new Event"
c.startDate=StartDate
c.calendar=calendars(0) // add to first calendar

dim EndDate as new date(StartDate) // one hour after start
EndDate.hour = EndDate.hour + 1
```

```
c.endDate=EndDate

dim a as new CalAlarmMBS // Send email one hour earlier
a.action = a.CalAlarmActionEmail
a.relativeTrigger = -3600
a.emailAddress="some@email.address"

c.addAlarm a // attach an alarm

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New event was created."
end if
```

Notes: Requires Mac OS X 10.5 to work.

6.1.2 Methods

6.1.3 Constructor

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: This constructor creates a new empty alarm object.
Example:

```
dim a as new CalAlarmMBS // add alarm
a.action = a.CalAlarmActionDisplay
a.relativeTrigger = -3600*24 // 24 Hours before
```

6.1.4 triggerDateRelativeTo(currentdate as date) as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Returns the date of the trigger relative to the given date.

6.1.5 Properties

6.1.6 absoluteTrigger as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The absolute trigger value.
Notes: The time that an alarm goes off is referred to as the trigger. Alarms have either a relative trigger, which means the alarm fires a certain number of seconds before an alarm occurs, or an absolute trigger, which specifies the exact time the alarm will trigger off.

Setting an absoluteTrigger will also set the relativeTrigger to 0.
(Read and Write property)

6.1.7 acknowledged as date

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The acknowledged date for the alarm.
Notes: (Read and Write property)

6.1.8 action as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The action used for this alarm.
Notes: See the CalAlarmAction* constants.
(Read and Write property)

6.1.9 emailAddress as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The email address to notify.
Notes: Setting an emailAddress will also set the action to CalAlarmEmail as well as set the sound and URL to nil.
(Read and Write property)

6.1.10 relatedTo as String

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Related to text.
Notes: (Read and Write property)

6.1.11 relativeTrigger as Double

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The absolute relative value.
Notes: The time that an alarm goes off is referred to as the trigger. Alarms have either a relative trigger, which means the alarm fires a certain number of seconds before an alarm occurs, or an absolute trigger, which specifies the exact time the alarm will trigger off.

Setting a relativeTrigger will also set the absoluteTrigger to 0.
(Read and Write property)

6.1.12 sound as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The sound file to play.
Notes: Setting a sound will also set the action to CalAlarmSound as well as set the emailAddress and URL to nil. Expects the name of a system alert. See NSSound.
(Read and Write property)

6.1.13 url as string

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The URL to launch when the alarm comes.
Notes: Setting a URL will also set the action to CalAlarmProcedure as well as set the emailAddress and sound to nil. The URL must be a file URL.
(Read and Write property)

6.1.14 Constants

Alarm Action Constants

Constant	Value	Description
CalAlarmActionDisplay	"DISPLAY"	Display the event.
CalAlarmActionEmail	"EMAIL"	Send an email.
CalAlarmActionProcedure	"PROCEDURE"	
CalAlarmActionSound	"AUDIO"	Play a sound.

6.2 class CalAttendeeMBS

6.2.1 class CalAttendeeMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKParticipantMBS instead. **Function:** The class for an Attendee.
Notes: Requires Mac OS X 10.5 to work.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

6.2.2 Methods

6.2.3 Constructor

Plugin Version: 13.1, Platform: macOS, Targets: Desktop only.

Function: The private constructor.

6.2.4 Properties

6.2.5 address as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The address of this attendee.
Notes: (Read only property)

6.2.6 commonName as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The user-entered name of the attendee.
Notes: (Read only property)

6.2.7 Handle as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The internal used CalAttendee reference.
Notes: (Read and Write property)

6.2.8 status as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The attendee status.
Notes: Use the CalAttendeeStatus* constants.

For now (Mac OS X 10.5), it is not possible to modify an event's attendees or the attendees themselves.
(Read only property)

6.2.9 Constants

Constants

Constant	Value	Description
CalAttendeeStatusAccepted	"ACCEPTED"	These constants are used to describe the user's confirmation stat tendee.
CalAttendeeStatusDeclined	"DECLINED"	These constants are used to describe the user's confirmation stat tendee.
CalAttendeeStatusNeedsAction	"NEEDS-ACTION"	These constants are used to describe the user's confirmation stat tendee. This is the default status for an attendee.
CalAttendeeStatusTentative	"TENTATIVE"	These constants are used to describe the user's confirmation stat tendee.

6.3 class CalCalendarItemMBS

6.3.1 class CalCalendarItemMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKCalendarItemMBS instead. **Function:** The class for a calendar item in iCal.
Notes: This class and its subclasses should be used to get information about CalEvent and CalTasks. Accessors for properties common to both of these classes are included here.

Requires Mac OS X 10.5 to work.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Real Studio Plugins, version 12.2pr2

6.3.2 Methods

6.3.3 addAlarm(alarm as CalAlarmMBS)

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Adds one alarm.

6.3.4 addAlarms(alarms() as CalAlarmMBS)

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Adds an array of alarms.

6.3.5 alarms as CalAlarmMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: An array of CalAlarms associated with the calendar item.

6.3.6 Constructor

Plugin Version: 13.1, Platform: macOS, Targets: Desktop only.

Function: The private constructor.

6.3.7 hasAlarm as Boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Whether this item has an alarm associated.

6.3.8 nextAlarmDate as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Returns the next alaram date.

6.3.9 removeAlarm(alarm as CalAlarmMBS)

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Removes one alarm.

6.3.10 removeAlarms(alarms() as CalAlarmMBS)

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Removes the alarms.

6.3.11 setalarms(alarms() as CalAlarmMBS)

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Sets the alarms for this item.

6.3.12 Show

Plugin Version: 12.2, Platform: macOS, Targets: Desktop only.

Function: Shows the item in iCal.
Example:

```
dim c as new CalCalendarStoreMBS

// search for some events within last year
dim d as new date
dim e as new date

d.Year = d.Year -1

dim events() as CalEventMBS = c.events(d, e)

// pick one, show title and show in iCal
MsgBox Events(30).Title
events(30).show
```

6.3.13 Properties

6.3.14 calendar as CalCalendarMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The calendar of this item.
Notes: (Read and Write property)

6.3.15 dateStamp as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The datestamp of this calendar item.
Notes: This value is read only.
(Read only property)

6.3.16 Handle as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The internal used CalCalendarItem reference.
Notes: (Read and Write property)

6.3.17 notes as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The notes text for this item.
Example:

```
dim c as new CalCalendarStoreMBS

// set the date range where we look for event
dim sd as new date(2016,6,7,0,0,0)
dim ed as new date(2016,6,7,23,59,59)

// look for an event on that date
dim a() as CalEventMBS = c.events(sd,ed, c.calendars)
dim e as CalEventMBS = a(1)

// show notes
MsgBox e.notes

// change it
e.notes = "Just a test"

// check again
MsgBox e.notes

// Save
dim error as NSErrorMBS
dim ok as Boolean = c.saveEvent(e, c.CalSpanThisEvent, error)

if ok then
MsgBox "OK"
elseif error <>nil then
MsgBox error.LocalizedDescription
else
MsgBox "Failed."
end if
```

Notes: (Read and Write property)

6.3.18 title as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The title for this calendar item.

Example:

```
// init
dim s as new CalCalendarStoreMBS

// Get date range for today
dim Startdate as new date
dim Enddate as new date

Startdate.hour = 0
Startdate.Minute = 0
Startdate.Second = 0

Enddate.hour = 23
Enddate.minute = 59
Enddate.second = 59

// Query events on all calendars
dim events() as CalEventMBS = s.events(Startdate,Enddate)

// Display result
dim lines(-1) as string
for each e as CalEventMBS in events
lines.Append e.Title
next

MsgBox Join(lines,EndOfLine)
```

Notes: (Read and Write property)

6.3.19 uid as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The unique ID for this item.
Example:

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar event
dim c as new CalEventMBS
```

```
dim calendars() as CalCalendarMBS = s.calendars

// set properties
c.Title="new Event"
c.startDate=new date
c.calendar=calendars(0) // add to first calendar

dim d as new date
d.hour=d.hour+1
c.endDate=d

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
MsgBox e.localizedDescription
else
// show the UID
MsgBox "New event was created with UID: "+c.uid
end if
```

Notes: This value is read only.
(Read only property)

6.3.20 URL as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The URL for this calendar item.
Notes: (Read and Write property)

6.4 class CalCalendarMBS

6.4.1 class CalCalendarMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKCalendarMBS instead.
Function: A class for the iCal calendars.
Example:

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar
dim c as new CalCalendarMBS

// set properties
c.Title="New Calendar"
c.notes="Just a test"

// save calendar
call s.saveCalendar(c,e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New calendar was created."
end if
```

Notes: Requires Mac OS X 10.5 to work.
This class can be used to get attributes of a calendar, but cannot be used to get the list of events or tasks in a calendar.
Blog Entries

- MBS Xojo Plugins, version 17.3pr1

6.4.2 Methods

6.4.3 Constructor

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The iCal class for a calendar.
Example:

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar
dim c as new CalCalendarMBS

// set properties
c.Title="New Calendar"
c.notes="Just a test"

// save calendar
call s.saveCalendar(c,e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New calendar was created."
end if
```

Notes: All calendars created with this API will be of type CalCalendarTypeLocal.

6.4.4 Properties

6.4.5 Color as NSColorMBS

Plugin Version: 13.2, Platform: macOS, Targets: Desktop only.

Function: The color for this calendar.
Notes: (Read and Write property)

6.4.6 Handle as Integer

Plugin Version: 13.2, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

6.4.7 isEditable as Boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Whether this calendar is editable.
Notes: This property is read only.
(Read only property)

6.4.8 notes as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The notes for this calendar.
Notes: (Read and Write property)

6.4.9 title as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The title of this calendar.
Example:

```
dim c as new CalCalendarStoreMBS
dim ca() as CalCalendarMBS = c.calendars
for each cc as CalCalendarMBS in ca
MsgBox cc.Title+EndOfLine+cc.type+EndOfLine+cc.notes
next
```

Notes: (Read and Write property)

6.4.10 type as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The type of this calendar.
Notes: This property is read only.

use the CalCalendarType* constants.
(Read only property)

6.4.11 uid as String

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The unique ID for this calendar.
Notes: This property is read only.
(Read only property)

6.4.12 Constants

Constants

Constant	Value	Description
CalCalendarTypeBirthday	"Birthday"	One of the calendar types.
CalCalendarTypeCalDAV	"CalDAV"	One of the calendar types.
CalCalendarTypeExchange	"Exchange"	One of the calendar types. New in Mac OS X 10.6.
CalCalendarTypeIMAP	"IMAP"	One of the calendar types.
CalCalendarTypeLocal	"Local"	One of the calendar types.
CalCalendarTypeSubscription	"Subscription"	One of the calendar types.

6.5 class CalCalendarStoreMBS

6.5.1 class CalCalendarStoreMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKEventStoreMBS instead. **Function:** The class for the calendar storage.
Example:

```
// init
dim s as new CalCalendarStoreMBS

// find calendar by name
dim myCalendar as CalCalendarMBS
dim calendars() as CalCalendarMBS = s.calendars

for each ca as CalCalendarMBS in calendars
if ca.Title = "Private Events" then
myCalendar=ca
exit
end if
next

// Get date range for today
dim Startdate as new date
dim Enddate as new date

Startdate.hour = 0
Startdate.Minute = 0
Startdate.Second = 0

Enddate.hour = 23
Enddate.minute = 59
Enddate.second = 59

// Query events on this calendar
dim events() as CalEventMBS = s.events(Startdate,Enddate, myCalendar)

// Display result
dim lines(-1) as string
for each e as CalEventMBS in events
lines.Append e.Title
next

MsgBox Join(lines,EndOfLine)
```

Notes: Requires Mac OS X 10.5 to work.

Calendar saving and modification errors:

CalCalendarNotEditableError	= 1025	Events and tasks cannot be added to an uneditable calendar
CalDateInvalidError	= 1026	The start date of an event must be earlier than its end date
CalCalendarNotInRepository	= 1027	Events' and tasks' calendar property must be a calendar in the user's calendar store
CalCalendarTitleNotUniqueError	= 1028	Calendar titles must be unique

And the domain for the errors is: CalCalendarStoreErrorDomain
Blog Entries

- Multithreaded plugin functions can increase speed of Xojo application
- Problems with killing Xojo threads with plugin calls.
- MBS Xojo Plugins, version 17.2pr4
- MBS Xojo / Real Studio Plugins, version 16.5pr5
- MBS Xojo / Real Studio Plugins, version 14.2pr6

6.5.2 Methods

6.5.3 calendars as CalCalendarMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: An array of all the user's calendars, represented as CalCalendars.
Example:

```
dim c as new CalCalendarStoreMBS
dim ca() as CalCalendarMBS

ca=c.calendars
for each cc as CalCalendarMBS in ca
MsgBox cc.Title+EndOfLine+cc.type+EndOfLine+cc.notes
next
```

Notes: If the user has iCal data from a previous version of Mac OS X, but has not launched iCal in 10.5, this will return an array of empty calendars. iCal needs to be launched at least once in order to migrate the user's calendar data.

If no calendar data from any version of Mac OS X exists, then this method will create and return two default calendars, named Home and Work.

6.5.4 calendarWithTitle(Title as string) as CalCalendarMBS

Plugin Version: 14.2, Platform: macOS, Targets: Desktop only.

Function: Queries all calendars and searches for one with the given title.
Example:

```
dim cs as new CalCalendarStoreMBS

// delete one
dim c as CalCalendarMBS = cs.calendarWithTitle("Just Testing")
dim e as NSErrorMBS
if cs.removeCalendar(c, e) then
MsgBox "deleted"
else
MsgBox "Failed to remove: "+e.LocalizedDescription
end if
```

Notes: Title comparison is case insensitive.
Returns nil on any error.

6.5.5 calendarWithUID(UID as string) as CalCalendarMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The calendar associated with the specific UID.
Notes: If no record with this UID exists, nil is returned.

6.5.6 Constructor

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The class for the calendar storage.
Notes: This is the main class. Keep an object of it around as long as you use the calendar classes.

6.5.7 events(StartDate as date, EndDate as date) as CalEventMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalEvents which match the condition.
Example:

```
dim c as new CalCalendarStoreMBS

dim i,count as Integer
dim ta() as CalEventMBS
dim ct as CalEventMBS

dim sd as new date
dim ed as new date

ed.day=ed.day+1
// events within the next 24 hours

ta=c.events(sd,ed)
for each ct in ta
msgbox ct.Title+EndOfLine+ct.location+EndOfLine+ct.startDate.LongDate+" "+ct.startDate.LongTime
next
```

Notes: This is the function which uses all calendars.

For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.
See also:

6.5.8 events(StartDate as date, EndDate as date, calendar as CalCalendarMBS) as CalEventMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalEvents which match the condition.
Example:

```
// init
dim s as new CalCalendarStoreMBS

// find calendar by name
dim myCalendar as CalCalendarMBS
dim calendars() as CalCalendarMBS = s.calendars

for each ca as CalCalendarMBS in calendars
if ca.Title = "Private Events" then
myCalendar=ca
exit
end if
next

// Get date range for today
dim Startdate as new date
dim Enddate as new date

Startdate.hour = 0
Startdate.Minute = 0
Startdate.Second = 0

Enddate.hour = 23
Enddate.minute = 59
Enddate.second = 59

// Query events on this calendar
dim events() as CalEventMBS = s.events(Startdate,Enddate, myCalendar)

// Display result
dim lines(-1) as string
for each e as CalEventMBS in events
lines.Append e.Title
next

MsgBox Join(lines,EndOfLine)
```

Notes: For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than

four years, then the timespan containing recurrences is always the first four years of date range.
See also:

6.5.9 events(StartDate as date, EndDate as date, calendars() as CalCalendarMBS) as CalEventMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalEvents which match the condition.
Notes: For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.
See also:

6.5.10 events(StartDate as date, EndDate as date, eventUID as string) as CalEventMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalEvents which match the condition.
Notes: This is the function which uses all calendars.

For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years,

then the timespan containing recurrences is always the first four years of date range.
See also:

- 6.5.7 events(StartDate as date, EndDate as date) as CalEventMBS() 165
- 6.5.8 events(StartDate as date, EndDate as date, calendar as CalCalendarMBS) as CalEventMBS() 166
- 6.5.9 events(StartDate as date, EndDate as date, calendars() as CalCalendarMBS) as CalEventMBS() 167
- 6.5.11 events(StartDate as date, EndDate as date, eventUID as string, calendar as CalCalendarMBS) as CalEventMBS() 168
- 6.5.12 events(StartDate as date, EndDate as date, eventUID as string, calendars() as CalCalendarMBS) as CalEventMBS() 168

6.5.11 events(StartDate as date, EndDate as date, eventUID as string, calendar as CalCalendarMBS) as CalEventMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalEvents which match the condition.
Notes: For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.
See also:

- 6.5.7 events(StartDate as date, EndDate as date) as CalEventMBS() 165
- 6.5.8 events(StartDate as date, EndDate as date, calendar as CalCalendarMBS) as CalEventMBS() 166
- 6.5.9 events(StartDate as date, EndDate as date, calendars() as CalCalendarMBS) as CalEventMBS() 167
- 6.5.10 events(StartDate as date, EndDate as date, eventUID as string) as CalEventMBS() 167
- 6.5.12 events(StartDate as date, EndDate as date, eventUID as string, calendars() as CalCalendarMBS) as CalEventMBS() 168

6.5.12 events(StartDate as date, EndDate as date, eventUID as string, calendars() as CalCalendarMBS) as CalEventMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalEvents which match the condition.
Notes: For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than

four years, then the timespan containing recurrences is always the first four years of date range.
See also:

6.5.13 eventsMT(StartDate as date, EndDate as date, calendars() as CalCalendarMBS = nil) as CalEventMBS()

Plugin Version: 16.5, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalEvents which match the condition.
Notes: For performance reasons, this method will only return occurrences of repeating events that fall within a specific four year timespan. If the date range between the startDate and endDate is greater than four years, then the timespan containing recurrences is always the first four years of date range.

If calendars array is nil, we use all calendars.

The work is performed on a preemptive thread, so this function does not block the application and can yield time to other Xojo threads. Must be called in a Xojo thread to enjoy benefits. If called in main thread will block, but keep other background threads running.

6.5.14 eventWithUID(UID as string, occurrence as date) as CalEventMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Searches the event with the given unique ID.
Example:

```
// connect to calendar storage
dim c as new CalCalendarStoreMBS

// find event with given UID
dim e as CalEventMBS = c.eventWithUID("M2CD-6-1-EEB42862-8BD6-4880-AF91-4AEEADD900B6", nil)

// and display title
```

```
MsgBox e.Title
```

Notes: Returns nil on any error.

uid: The unique identifier of an event.
date: The date of a recurring event. Pass nil if the event is not recurring.

Returns a CalEvent object that matches the specified unique identifier and date. Returns nil if the event is not found, or the event is recurring and date is not specified.

Available in Mac OS X v10.5 and later.

6.5.15 removeCalendar(calendar as CalCalendarMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Deletes a calendar.
Example:

```
dim cs as new CalCalendarStoreMBS

// before

dim calendars1() as CalCalendarMBS = cs.calendars
dim list1() as string

for each c1 as CalCalendarMBS in calendars1
list1.Append c1.Title
next

MsgBox Join(list1, EndOfLine)

// delete one
dim c as CalCalendarMBS = cs.calendarWithTitle("Just Testing")
dim e as NSErrorMBS
if cs.removeCalendar(c, e) then
MsgBox "deleted"
else
MsgBox "Failed to remove: "+e.LocalizedDescription
end if

// after
```

```
dim calendars2() as CalCalendarMBS = cs.calendars
dim list2() as string

for each c2 as CalCalendarMBS in calendars2
list2.Append c2.Title
next

MsgBox Join(list2, EndOfLine)
```

Notes: Return

6.5.16 removeEvent(theEvent as CalEventMBS, span as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Removes the event from the calendar.
Example:

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new calendar event
dim c as new CalEventMBS

dim calendars() as CalCalendarMBS = s.calendars

// set properties
c.Title="new Event"
c.startDate=new date
c.calendar=calendars(0) // add to first calendar

dim d as new date
d.hour=d.hour+1
c.endDate=d

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New event was created with UID: "+c.uid
```

```
e = nil

// and delete it
if s.removeEvent(c, s.CalSpanAllEvents, e) then
MsgBox "Event deleted."
else
MsgBox e.localizedDescription
end if

end if
```

Notes: Returns true on success and false on failure.
Error is stored in the error object.

6.5.17 removeTask(task as CalTaskMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Removes the task from the calendar.
Notes: Returns true on success and false on failure.
Error is stored in the error object.

6.5.18 saveCalendar(calendar as CalCalendarMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Writes changes to calendar.
Example:

```
dim cs as new CalCalendarStoreMBS
dim c as new CalCalendarMBS

c.Title = "Just Testing"

dim e as NSErrorMBS
if cs.saveCalendar(c, e) then
MsgBox "OK"
else
MsgBox "Failed "+e.LocalizedDescription
end if
```

Notes: The saveCalendar and the removeCalendar calendars allow the client to add, modify, and remove calendars in the user's calendar store. saveCalendar should be used both to add a new calendar to the calendar store, and to modify a calendar already in the store.

The only calendars that can be added with this API are local calendars; it is not possible to add subscribed or CalDAV calendars, or the birthday calendar.

Changes made to a CalCalendar are not persisted until that calendar has been passed to saveCalendar. If saveCalendar is not called, the changes will be lost.

6.5.19 saveEvent(theEvent as CalEventMBS, span as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: This method allows the client to add or modify events in the user's calendar store.
Notes: This method should be used both to add a new event to the calendar store, and to modify an event already in the calendar store.
If the event being saved is a repeating event, the second argument is used to describe whether the change being made should apply to future occurrences of that event, all occurrences, or only this instance. This is analogous to options on the dialog iCal presents when a user modifies a recurring event (though iCal's UI does not provide a way to change all events, past and present).

Changes made to a CalEvent are not persisted until that event has been passed to saveEvent. If saveEvent is not called, the changes will be lost.

Applying changes to all events or all future events may cause the UID or the occurrence date of the event to change.

6.5.20 saveTask(task as CalTaskMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Saves the specified task to the calendar store.
Example:

```
dim s as new CalCalendarStoreMBS
dim t as new CalTaskMBS
dim a() as CalCalendarMBS = s.calendars
dim d as new date
```

```
d.Month = d.Month + 1

t.calendar = a(0)
t.Title = "Test"
t.URL = "http://www.mbsplugins.de/"
t.priority = t.CalPriorityMedium
t.dueDate = d
t.notes = "just a test"
t.isCompleted = false

dim e as NSErrorMBS
if s.saveTask(t, e) then
MsgBox "saved"
else
MsgBox "failed to save"
end if
```

Notes: task: The task to save.
error: If this method returns false, an NSError object describing the error.

Returns true on success; otherwise, returns false and sets the error argument to an NSError object describing the error.

Use this method to save new task objects and modifications to existing task objects. Changes to task objects are not persistent until this method is invoked. The calendar property needs to be set before attempting to save a task.

Available in Mac OS X v10.5 and later.

6.5.21 tasks as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks.
Notes: This is the function which uses all calendars.
See also:

- 6.5.22 tasks(calendar as CalCalendarMBS) as CalTaskMBS() 175
- 6.5.23 tasks(calendars() as CalCalendarMBS) as CalTaskMBS() 175

6.5.22 tasks(calendar as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
See also:

- 6.5.21 tasks as CalTaskMBS() 174
- 6.5.23 tasks(calendars() as CalCalendarMBS) as CalTaskMBS() 175

6.5.23 tasks(calendars() as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
See also:

- 6.5.21 tasks as CalTaskMBS() 174
- 6.5.22 tasks(calendar as CalCalendarMBS) as CalTaskMBS() 175

6.5.24 TasksCompletedSince(completedSince as date) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
Notes: This is the function which uses all calendars.
See also:

- 6.5.25 TasksCompletedSince(completedSince as date, calendar as CalCalendarMBS) as CalTaskMBS() 175
- 6.5.26 TasksCompletedSince(completedSince as date, calendars() as CalCalendarMBS) as CalTaskMBS() 176

6.5.25 TasksCompletedSince(completedSince as date, calendar as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
See also:

- 6.5.24 TasksCompletedSince(completedSince as date) as CalTaskMBS() 175
- 6.5.26 TasksCompletedSince(completedSince as date, calendars() as CalCalendarMBS) as CalTaskMBS() 176

6.5.26 TasksCompletedSince(completedSince as date, calendars() as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
See also:

- 6.5.24 TasksCompletedSince(completedSince as date) as CalTaskMBS() 175
- 6.5.25 TasksCompletedSince(completedSince as date, calendar as CalCalendarMBS) as CalTaskMBS() 175

6.5.27 taskWithUID(UID as string) as CalTaskMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Searches the task with the given unique ID.
Notes: Returns nil on any error.

6.5.28 UncompletedTasks as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
Example:

```
dim c as new CalCalendarStoreMBS

dim ta() as CalTaskMBS = c.UncompletedTasks

for each ct as CalTaskMBS in ta
msgbox ct.Title+EndOfLine+str(ct.priority)+EndOfLine+ct.dueDate.LongDate
next
```

Notes: This is the function which uses all calendars.
See also:

- 6.5.29 UncompletedTasks(calendar as CalCalendarMBS) as CalTaskMBS() 176
- 6.5.30 UncompletedTasks(calendars() as CalCalendarMBS) as CalTaskMBS() 177

6.5.29 UncompletedTasks(calendar as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
See also:

- 6.5.28 UncompletedTasks as CalTaskMBS() 176
- 6.5.30 UncompletedTasks(calendars() as CalCalendarMBS) as CalTaskMBS() 177

6.5.30 UncompletedTasks(calendars() as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
See also:

- 6.5.28 UncompletedTasks as CalTaskMBS() 176
- 6.5.29 UncompletedTasks(calendar as CalCalendarMBS) as CalTaskMBS() 176

6.5.31 UncompletedTasksDueBefore(dueDate as date) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
Notes: This is the function which uses all calendars.
See also:

- 6.5.32 UncompletedTasksDueBefore(dueDate as date, calendar as CalCalendarMBS) as CalTaskMBS() 177
- 6.5.33 UncompletedTasksDueBefore(dueDate as date, calendars() as CalCalendarMBS) as CalTaskMBS() 178

6.5.32 UncompletedTasksDueBefore(dueDate as date, calendar as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
See also:

- 6.5.31 UncompletedTasksDueBefore(dueDate as date) as CalTaskMBS() 177
- 6.5.33 UncompletedTasksDueBefore(dueDate as date, calendars() as CalCalendarMBS) as CalTaskMBS() 178

6.5.33 UncompletedTasksDueBefore(dueDate as date, calendars() as CalCalendarMBS) as CalTaskMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This method returns an array of all the CalTasks which match the condition.
See also:

- 6.5.31 UncompletedTasksDueBefore(dueDate as date) as CalTaskMBS() 177
- 6.5.32 UncompletedTasksDueBefore(dueDate as date, calendar as CalCalendarMBS) as CalTaskMBS() 177

6.5.34 Properties

6.5.35 Handle as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The internal used CalCalendarStore reference.
Notes: (Read and Write property)

6.5.36 Events

6.5.37 CalendarsChanged(Externally as boolean, InsertedRecords() as string, UpdatedRecords() as string, DeletedRecords() as string)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: The event being called when some calendars changed.
Notes: The Calendar Store frameworks posts notifications when any application, including yours, makes changes to the user's calendar data.

Externally is true if this changes are not made by your application.

The three events give you the unique IDs of the calendars which have been inserted, updated or modified.

If all three arrays are nil/empty, that indicates everything has changed, and the client should refresh the calendar, event, and task information currently being used. Since this tends to be an expensive and inconvenient operation, it will only occur under unusual circumstances, such as when restoring from backup.

6.5.38 EventsChanged(Externally as boolean, InsertedRecords() as string, UpdatedRecords() as string, DeletedRecords() as string)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: The event being called when some events changed.
Notes: The Calendar Store frameworks posts notifications when any application, including yours, makes changes to the user's calendar data.

Externally is true if this changes are not made by your application.

The three events give you the unique IDs of the events which have been inserted, updated or modified.

If all three arrays are nil/empty, that indicates everything has changed, and the client should refresh the calendar, event, and task information currently being used. Since this tends to be an expensive and inconvenient operation, it will only occur under unusual circumstances, such as when restoring from backup.

6.5.39 TasksChanged(Externally as boolean, InsertedRecords() as string, UpdatedRecords() as string, DeletedRecords() as string)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: The event being called when some tasks changed.
Notes: The Calendar Store frameworks posts notifications when any application, including yours, makes changes to the user's calendar data.

Externally is true if this changes are not made by your application.

The three events give you the unique IDs of the tasks which have been inserted, updated or modified.

If all three arrays are nil/empty, that indicates everything has changed, and the client should refresh the calendar, event, and task information currently being used. Since this tends to be an expensive and inconvenient operation, it will only occur under unusual circumstances, such as when restoring from backup.

6.5.40 Constants

Constants

Constant	Value	Description
CalSpanAllEvents	2	One of the Calendar Span constants.
CalSpanFutureEvents	1	One of the Calendar Span constants.
CalSpanThisEvent	0	One of the Calendar Span constants.

6.6 class CalEventMBS

6.6.1 class CalEventMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKEventMBS instead.
Function: The class to handle events in iCal.
Example:

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new event
dim c as new CalEventMBS

// set properties
dim calendars() as CalCalendarMBS = s.calendars
c.Title="new Event"
c.startDate=new date
c.calendar=calendars(0) // add to first calendar

dim d as new date
d.hour=d.hour+1
c.endDate=d

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New event was created."
end if
```

Notes: Requires Mac OS X 10.5 to work.
Subclass of the CalCalendarItemMBS class.
Blog Entries

- MBS Xojo Plugins, version 19.6pr4

- MBS Xojo Plugins, version 19.4pr7

6.6.2 Methods

6.6.3 attendees as CalAttendeeMBS()

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The attendees for this event.
Notes: It is not possible to modify an event's attendees in Mac OS X 10.5.

6.6.4 Constructor

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The constructor to which creates a new event.
Example:

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

// create a new event
dim c as new CalEventMBS

// set properties
dim calendars() as CalCalendarMBS = s.calendars
c.Title="new Event"
c.startDate=new date
c.calendar=calendars(0) // add to first calendar

dim d as new date
d.hour=d.hour+1
c.endDate=d

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New event was created."
end if
```

Notes: The calendar property must be set before calling saveTask on a new task.

6.6.5 setEndDate(d as date, tz as NSTimeZoneMBS)

Plugin Version: 19.4, Platform: macOS, Targets: Desktop only.

Function: Sets the end date with given time zone.
Example:

```
Dim d As new date
Dim tz As NSTimeZoneMBS = NSTimeZoneMBS.localTimeZone
Dim e As New CalEventMBS

e.setEndDate d, tz
```

Notes: The client is responsible for making sure they never attempt to save an event with a start date that occurs after the endDate, or an endDate that occurs before the startDate. Calling saveEvent: on an improperly configured event will fail.

6.6.6 setStartDate(d as date, tz as NSTimeZoneMBS)

Plugin Version: 19.4, Platform: macOS, Targets: Desktop only.

Function: Sets the start date with given time zone.
Example:

```
Dim Today As New date

Dim cal As New CalCalendarStoreMBS
Dim e As New CalEventMBS
Dim error As NSErrorMBS

Dim sDate As New Date
Dim eDate As New Date

sDate.Year=Today.Year
sDate.Month=Today.Month
sDate.Day=Today.Day
sDate.Hour=8
sDate.Minute=0
sDate.Second=0

eDate.Year=Today.Year
eDate.Month=Today.Month
eDate.Day=Today.Day
eDate.Hour=8
eDate.Minute=15
eDate.Second=0
```

```
Dim tz As NSTimeZoneMBS = NSTimeZoneMBS.systemTimeZone
e.setStartDate(sDate, tz)
e.setEndDate(eDate, tz)
e.Title = "Hello World"
e.calendar = cal.calendarWithTitle("Private") // put valid calendar name here

If cal.saveEvent(e,cal.CalSpanAllEvents,error) Then
'MainWindow.NotePlayer1.Instrument=Globals.RDV_SOUND
'MainWindow.NotePlayer1.PlayNote(60,60)
MsgBox "OK"
Else
MsgBox "Failed: "+error.localizedDescription
End If
```

Notes: The client is responsible for making sure they never attempt to save an event with a start date that occurs after the endDate, or an endDate that occurs before the startDate. Calling saveEvent: on an improperly configured event will fail.

6.6.7 Properties

6.6.8 endDate as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The end date.
Example:

```
dim e as CalEventMBS
msgbox e.endDate.longdate+" "+e.endDate.longtime
```

Notes: The client is responsible for making sure they never attempt to save an event with a start date that occurs after the endDate, or an endDate that occurs before the startDate. Calling saveEvent: on an improperly configured event will fail.
(Read and Write property)

6.6.9 isAllDay as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Whether this event is all day.

Notes: True for all day events.
(Read and Write property)

6.6.10 isDetached as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Whether this event is detached.
Notes: These properties are only meaningful for CalEvents which are instances of a repeating event.

If this CalEvent is an instance of a repeating event, and an attribute of this CalEvent has been changed to from the default value generated by the repeating event, isDetached will return true. If the CalEvent is unchanged from its default state, or is not a repeating event, isDetached returns false.
(Read only property)

6.6.11 location as string

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The location of this event.
Example:

```
dim c as new CalCalendarStoreMBS

// set the date range where we look for event
dim sd as new date(2016,6,7,0,0,0)
dim ed as new date(2016,6,7,23,59,59)

// look for an event on that date
dim a() as CalEventMBS = c.events(sd,ed, c.calendars)
dim e as CalEventMBS = a(1)

// show location
MsgBox e.location

// change it
e.location = "Hamburg"

// check again
MsgBox e.location

// Save
dim error as NSErrorMBS
dim ok as Boolean = c.saveEvent(e, c.CalSpanThisEvent, error)
```

```
if ok then
MsgBox "OK"
elseif error <>nil then
MsgBox error.LocalizedDescription
else
MsgBox "Failed."
end if
```

Notes: (Read and Write property)

6.6.12 occurrence as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The ocurrences of this event.
Notes: These properties are only meaningful for CalEvents which are instances of a repeating event.

Returns the occurrence date of a CalEvent. Since all instances of a repeating event have the same UID, we need another way to differentiate between those CalEvents. This method returns the NSDate on which this event was originally scheduled to occur. This value will remain the same even if the event has been detached and its start date has changed. For CalEvents not part of a repeating pattern, this method will return the same value as startDate.
(Read only property)

6.6.13 recurrenceRule as CalRecurrenceRuleMBS

Plugin Version: 8.4, Platform: macOS, Targets: Desktop only.

Function: The recurrence rule for this event.
Example:

```
// create a recurrence event:

dim c as new CalCalendarStoreMBS
dim e as new CalEventMBS
dim error as NSErrorMBS
dim s as string
dim ed as new date
dim rule as CalRecurrenceRuleMBS
dim rend as CalRecurrenceEndMBS

ed.day=21
```

```
ed.Month=7
ed.Year=2008

e.endDate=ed

dim sd as new date

sd.day=18
sd.Month=7
sd.Year=2008

e.startDate=sd
e.isAllDay=true
e.location="Example Location"

rule=CalRecurrenceRuleMBS.initYearlyRecurrence(1,nil)

dim calendars() as CalCalendarMBS = c.calendars
e.Title="Example Title"
e.calendar=calendars(0) // pick first calendar
e.notes="Example Notes"
e.URL="http://www.monkeybreadsoftware.de"
e.recurrenceRule=rule


if c.saveEvent(e, c.CalSpanAllEvents, error) then
if error<>Nil then s=error.localizedDescription
MsgBox "OK"+EndOfLine+s
else
if error<>Nil then s=error.localizedDescription
MsgBox "Failed"+EndOfLine+s
end if
```

Notes: Set to nil to remove recurrence rule.
(Read and Write property)

6.6.14 startDate as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The start date.
Example:

```
dim e as CalEventMBS
msgbox e.startDate.longdate+" "+e.startDate.longtime
```

Notes: The client is responsible for making sure they never attempt to save an event with a start date that occurs after the endDate, or an endDate that occurs before the startDate. Calling saveEvent: on an improperly configured event will fail.
(Read and Write property)

6.7 class CalNthWeekDayMBS

6.7.1 class CalNthWeekDayMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKRecurrenceDayOfWeekMBS instead. **Function:** CalNthWeekDay specifies the nth instance of a particular day of the week, such as the third Tuesday of every month.
Notes: Requires Mac OS X 10.5 to work.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

6.7.2 Methods

6.7.3 Constructor

Plugin Version: 13.1, Platform: macOS, Targets: Desktop only.

Function: The private constructor.

6.7.4 Properties

6.7.5 dayOfTheWeek as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The day of the week.
Notes: Valid values for dayOfTheWeek are integers 1-7, which correspond to days of the week with Sunday = 1.
(Read only property)

6.7.6 weekNumber as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The week number.
Notes: Valid values for weekNumber portion are 1, 2, 3, 4, or -1, where a value of -1 indicates the last week.
(Read only property)

6.8 class CalRecurrenceEndMBS

6.8.1 class CalRecurrenceEndMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKRecurrenceEndMBS instead. **Function:** The class to specify the end of a recurring calendar event.
Notes: CalRecurrenceEnd is an attribute of CalRecurrenceRule that defines how long the recurrence is scheduled to repeat.

The recurrence can be defined either with an integer that indicates the total number times it repeats, or with a date, after which it no longer repeats. An event which is set to never end should have its CalRecurrenceEnd set to nil.

If the end of the pattern is defines with a date, the client must pass a valid date, nil cannot be passed. If the end of the pattern is defined as terms of a number of occurrences, the occurrenceCount passed to the initializer must be positive, it cannot be 0. If the client attempts to initialize a CalRecurrenceEnd with a nil date or OccurrenceCount of 0, an exception is raised.

A CalRecurrenceEnd initialized with an end date will return 0 for occurrenceCount. One initialized with a number of occurrences will return nil for its endDate.

Requires Mac OS X 10.5 to work.

6.8.2 Methods

6.8.3 Constructor(endDate as date)

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The constructor for a new recurrence end based on an end date.
See also:

- 6.8.4 Constructor(occurrenceCount as Integer) 190

6.8.4 Constructor(occurrenceCount as Integer)

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The constructor for a new recurrence end based on an occurrence count.
See also:

6.8.5 Properties

6.8.6 endDate as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The end date.
Notes: This property is read only.
(Read only property)

6.8.7 occurrenceCount as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The occurrence count.
Notes: This property is read only.
(Read only property)

6.8.8 usesEndDate as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Whether the end date is used.
Notes: This property is read only.
(Read only property)

6.9 class CalRecurrenceRuleMBS

6.9.1 class CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKRecurrenceRuleMBS instead. **Function:** The class for the recurrence rules.
Example:

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

dim r as CalRecurrenceRuleMBS = CalRecurrenceRuleMBS.initYearlyRecurrence(1, nil) // repeat every year without end

dim a as new CalAlarmMBS // add alarm
a.action = a.CalAlarmActionDisplay
a.relativeTrigger = -3600*24 // 24 Hours before

// create a new calendar
dim c as new CalEventMBS

dim d as new date(2011, 04, 20) // the date

// set properties
dim calendars() as CalCalendarMBS = s.calendars
c.Title="Test Birthday"
c.startDate=d
c.recurrenceRule = r
c.calendar=calendars(1) // add to second calendar
c.addAlarm(a)
c.endDate = d
c.isAllDay = true

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New event was created."
end if
```

Notes: Requires Mac OS X 10.5 to work.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

6.9.2 Methods

6.9.3 Constructor

Plugin Version: 13.1, Platform: macOS, Targets: Desktop only.

Function: The private constructor.

6.9.4 daysOfTheMonth as Integer()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This property can be accessed as an array containing one or more integers corresponding to the days of the month the event recurs.
Notes: This property is valid for rules whose CalRecurrenceType is CalMonthlyRecurrence, and that were initialized with one or more specific days of the month (not with a day of the week and week of the month).

For all other CalRecurrenceRules, this property is empty.

6.9.5 daysOfTheWeek as Integer()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This property can be accessed as an array containing one or more integers corresponding to the days of the week the event recurs.
Notes: This property is valid for rules whose CalRecurrenceType is CalWeeklyRecurrence. For all other CalRecurrenceRules, this property is empty.

6.9.6 initDailyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Daily Recurrence initializer.
Notes: Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every

week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each CalRecurrenceType which take only these two parameters.

6.9.7 initMonthlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Monthly Recurrence initializer.
Notes: This initializer allows the client to specify a repeating monthly pattern in terms of a day of the week and a week of the month that the even repeats. An example is an event that recurs the first Monday of every month.

Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each CalRecurrenceType which take only these two parameters.

Valid values for days of the week are integers 1-7, which correspond to days of the week with Sunday = 1.
Valid values for weeks of the month are integers 1-4 and -1, which is used to indicate the last week of the month.
See also:

- 6.9.8 initMonthlyRecurrence(interval as Integer, DaysOfTheMonth() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 194
- 6.9.9 initMonthlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 195

6.9.8 initMonthlyRecurrence(interval as Integer, DaysOfTheMonth() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Monthly Recurrence initializer.
Notes: This initializer allows the client to specify multiple days of the month that an event will recur. This method should be used to initialize events that occur more than once a month, in a set monthly pattern.

Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every

week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each CalRecurrenceType which take only these two parameters.

Valid values for days of the month are integers 1-31.
See also:

- 6.9.7 initMonthlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 194
- 6.9.9 initMonthlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 195

6.9.9 initMonthlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Monthly Recurrence initializer.
Notes: Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each CalRecurrenceType which take only these two parameters.
See also:

- 6.9.7 initMonthlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 194
- 6.9.8 initMonthlyRecurrence(interval as Integer, DaysOfTheMonth() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 194

6.9.10 initWeeklyRecurrence(interval as Integer, DaysOfTheWeek() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Weekly Recurrence initializers.
Notes: This initializer allows the client to specify multiple days of the week that an event will recur. This initializer should be used to initialize events that occur more than once a week, in a set weekly pattern.

Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple

initializers for each CalRecurrenceType which take only these two parameters.

Valid values for days of the week are integers 1-7, which correspond to days of the week with Sunday = 1.
See also:

- 6.9.11 initWeeklyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 196

6.9.11 initWeeklyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Weekly Recurrence initializers.
Notes: Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each CalRecurrenceType which take only these two parameters.
See also:

- 6.9.10 initWeeklyRecurrence(interval as Integer, DaysOfTheWeek() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 195

6.9.12 initYearlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Yearly Recurrence initializer.
Notes: This initializer allows the client to specify multiple months of the year that an event will recur. This method should be used to initialize events that recur on the same day of the week, in the same week of a month, of possibly more than one month a year, in a set yearly pattern. An example is an event that occurs every year on the last Friday of sixth and twelfth months.

Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each CalRecurrenceType which take only these two parameters.

Valid values for days of the week are integers 1-7, which correspond to days of the week with Sunday = 1.
Valid values for weeks of the month are integers 1-4 and -1, which is used to indicate the last week of the

month.
Valid values for months of the year are integers 1-12, which correspond to months of the year with January = 1.
See also:

- 6.9.13 initYearlyRecurrence(interval as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 197
- 6.9.14 initYearlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 197

6.9.13 initYearlyRecurrence(interval as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Yearly Recurrence initializer.
Notes: This initializer allows the client to specify multiple months of the year that an event will recur. This method should be used to initialize events that occur on the same date, in more than month a year, in a set monthly pattern. An example is an event that occurs every year on the first day of the first and seventh months.

Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each CalRecurrenceType which take only these two parameters.

Valid values for months of the year are integers 1-12, which correspond to months of the year with January = 1.
See also:

- 6.9.12 initYearlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 196
- 6.9.14 initYearlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 197

6.9.14 initYearlyRecurrence(interval as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Yearly Recurrence initializer.
Example:

```
// create a recurrence event:

dim c as new CalCalendarStoreMBS
dim e as new CalEventMBS
dim error as NSErrorMBS
dim s as string
dim ed as new date
dim rule as CalRecurrenceRuleMBS
dim rend as CalRecurrenceEndMBS

ed.day=21
ed.Month=7
ed.Year=2008

e.endDate=ed

dim sd as new date

sd.day=18
sd.Month=7
sd.Year=2008

e.startDate=sd
e.isAllDay=true
e.location="Example Location"

rule=CalRecurrenceRuleMBS.initYearlyRecurrence(1,nil)

dim calendars() as CalCalendarMBS = c.calendars
e.Title="Example Title"
e.calendar=calendars(0) // pick first calendar
e.notes="Example Notes"
e.URL="http://www.monkeybreadsoftware.de"
e.recurrenceRule=rule


if c.saveEvent(e, c.CalSpanAllEvents, error) then
if error<>Nil then s=error.localizedDescription
MsgBox "OK"+EndOfLine+s
else
if error<>Nil then s=error.localizedDescription
MsgBox "Failed"+EndOfLine+s
end if
```

Notes: Two parameters are included in every CalRecurrenceRule initializer. The first is the interval, which is described above and indicates how many CalRecurrenceTypes make up the period of the recurrence (every

week, every other week, etc.). The second is a CalRecurrenceEnd, which describes when the CalRecurrenceRule ends. If valid values for these two parameters are not included, nil is returned. There are simple initializers for each CalRecurrenceType which take only these two parameters.
See also:

- 6.9.12 initYearlyRecurrence(interval as Integer, DayOfTheWeek as Integer, WeekOfTheMonth as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 196
- 6.9.13 initYearlyRecurrence(interval as Integer, MonthsOfTheYear() as Integer, RecurrenceEnd as CalRecurrenceEndMBS) as CalRecurrenceRuleMBS 197

6.9.15 monthsOfTheYear as Integer()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This property can be accessed as an array containing one or more integer corresponding to the months of the year the event recurs.
Notes: This property is valid for rules whose CalRecurrenceType is CalYearlyRecurrence. For all other CalRecurrenceRules, this property is empty.

6.9.16 nthWeekDaysOfTheMonth as CalNthWeekDayMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This property can be accessed as an array containing exactly one CalNthWeekDay corresponding to the week of the month the event recurs.
Notes: This property is valid for rules whose CalRecurrenceType is CalMonthlyRecurrence or CalYearlyRecurrence, and that were initialized with a day of the week and week of the month. For all other CalRecurrenceRules, this property is empty.

6.9.17 Properties

6.9.18 firstDayOfTheWeek as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The first day of the week.
Notes: Recurrence patterns can specify which day of the week should be treated as the first day. Possible values for this property are integers 0 and 1-7, which correspond to days of the week with Sunday = 1. Zero indicates that the property is not set for this recurrence. he first day of the week only affects the way the recurrence is expanded for weekly recurrence patterns with an interval greater than 1. For those types of recurrence patterns, the CalendarStore framework will set firstDayOfTheWeek to be 2 (Monday). In all other cases, this property will be set to zero. The iCalendar spec stipulates that the default value is Monday

if this property is not set.
(Read only property)

6.9.19 Handle as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The internal used CalRecurrenceRule reference.
Notes: (Read and Write property)

6.9.20 recurrenceEnd as CalRecurrenceEndMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: This property defines when the the repeating event is scheduled to end.
Notes: The end date can be specified by a number of occurrences, or with an end date.
Value can be nil.
This is a read only property.
(Read only property)

6.9.21 recurrenceInterval as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Specifies how often the rule repeats over the given recurrence type.
Notes: An interval of 1 indicates that the event repeats every time unit, while an interval of 2 indicates that the repetition occurs in every other unit, etc.

This is a read only property.
(Read only property)

6.9.22 recurrenceType as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: This property designates the unit of time used to describe the recurrence pattern.
Notes: CalRecurrenceType designates the unit of time used to describe the recurrence. It has four possible values, which correspond to recurrence rules that are defined in terms of days, weeks, months, and years.

The interval of a CalRecurrenceRule is an Integer which specifies how often the recurrence rule repeats over

the unit of time described by the CalRecurrenceType. For example, if the CalRecurrenceType is CalWeeklyRecurrence, then an interval of 1 means the pattern is repeated every week. A NSUInteger of 2 indicates it is repeated every other week, 3 means every third week, and so on. The Integer must be a positive integer; 0 is not a valid value, and nil will be returned if the client attempts to initialize a rule with a negative or zero interval.

Together, CalRecurrenceType and interval define how often the CalRecurrenceRule's pattern repeats. This is a read only property.
(Read only property)

6.9.23 Constants

Constants

Constant	Value	Description
CalRecurrenceDaily	0	One of the recurrence type constants.
CalRecurrenceMonthly	2	One of the recurrence type constants.
CalRecurrenceWeekly	1	One of the recurrence type constants.
CalRecurrenceYearly	3	One of the recurrence type constants.

6.10 class CalTaskMBS

6.10.1 class CalTaskMBS

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use EKReminderMBS instead.
Function: The class for tasks in iCal.
Example:

```
dim calStore as new CalCalendarStoreMBS
dim err as NSErrorMBS ' needed for the error details
dim newTask as new CalTaskMBS ' create a new reminder

// find existign tasks
dim tasks() as CalTaskMBS = calStore.tasks

// set properties
newTask.Title="new reminder"
newTask.Priority=9
newTask.DueDate=new date
//

newTask.calendar = tasks(0).calendar ' add to first List of reminders

call calStore.saveTask(newTask,err) ' save reminder
if err<>nil then
MsgBox err.localizedDescription
else
MsgBox "New reminder was created."
end if
```

Notes: Requires Mac OS X 10.5 to work.
Subclass of the CalCalendarItemMBS class.

6.10.2 Methods

6.10.3 Constructor

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The constructor to create a new empty task.
Example:

```
dim s as new CalCalendarStoreMBS
```

```
dim t as new CalTaskMBS
dim a() as CalCalendarMBS = s.calendars
dim d as new date

d.Month = d.Month + 1

t.calendar = a(0)
t.Title = "Test"
t.URL = "http://www.mbsplugins.de/"
t.priority = t.CalPriorityMedium
t.dueDate = d
t.notes = "just a test"
t.isCompleted = false

dim e as NSErrorMBS
if s.saveTask(t, e) then
MsgBox "saved"
else
MsgBox "failed to save"
end if
```

Notes: The calendar property must be set before calling saveTask on a new task.

6.10.4 Properties

6.10.5 completedDate as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The date the task was completed.
Notes: The properties isCompleted and CompletedDate are inextricably linked. Setting isCompleted to be true, will set the completedDate to be now, and setting any completedDate will change isCompleted to be true. Similarly, setting isCompleted to be false will set the completedDate to be nil, and setting the completedDate changes isCompleted to false.
(Read and Write property)

6.10.6 dueDate as date

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The date the task is due.
Example:

```
dim c as new CalCalendarStoreMBS

dim i,count as Integer
dim ta() as CalTaskMBS
dim ct as CalTaskMBS

ta=c.UncompletedTasks
for each ct in ta
msgbox ct.Title+EndOfLine+str(ct.priority)+EndOfLine+ct.dueDate.LongDate
next
```

Notes: (Read and Write property)

6.10.7 isCompleted as Boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: Whether the task has been completed.
Notes: The properties isCompleted and CompletedDate are inextricably linked. Setting isCompleted to be true, will set the completedDate to be now, and setting any completedDate will change isCompleted to be true. Similarly, setting isCompleted to be false will set the completedDate to be nil, and setting the completedDate changes isCompleted to false.
(Read and Write property)

6.10.8 priority as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop only.

Function: The priority of this task.
Notes: The iCalendar specification allows priority to be specified with an integer in the range of 0-9, with 0 representing an undefined priority, 1 the highest priority, and 9 the lowest priority. When a user sets the priority to high, medium or low in iCal saves the priority as 1, 5, or 9 respectively. Clients are encouraged to use these values when setting a task's priority, but is is possible to specify any integer value from 0 to 9. In iCal, a task with a priority in the range of 1-4 will show up as high priority, a task with a priority of 5 will be displayed as having medium priority, and 6-9 will be displayed as having a low priority.
(Read and Write property)

6.10.9 Constants

Constants

Constant	Value	Description
CalPriorityHigh	1	One of the constants for the priority property.
CalPriorityLow	9	One of the constants for the priority property.
CalPriorityMedium	5	One of the constants for the priority property.
CalPriorityNone	0	One of the constants for the priority property.

Chapter 7

Cocoa

7.1 control CocoaControlMBS

7.1.1 control CocoaControlMBS

Plugin Version: 8.4, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. **Function:** The control to embed NSViews into a Xojo window.
Notes: Due the way Cocoa event handling works, the keydown event handler (and others) do not work with this control. To actually get an event, you'd have to use a subclass of CustomNSViewMBS and handle events there. In the CustomNSViewMBS you add the actual view you like to have. So all events not handled by this view, fall through to your CustomNSViewMBS.
On Carbon the RS framework intercepts events and calls keydown event.
Requires the window being composite for Carbon targets which is currently not available for modal windows in Xojo.
Blog Entries

- MBS Xojo Plugins, version 22.4pr4
- MBS Xojo / Real Studio Plugins, version 15.0pr7
- MBS Xojo / Real Studio Plugins, version 13.4pr4
- MBS Xojo / Real Studio Plugins, version 13.2pr5
- MBS Real Studio Plugins, version 13.1pr16
- MBS Real Studio Plugins, version 13.0pr1
- Adding NSDatePickerMBS class.
- Using NSTextViewMBS
- MBS REALbasic plug-in 9.6

Xojo Developer Magazine

- 14.4, page 23: NSTabula Rasa, What to do when your new sports car arrives in parts by Ulrich Bogun

7.1.2 Properties

7.1.3 Available as Boolean

Plugin Version: 8.4, Platform: macOS, Targets: Desktop only.

Function: Whether this control can work.
Notes: Returns true on Mac OS X 10.5 (or newer) and false on any other OS.
(Read only property)

7.1.4 View as NSViewMBS

Plugin Version: 8.4, Platform: macOS, Targets: Desktop only.

Function: The view used with this control.
Notes: You define this view in the GetView event.
(Read only property)

7.1.5 WantsFocus as Boolean

Plugin Version: 13.2, Platform: macOS, Targets: Desktop only.

Function: Whether this control wants to have focus.
Notes: By default this is true.
(Read and Write property)

7.1.6 Events

7.1.7 Close

Plugin Version: 8.4, Platform: macOS, Targets: .

Function: The control is about to close.

7.1.8 ConstructContextualMenu(base as MenuItem, x as Integer, y as Integer) as Boolean

Plugin Version: 22.1, Platform: macOS, Targets: .

Function: This event is called when it is appropriate to display a contextual menu for the control.

7.1.9 ContextualMenuAction(hitItem as MenuItem) as Boolean

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: Called when a menuitem is choosen.
Notes: This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

7.1.10 EnableMenuItems

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The event where you can enable menu items.

7.1.11 GetView as NSViewMBS

Plugin Version: 8.4, Platform: macOS, Targets: .

Function: Asks your application which NSView should be used.
Example:

```
// an example on how to use this event:

Function GetView() As NSViewMBS
dim n as NSTextViewMBS

// create a textview:

n=new NSTextViewMBS(0, 0, CocoaControlMBS1.Width, CocoaControlMBS1.Height)
n.ContinuousSpellCheckingEnabled=true
Return n

End Function
```

Notes: Return a NSView setup as you like.

You may also want to keep a reference to the view you use for easier access.

7.1.12 MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The mouse button was pressed inside the control,Äôs region at the location passed in to x, y.
Notes: The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner or the Control.
Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

7.1.13 MouseDrag(x as Integer, y as Integer)

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: This event fires continuously after the mouse button was pressed inside the Control.
Notes: Mouse location is local to the control passed in to x, y.
As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

7.1.14 MouseUp(x as Integer, y as Integer)

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The mouse button was released.
Notes: Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

7.1.15 Open

Plugin Version: 8.4, Platform: macOS, Targets: .

Function: The control is about to was created and you can initialize it.

7.1.16 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The backing store scale factor has changed.
Notes: Please invalidate any cached bitmaps or other relevant state.

7.2 module DictionaryServiceMBS

7.2.1 module DictionaryServiceMBS

Plugin Version: 7.7, Platform: macOS, Targets: All.

Function: The Dictionary Services module.
Notes: Dictionary Services provides functions that let you access dictionaries programmatically from within your application.

A dictionary is any look-up reference that is built using the Dictionary Development Kit. The contents of a dictionary can serve many purposes. The most typical use is to provide definitions for a single language, but you can create content for a thesaurus, bilingual dictionaries (such as English-Japanese), in-house glossaries, and professional dictionaries (such as legal, medical, and technical).

Available in Mac OS X v10.5 and later.

7.2.2 Methods

7.2.3 GetTermRangeInString(text as string, offset as Integer=0) as boolean

Plugin Version: 7.7, Platform: macOS, Targets: All.

Function: Determines the range of the longest word or phrase with respect to an offset.
Notes: text: Text that contains the word or phrase to look up.
offset: A character offset in the textString parameter.

Return Value

The range that specifies the location, around the specified offset, of the word or phrase, or the value -1. The range is stored in the RangePosition and RangeLength properties and the function returns true. On any error it returns false.

You can use this function to determine the range of text that contains a word or phrase. After you determine the range, you can pass the result to the functions TextDefinition and Show.

To see how this works, follow these steps:
In Mac OS X v10.5 or later, open Text Edit.
Type It is a foggy day in San Francisco, California.
Control-click Francisco (don't select it). Then, choose "Lookup in Dictionary".

Note that the Dictionary window appears with a definition of San Francisco. The function GetTermRangeInString automatically detected the range of the phrase San Francisco, using Francisco as the text string to search for and a character offset in this string. The function expanded the range until it found a possible match.

You can also point the cursor at the word Francisco and, without making a selection or clicking, type Command-Control-D. GetTermRangeInString detects the range.

The function GetTermRangeInString only returns the range. You must call TextDefinition to copy the definition and Show to display the definition in a Dictionary window.

Available in Mac OS X v10.5 and later.

7.2.4 RangeLength as Integer

Plugin Version: 7.7, Platform: macOS, Targets: All.

Function: The length from the range.
Notes: This value set by the GetTermRangeInString function.
(Read and Write computed property)

7.2.5 RangePosition as Integer

Plugin Version: 7.7, Platform: macOS, Targets: All.

Function: The position from the range.
Notes: This value set by the GetTermRangeInString function.
(Read and Write computed property)

7.2.6 Show(text as string, start as Integer = 0, length as Integer = 0, textOriginX as Double = 0, textOriginY as Double = 0) as boolean

Plugin Version: 7.7, Platform: macOS, Targets: All.

Function: Displays dictionary search result in a dictionary window.
Notes: text: Text that contains the word or phrase to look up.

start and length:
If you are using this function to show the results associated with text selected by the user, then provide the selection range of the textString parameter. If you are using this function to show the results associ-

ated with calling the DCSGetTermRangeInString function, then provide the range returned by that function.

This function opens a window to display the definition of a word or phrase.

Available in Mac OS X v10.5 and later.

7.2.7 TextDefinition(text as string, position as Integer=0, length as Integer=0) as string

Plugin Version: 7.7, Platform: macOS, Targets: All.

Function: Returns the definition associated with the provided text range.
Notes: text: Text that contains the word or phrase to look up.

position and length: A range that specifies the location of the word or phrase in the textString parameter. If text string exactly specifies the word or phrase that you want to look up, you can pass the range of the text string. For example, for the word make, you would pass (0,4) to specify the range.

If the textString parameter contains the word or phrase, but does not specify it exactly, then pass the range returned by the function GetTermRangeInString.

Return Value:
The definition of the word or phrase, as plain text. The returned text does not contain any elements that are marked with a priority attribute whose value is 2.

This function returns the description of the first matching record found in the the active dictionaries. It searches first in the default word definition dictionary which, in the English environment, is the Oxford dictionary.

Available in Mac OS X v10.5 and later.

7.3 class NSAnimationContextMBS

7.3.1 class NSAnimationContextMBS

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: The Cocoa class for the context of a NSAnimation.
Notes: Available in Mac OS X v10.5 and later.
Blog Entries

- MBS Xojo Plugins, version 21.3pr1

7.3.2 Methods

7.3.3 beginGrouping

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Creates a new animation grouping.
Notes: Available in Mac OS X v10.5 and later.

7.3.4 Constructor

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Creates a new NSAnimationContextMBS object with the current animation context.
Notes: Available in Mac OS X v10.5 and later.

7.3.5 currentContext as NSAnimationContextMBS

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Returns the current animation context.
Notes: Available in Mac OS X v10.5 and later.

7.3.6 endGrouping

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Ends the current animation grouping.
Notes: Available in Mac OS X v10.5 and later.

7.3.7 Properties

7.3.8 allowsImplicitAnimation as Boolean

Plugin Version: 21.3, Platform: macOS, Targets: All.

Function: Determine if animations are enabled or not for animations that occur as a result of another property change.
Example:

```
dim collectionView as NSCollectionViewMBS // your control

Dim context As NSAnimationContextMBS = NSAnimationContextMBS.currentContext
context.beginGrouping
context.allowsImplicitAnimation = True
context.duration = 0.5

Dim view As Variant = collectionView.animator
Dim animator As NSCollectionViewMBS = view

// scroll to top
Dim itemPaths() As NSIndexPathMBS
itemPaths.Append NSIndexPathMBS.indexPathForItem(0)

animator.scrollToItems(itemPaths, NSCollectionViewMBS.NSCollectionViewScrollPositionTop)

context.endGrouping
```

Notes: The default value is false.
(Read and Write property)

7.3.9 duration as Double

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: The duration used when animating object properties that support animation.
Example:

```
NSAnimationContextMBS.currentContext.duration = 0.5
```

Notes: Any animations that occur as a result of setting the values of animatable properties in the current context will run for this duration.

Available in Mac OS X v10.5 and later.
(Read and Write property)

7.3.10 Handle as Integer

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: The internal reference to the NSAnimationContext object.
Notes: (Read and Write property)

7.4 class NSAnimationMBS

7.4.1 class NSAnimationMBS

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Objects of the NSAnimation class manage the timing and progress of animations in the user interface.
Notes: The class also lets you link together multiple animations so that when one animation ends another one starts. It does not provide any drawing support for animation and does not directly deal with views, targets, or actions.

NSAnimation objects have several characteristics, including duration, frame rate, and animation curve, which describes the relative speed of the animation over its course. You can set progress marks in an animation, each of which specifies a percentage of the animation completed; when an animation reaches a progress mark, it notifies its delegate and posts a notification to any observers. Animations execute in one of three blocking modes: blocking, non-blocking on the main thread, and non-blocking on a separate thread. The non-blocking modes permit the handling of user events while the animation is running.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 13.5pr11

7.4.2 Methods

7.4.3 clearStartAnimation

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Clears linkage to another animation that causes the receiver to start.

7.4.4 clearStopAnimation

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Clears linkage to another animation that causes the receiver to stop.

7.4.5 Constructor(duration as Double, animationCurve as Integer)

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Initializes the object with the specified duration and animation-curve values.
Notes: duration: The number of seconds over which the animation occurs. Specifying a negative number raises an exception.

animationCurve: An NSAnimationCurve constant that describes the relative speed of the animation over its course; if it is zero, the default curve (NSAnimationEaseInOut) is used.

You can always later change the duration of an NSAnimation object by sending it a setDuration: message, even while the animation is running. See "Constants" for descriptions of the NSAnimationCurve constants.

7.4.6 currentValue as Double

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Returns the current value of the effect based on the current progress.

7.4.7 Destructor

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: The destructor.

7.4.8 isAnimating as boolean

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Returns a Boolean value that indicates whether the receiver is currently animating.
Notes: True if the receiver is animating, false otherwise.

7.4.9 startAnimation

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Starts the animation represented by the receiver.
Notes: The receiver retains itself and is then autoreleased at the end of the animation or when it receives stopAnimation. If the blocking mode is NSAnimationBlocking, the method only returns after the animation has completed or the delegate sends it stopAnimation. If the receiver has a progress of 1.0, it starts again at 0.0.

7.4.10 stopAnimation

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: Stops the animation represented by the receiver.
Notes: The current progress of the receiver is not reset. When this method is sent to instances of NSViewAnimation (a subclass of NSAnimation) the receiver moves to the end frame location.

7.4.11 Properties

7.4.12 Handle as Integer

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: The internal reference to the animation object.
Notes: (Read and Write property)

7.4.13 animationBlockingMode as Integer

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: The blocking mode of the receiver.
Notes: A constant representing the blocking mode the animation is next scheduled to run under. See "NSAnimationBlockingMode" for valid values.

If the constant is NSAnimationNonblocking, the animation runs in the main thread in one of the standard run-loop modes or in a mode returned from runLoopModesForAnimating. If animationBlockingMode is NSAnimationNonblockingThreaded, a new thread is spawned to run the animation.

The default mode is NSAnimationBlocking, which means that the animation runs on the main thread in a custom run-loop mode that blocks user events. The new blocking mode takes effect the next time the receiver is started and has no effect on an animation underway.
(Read and Write computed property)

7.4.14 animationCurve as Integer

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: The animation curve the receiver is running under.
Notes: The animation curve describes the relative frame rate over the course of the animation. See NSAnimation* constants.
(Read and Write computed property)

7.4.15 currentProgress as Double

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: The current progress of the receiver.
Notes: The current progress is a value between 0.0 and 1.0 that represents the percentage of the animation currently completed.
(Read and Write computed property)

7.4.16 duration as Double

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: The duration of the animation, in seconds.
Notes: (Read and Write computed property)

7.4.17 frameRate as Double

Plugin Version: 10.0, Platform: macOS, Targets: All.

Function: The frame rate of the animation.
Notes: The frame rate is the number of updates per second. It is not guaranteed to be accurate because of differences between systems on the time needed to process a frame.
(Read and Write computed property)

7.4.18 Events

7.4.19 CurrentProgressChanged(progress as Double)

Plugin Version: 10.0, Platform: macOS, Targets: .

Function: The event called whenever the current value changes.

7.4.20 Constants

Constants

Constant	Value	Description
NSAnimationBlocking	0	One of the constants to indicate the blocking mode of an NSAnimation obj when it is running. Requests the animation to run in the main thread in a custom run-loop mo that blocks user input. This is the default.
NSAnimationEaseIn	1	One of the constants to describe the curve of an animation—that is, the relat speed of an animation from start to finish. Describes an animation that slows down as it reaches the end.
NSAnimationEaseInOut	0	One of the constants to describe the curve of an animation—that is, the relat speed of an animation from start to finish. Describes an S-curve in which the animation slowly speeds up and then slo down near the end of the animation. This constant is the default.
NSAnimationEaseOut	2	One of the constants to describe the curve of an animation—that is, the relat speed of an animation from start to finish. Describes an animation that slowly speeds up from the start.
NSAnimationLinear	3	One of the constants to describe the curve of an animation—that is, the relat speed of an animation from start to finish. Describes an animation in which there is no change in frame rate.
NSAnimationNonblocking	1	One of the constants to indicate the blocking mode of an NSAnimation obj when it is running. Requests the animation to run in a standard or specified run-loop mode th allows user input.
NSAnimationNonblockingThreaded	2	One of the constants to indicate the blocking mode of an NSAnimation obj when it is running. Requests the animation to run in a separate thread that is spawned by t NSAnimation object. The secondary thread has its own run loop.

7.5 class NSAppearanceMBS

7.5.1 class NSAppearanceMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The appearance class.
Notes: An NSAppearance object represents a file that specifies a standard or custom appearance that applies to a subset of UI elements in an app. An app can contain multiple appearance files and—because NSAppearance conforms to NSCoding—you can use Interface Builder to assign UI elements to an appearance.

Typically, you customize a window by using Xcode to create an appearance file that contains the views you want to customize and the custom art that should be applied to them. Xcode transforms the file,Äôs art content into a runtime format that AppKit can draw when the specified views are displayed.

If the art for a specific view can,Äôt be found, AppKit searches for the art in the appearances of the view,Äôs ancestors. A nil appearance means that a view uses the default Aqua appearance; a non-nil appearance means that the view uses an ancestor,Äôs appearance.

When AppKit draws a control, it automatically sets the current appearance on the current thread to the control,Äôs appearance. The current appearance can influence the actual drawing path and the return values you get when you access system fonts and colors. The current appearance also affects the appearance of text and images, such as the text and template images that can be displayed in a toolbar.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Xojo Plugins, version 21.5pr3
- MBS Xojo Plugins, version 20.5pr1
- MBS Xojo Plugins, version 20.3pr10
- MBS Xojo Plugins, version 19.4pr1
- MBS Xojo / Real Studio Plugins, version 16.2pr2
- MBS Xojo / Real Studio Plugins, version 15.1pr7
- New for Mac OS X 10.10 in MBS Xojo Plugins
- MBS Xojo / Real Studio Plugins, version 14.3pr10

7.5.2 Methods

7.5.3 appearance(item as Variant) as NSAppearanceMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The appearance of the receiver, in an NSAppearance object.
Example:

```
dim v as NSViewMBS = PushButton1.NSViewMBS
dim a as NSAppearanceMBS = NSAppearanceMBS.appearance(v)

MsgBox a.name
```

Notes: The default value for this property is nil, which means that the receiver uses the appearance it inherits from the nearest ancestor that has set an appearance. When you set appearance to a non-nil value, the receiver and the views it contains use the specified appearance.

Version 20.5 of MBS Plugin can accept application or NSApplicationMBS objects to query appearance of whole app.

7.5.4 appearanceNamed(name as string) as NSAppearanceMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Returns the NSAppearance object with the specified name.
Notes: name: The name of a standard or custom appearance.
Returns a standard or custom appearance object.

When you specify a standard appearance name—such as NSAppearanceNameAqua—this method returns a built-in appearance. If you specify a custom appearance name, this method searches the main bundle for an appearance file that has the specified name.
Available in OS X v10.9 and later.
See also:

- 7.5.5 appearanceNamed(name as string, bundle as NSBundleMBS) as NSAppearanceMBS 224

7.5.5 appearanceNamed(name as string, bundle as NSBundleMBS) as NSAppearanceMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Creates an NSAppearance object initialized to the specified appearance file in the specified bundle.
Notes: name: The name of the appearance file to search for, without any path information.
bundle: The bundle in which to search for the appearance file. If bundle is nil, this method searches in the main bundle.

Returns an initialized appearance object, or nil if an error occurs.
Available in OS X v10.9 and later.
See also:

- 7.5.4 appearanceNamed(name as string) as NSAppearanceMBS 224

7.5.6 Available as boolean

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Whether this class is available.

7.5.7 Constructor

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The private constructor.

7.5.8 currentAppearance as NSAppearanceMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Returns the NSAppearance object that,Äôs set on the current thread.
Example:

```
MsgBox NSAppearanceMBS.currentAppearance.name
```

Notes: When a UI element draws on the screen, it automatically sets the appearance that it,Äôs using on the current thread.
Available in OS X v10.9 and later.

7.5.9 effectiveAppearance(item as Variant) as NSAppearanceMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The appearance that will be used when the receiver is drawn onscreen, in an NSAppearance object.
Notes: The default value for this property is provided by the nearest ancestor of the receiver that has set an appearance.
You can use this property to ensure that an offscreen view sets the appropriate current appearance when it draws onscreen.

Available in OS X v10.9 and later.

Version 20.5 of MBS Plugin can accept application or NSApplicationMBS objects to query appearance of whole app.

7.5.10 NSAppearanceNameAccessibilityHighContrastAqua as string

Plugin Version: 19.4, Platform: macOS, Targets: Desktop only.

Function: A high-contrast version of the standard light system appearance.
Notes: Don't assign an NSAppearanceMBS object with this type directly to one of your views. Instead, assign a light appearance to your view. AppKit then returns this type when the user enables the Increase Contrast option in the Accessibility system preferences.
Available on MacOS 10.14 or newer.

7.5.11 NSAppearanceNameAccessibilityHighContrastDarkAqua as string

Plugin Version: 19.4, Platform: macOS, Targets: Desktop only.

Function: A high-contrast version of the standard dark system appearance.
Notes: Don't assign an NSAppearanceMBS object with this type directly to one of your views. Instead, assign a dark appearance to your view. AppKit then returns this type when the user enables the Increase Contrast option in the Accessibility system preferences.
Available on MacOS 10.14 or newer.

7.5.12 NSAppearanceNameAccessibilityHighContrastVibrantDark as string

Plugin Version: 19.4, Platform: macOS, Targets: Desktop only.

Function: A high-contrast version of the dark vibrant appearance.
Notes: Don't assign an NSAppearanceMBS object with this type directly to one of your views. Instead, assign a dark appearance to your view. AppKit then returns this type when the user enables the Increase Contrast option in the Accessibility system preferences and the view's allowsVibrancy property is true.
Available on MacOS 10.14 or newer.

7.5.13 NSAppearanceNameAccessibilityHighContrastVibrantLight as string

Plugin Version: 19.4, Platform: macOS, Targets: Desktop only.

Function: A high-contrast version of the light vibrant appearance.
Notes: Don't assign an NSAppearanceMBS object with this type directly to one of your views. Instead,

assign a light appearance to your view. AppKit then returns this type when the user enables the Increase Contrast option in the Accessibility system preferences and the view's allowsVibrancy property is true.
Available on MacOS 10.14 or newer.

7.5.14 NSAppearanceNameAqua as string

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The name of the standard Aqua appearance.

7.5.15 NSAppearanceNameDarkAqua as string

Plugin Version: 20.3, Platform: macOS, Targets: Desktop only.

Function: The name of the dark mode Aqua appearance.

7.5.16 NSAppearanceNameLightContent as string

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The name of the standard appearance that can be used by controls in light content areas (not including window-frame areas).

7.5.17 NSAppearanceNameVibrantDark as string

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The name of the vibrant dark appearance.
Notes: Available on Mac OS X 10.10 and newer.
Should only be set on an NSVisualEffectView, or one of its container subviews.

7.5.18 NSAppearanceNameVibrantLight as string

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The name of the vibrant dark appearance.
Notes: Available on Mac OS X 10.10 and newer.
Should only be set on an NSVisualEffectView, or one of its container subviews.

7.5.19 setAppearance(item as Variant, appearance as NSAppearanceMBS)

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Sets the appearance of the receiver, in an NSAppearance object.
Example:

```
// set the app to dark mode
Dim a As NSAppearanceMBS = NSAppearanceMBS.appearanceNamed(NSAppearanceMBS.NSAppearanceNameDarkAqua)
NSAppearanceMBS.setAppearance(app, a)
```

Notes: The default value for this property is nil, which means that the receiver uses the appearance it inherits from the nearest ancestor that has set an appearance. When you set appearance to a non-nil value, the receiver and the views it contains use the specified appearance.

Version 20.5 of MBS Plugin can accept application or NSApplicationMBS objects to set appearance of whole app.

7.5.20 setCurrentAppearance(appearance as NSAppearanceMBS = nil)

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Sets the current appearance to the specified NSAppearance object.
Notes: appearance: The NSAppearance object that should be used for the window or view, or nil to specify the default appearance.

When you set an appearance on a window, all views in that window—including the window background and controls in both the frame and content areas—use that appearance. By default, AppKit sets the current appearance for standard windows and views during window drawing, so you don't need to use this method unless you want to change the current appearance of a specific window or view.

You can use this method to set the current appearance for an offscreen view to the appearance that will be used when the view is drawn. To do this, use the offscreen view,Äôs effectiveAppearance for the appearance parameter.

Available in OS X v10.9 and later.

7.5.21 Properties

7.5.22 allowsVibrancy as Boolean

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Query allowsVibrancy to see if the given appearance actually needs vibrant drawing.
Notes: You may want to draw differently if the current apperance is vibrant.
(Read only property)

7.5.23 Handle as Integer

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

7.5.24 name as String

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The name of the appearance.
Example:

MsgBox NSAppearanceMBS.currentAppearance.name

Notes: (Read only property)

7.6 class NSDateIntervalMBS

7.6.1 class NSDateIntervalMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: An object representing the span of time between a specific start date and end date.
Notes: An NSDateIntervalMBS object represents a closed interval between two dates. The NSDateIntervalMBS class provides a programmatic interface for calculating the duration of a time interval and determining whether a date falls within it, as well as comparing date intervals and checking to see whether they intersect.
An NSDateIntervalMBS object consists of a startDate and an endDate. The startDate and endDate of a date interval can be equal, in which case its duration is 0. However, endDate cannot occur earlier than startDate.
You can use the NSDateIntervalFormatter class to create string representations of NSDateIntervalMBS objects that are suitable for display in the current locale.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 20.2
- MBS Xojo Plugins, version 20.2pr3

7.6.2 Methods

7.6.3 available as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Checks whether the class is available.
Notes: Returns true on MacOS 10.12 or newer.

7.6.4 compare(DateInterval as NSDateIntervalMBS) as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Compares the receiver with the specified date interval.
Notes: dateInterval: The date interval with which to compare the receiver.

Returns an NSComparisonResult value that indicates the temporal ordering of the receiver and a given date interval:
NSOrderedAscending (-1) if the receiver,Äôs startDate occurs earlier than that of dateInterval, or both startDate values are equal and the duration of the receiver is less than that of dateInterval.
NSOrderedDescending (1) if the receiver,Äôs startDate occurs later than that of dateInterval, or both startDate values are equal and the duration of the receiver is greater than that of dateInterval.

NSOrderedSame (0) if the receiver,Äôs startDate and duration values are equal to those of dateInterval.

7.6.5 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Initializes a date interval by setting the start and end date to the current date.
See also:

- 7.6.6 Constructor(startDate as date, duration as double) 231
- 7.6.7 Constructor(startDate as date, endDate as date) 231
- 7.6.8 Constructor(startDate as dateTime, endDate as dateTime) 232

7.6.6 Constructor(startDate as date, duration as double)

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Initializes a date interval with a given start date and duration.
Notes: startDate: The start date of the date interval.
duration: The duration from the start date for the date interval.

This method raises an NSExceptionMBS if duration is less than 0.
See also:

- 7.6.5 Constructor 231
- 7.6.7 Constructor(startDate as date, endDate as date) 231
- 7.6.8 Constructor(startDate as dateTime, endDate as dateTime) 232

7.6.7 Constructor(startDate as date, endDate as date)

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Initializes a date interval from a given start date and end date.
Notes: startDate: The start date of the date interval.
endDate: The end date of the date interval.

This method raises an NSExceptionMBS if endDate occurs earlier than startDate.
See also:

- 7.6.5 Constructor 231

7.6.8 Constructor(startDate as dateTime, endDate as dateTime)

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: Initializes a date interval from a given start date and end date.
Notes: startDate: The start date of the date interval.
endDate: The end date of the date interval.

This method raises an NSExceptionMBS if endDate occurs earlier than startDate.
See also:

7.6.9 containsDate(date as date) as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Indicates whether the receiver contains the specified date.
Notes: date: The date for which to test membership of the date interval.

Returns true if the receiver contains date. Otherwise, false.

7.6.10 containsDateTime(date as dateTime) as Boolean

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: Indicates whether the receiver contains the specified date.
Notes: date: The date for which to test membership of the date interval.

Returns true if the receiver contains date. Otherwise, false.

7.6.11 copy as NSDateIntervalMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

7.6.12 intersectionWithDateInterval(DateInterval as NSDateIntervalMBS) as NSDateIntervalMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Returns the intersection between the receiver and the specified date interval.
Notes: dateInterval: The date interval with which to calculate the intersection of the receiver.

Returns a date interval for the intersection of the receiver and dateInterval, or nil if no intersection occurs.

Calculating the intersection of date intervals is a commutative and associative operation. The intersection of a date interval with itself is equal to itself.

7.6.13 intersectsDateInterval(DateInterval as NSDateIntervalMBS) as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Indicates whether the receiver intersects with the specified date interval.
Notes: dateInterval: The date interval with which to check the receiver for intersection.

See intersectionWithDateInterval for more information about determining whether two date intervals intersect.

7.6.14 isEqualToDateInterval(DateInterval as NSDateIntervalMBS) as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Indicates whether the receiver is equal to the specified date interval.
Notes: dateInterval: The date interval with which to check the receiver for equality.

Returns true if the startDate and duration of dateInterval and the receiver are equal. Otherwise, false.

7.6.15 Operator_Compare(DateInterval as NSDateIntervalMBS) as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The compare operator to use in Xojo.

7.6.16 Properties

7.6.17 duration as Double

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The duration of the date interval.
Notes: In seconds.
(Read only property)

7.6.18 endDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The end date of the date interval.
Notes: (Read only property)

7.6.19 endDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The end date of the date interval.
Notes: (Read only property)

7.6.20 Handle as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

7.6.21 startDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The start date of the date interval.
Notes: (Read only property)

7.6.22 startDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The start date of the date interval.
Notes: (Read only property)

7.7 class NSEventMonitorMBS

7.7.1 class NSEventMonitorMBS

Plugin Version: 12.4, Platform: macOS, Targets: Desktop only.

Function: The class for watching events in Cocoa.
Notes: For Mac OS X 10.5 compatibility, please use CarbonMonitorEventsMBS class.
Blog Entries

- MBS Real Studio Plugins, version 12.4pr9

7.7.2 Methods

7.7.3 addGlobalMonitorForEventsMatchingMask(mask as UInt64) as boolean

Plugin Version: 12.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Installs an event monitor that receives copies of events posted to other applications.
Notes: mask: An event mask specifying which events you wish to monitor. See NSEventMBS constants for possible values.

Events are delivered asynchronously to your app and you can only observe the event; you cannot modify or otherwise prevent the event from being delivered to its original target application.

Key-related events may only be monitored if accessibility is enabled or if your application is trusted for accessibility access (see AXIsProcessTrusted).

Note that your handler will not be called for events that are sent to your own application.

Special Considerations
In OS X v 10.6, event monitors are only able to monitor the following event types:

NSLeftMouseDragged
NSRightMouseDragged
NSOtherMouseDragged
NSLeftMouseUp
NSRightMouseUp
NSOtherMouseUp
NSLeftMouseDown
NSRightMouseDown
NSOtherMouseDown
NSMouseMoved
NSFlagsChanged

NSScrollWheel
NSTabletPoint
NSTabletProximity
NSKeyDown (Key repeats are determined by sending the event an isARepeat message.)

Available in OS X v10.6 and later.

7.7.4 addLocalMonitorForEventsMatchingMask(mask as UInt64) as boolean

Plugin Version: 12.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Installs an event monitor that receives copies of events posted to this application before they are dispatched.
Notes: mask: An event mask specifying which events you wish to monitor. See NSEventMBS constants for possible values.

Calls the LocalEvent event. You can return the event unmodified, create and return a new NSEventMBS object, or return nil to stop the dispatching of the event.

Your handler will not be called for events that are consumed by nested event-tracking loops such as control tracking, menu tracking, or window dragging; only events that are dispatched through the applications sendEvent method will be passed to your handler.

Note: The monitor Block is called for all future events that match mask.

Special Considerations
In OS X v 10.6, event monitors are only able to monitor the following event types:

NSFlagsChanged
NSLeftMouseDragged
NSRightMouseDragged
NSOtherMouseDragged
NSLeftMouseUp
NSRightMouseUp
NSOtherMouseUp
NSLeftMouseDown
NSRightMouseDown
NSOtherMouseDown
NSMouseMoved
NSFlagsChanged
NSScrollWheel
NSTabletPoint
NSTabletProximity

NSKeyDown (Key repeats are determined by sending the event an isARepeat message.)

Available in OS X v10.6 and later.

7.7.5 Available as boolean

Plugin Version: 12.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether event monitoring is available.
Notes: Returns true on Mac OS X 10.6 and newer.

7.7.6 Constructor

Plugin Version: 12.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor.
Notes: Initializes the object.

7.7.7 Destructor

Plugin Version: 12.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The destructor.
Notes: Remove all event monitors you added.

7.7.8 Properties

7.7.9 Count as Integer

Plugin Version: 12.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns number of event monitors you added.
Notes: (Read only property)

7.7.10 Events

7.7.11 GlobalEvent(e as NSEventMBS)

Plugin Version: 12.4, Platform: macOS, Targets: .

Function: This event is called for global system events.
Notes: It is passed the event to monitor. You are unable to change the event, merely observe it.

Events are delivered asynchronously to your app and you can only observe the event; you cannot modify or otherwise prevent the event from being delivered to its original target application.

7.7.12 LocalEvent(e as NSEventMBS) as NSEventMBS

Plugin Version: 12.4, Platform: macOS, Targets: .

Function: This event is called for local application events.
Notes: You can return the event unmodified, create and return a new NSEventMBS object, or return nil to stop the dispatching of the event.

7.8 class NSVisualEffectViewMBS

7.8.1 class NSVisualEffectViewMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The class to use visual effect view.
Notes: The NSVisualEffectView is the basis for all visual effects, including "vibrant" appearances. You can optionally set the appearance to NSAppearanceMBS.appearanceNamed(NSAppearanceNameVibrantDark) (or Light) to get the desired light or dark appearance. Combine this with an appropriate light or dark material to get the desired vibrant look. Combining NSAppearanceNameVibrantDark with a light material will look bad, and should not be done.

Requires Mac OS X 10.10 or newer.

Please review Apple's documentation on this for details.
Subclass of the NSViewMBS class.
Blog Entries

- MBS Xojo Plugins, version 21.2pr1
- New for Mac OS X 10.10 in MBS Xojo Plugins

7.8.2 Methods

7.8.3 Available as boolean

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Whether this class is available.
Notes: Only available on Mac OS X 10.10 or later.

7.8.4 Constructor

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The constructor for a new NSVisualEffectViewMBS object.
See also:

- 7.8.5 Constructor(Handle as Integer) 241
- 7.8.6 Constructor(left as Double, top as Double, width as Double, height as Double) 241

7.8.5 Constructor(Handle as Integer)

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Creates an object based on the given NSVisualEffectView handle.
Example:

```
dim t as new NSVisualEffectViewMBS(0, 0, 100, 100)
dim v as new NSVisualEffectViewMBS(t.handle)

MsgBox str(v.Bounds.Width)+" x "+str(v.Bounds.Height)
```

Notes: The handle is casted to a NSVisualEffectView and the plugin retains this handle.
See also:

- 7.8.4 Constructor 240
- 7.8.6 Constructor(left as Double, top as Double, width as Double, height as Double) 241

7.8.6 Constructor(left as Double, top as Double, width as Double, height as Double)

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The constructor for a new NSVisualEffectViewMBS object.
See also:

- 7.8.4 Constructor 240
- 7.8.5 Constructor(Handle as Integer) 241

7.8.7 Properties

7.8.8 blendingMode as Integer

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: How this backdrop view blurs its contents.
Notes: It can either blend with the contents behind the window (NSVisualEffectBlendingModeBehindWindow – the default), or within the current window (NSVisualEffectBlendingModeWithinWindow). The blending mode for the material NSVisualEffectMaterialTitlebar can only be NSVisualEffectBlendingModeWithinWindow.

The blendingMode NSVisualEffectBlendingModeWithinWindow requires WantsLayer = true to be done on the parent view that you desire to blend with.

(Read and Write property)

7.8.9 Emphasized as Boolean

Plugin Version: 21.2, Platform: macOS, Targets: Desktop only.

Function: A Boolean value indicating whether to emphasize the look of the material.
Notes: Some materials change their appearance when they are emphasized. For example, the first responder view conveys its status.
The default value of this property is false.

Available in MacOS 10.12 or newer.
(Read and Write property)

7.8.10 interiorBackgroundStyle as Integer

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The interior background style.
Notes: Returns "Light" or "Dark" depending on the material selected.
(Read only property)

7.8.11 maskImage as NSImageMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The mask image masks this view.
Notes: (Read and Write property)

7.8.12 material as Integer

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The material used.
Notes: The default value is NSVisualEffectMaterialAppearanceBased; the material is updated to be the correct material based on the appearance set on this view.
(Read and Write property)

7.8.13 state as Integer

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The current state.
Notes: The state defaults to NSVisualEffectStateFollowsWindowActiveState.
(Read and Write property)

7.8.14 Constants

Background Styles

Constant	Value	Description
NSBackgroundStyleDark	1	Dark
NSBackgroundStyleLight	0	Light

Blending Modes

Constant	Value	Description
NSVisualEffectBlendingModeBehindWindow	0	Blends and blurs with the contents behind the window (such as th other windows). These can overlap, and the view lower in the h "win".
NSVisualEffectBlendingModeWithinWindow	1	Blends and blurs with contents behind the view in the current wind now, these cannot overlap each other. This mode REQUIRES l with view.wantsLayer = true.

Materials

Constant	Value	Description
NSVisualEffectMaterialAppearanceBased	0	When NSVisualEffectMaterialAppearanceBased is set, the determined by the current effectiveAppearance that is on the
NSVisualEffectMaterialContentBackground	18	The material for the background of opaque content. You might use this material as the background for content table view, or collection view. This material supports Desktop Tinting in Dark Mode. With the system modifies the material's color dynamically by incor the color from the underlying desktop image.
NSVisualEffectMaterialDark	2	Dark
NSVisualEffectMaterialFullScreenUI	15	The material for the background of a full-screen modal interf
NSVisualEffectMaterialHeaderView	10	The material for in-line header or footer views.
NSVisualEffectMaterialHUDWindow	13	The material for the background of heads-up display (HUD)
NSVisualEffectMaterialLight	1	Light
NSVisualEffectMaterialMenu	5	The material for menus.
NSVisualEffectMaterialPopover	6	The material for the background of popover windows.
NSVisualEffectMaterialSelection	4	The material used to indicate a selection.
NSVisualEffectMaterialSheet	11	The material for the background of sheet windows.
NSVisualEffectMaterialSidebar	7	The material for the background of window sidebars.
NSVisualEffectMaterialTitlebar	3	The material for a window,Äôs titlebar.
NSVisualEffectMaterialToolTip	17	The material for the background of a tool tip.
NSVisualEffectMaterialUnderPageBackground	22	The material for the area behind the pages of a document. This material supports Desktop Tinting in Dark Mode. With the system modifies the material's color dynamically by incor the color from the underlying desktop image.
NSVisualEffectMaterialUnderWindowBackground	21	The material to show under a window's background. Use this material on a visual effect view with a blendingM EffectBlendingModeBehindWindow to create a sense of pee back of the window. This effect creates an illusion that the b window has peeled away to reveal what,Äôs under it.
NSVisualEffectMaterialWindowBackground	12	The material for the background of opaque windows. This material supports Desktop Tinting in Dark Mode. With the system modifies the material's color dynamically by incor the color from the underlying desktop image.

States

Constant	Value	Description
NSVisualEffectStateActive	1	The backdrop is explicitly active, always.
NSVisualEffectStateFollowsWindowActiveState	0	The backdrop automatically appears active when the window inactive when it is not active.
NSVisualEffectStateInactive	2	The backdrop is explicitly inactive.

Chapter 8

Cocoa Networking

8.1 class NSNetServiceBrowserMBS

8.1.1 class NSNetServiceBrowserMBS

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: A network service browser that finds published services on a network using multicast DNS.
Notes: Services can range from standard services, such as HTTP and FTP, to custom services defined by other applications. You can use a network service browser in your code to obtain the list of accessible domains and then to obtain an NSNetServiceMBS object for each discovered service. Each network service browser performs one search at a time, so if you want to perform multiple simultaneous searches, use multiple network service browsers.

A network service browser performs all searches asynchronously using the current run loop to execute the search in the background. Results from a search are returned through the associated delegate object, which your client application must provide. Searching proceeds in the background until the object receives a stop message.

To use an NSNetServiceBrowserMBS object to search for services, use the constructor. Once your object is ready, you begin by gathering the list of accessible domains using either the searchForRegistrationDomains or searchForBrowsableDomains methods. From the list of returned domains, you can pick one and use the searchForServicesOfType method to search for services in that domain.

The NSNetServiceBrowserMBS class provides two ways to search for domains. In most cases, your client should use the searchForRegistrationDomains method to search only for local domains to which the host machine has registration authority. This is the preferred method for accessing domains as it guarantees that the host machine can connect to services in the returned domains. Access to domains outside this list may be more limited.
Blog Entries

- Using Bonjour to find iOS companion app
- News from the MBS Xojo Plugins Version 21.1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 21.1
- MBS Xojo Plugins, version 21.1pr5
- NSNetService classes for Xojo

8.1.2 Methods

8.1.3 Constructor

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Initializes an NSNetServiceBrowser object.

8.1.4 Destructor

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: The destructor.

8.1.5 searchForBrowsableDomains

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Initiates a search for domains visible to the host. This method returns immediately.
Notes: didFindDomain:moreComing event is raised for each domain discovered.

8.1.6 searchForRegistrationDomains

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Initiates a search for domains in which the host may register services.
Notes: This method returns immediately, sending a WillSearch event if the network was ready to initiate the search. Subsequent didFindDomain event is raised for each domain discovered.

Most network service browser clients do not have to use this method—it is sufficient to publish a service with the empty string, which registers it in any available registration domains automatically.

8.1.7 searchForServicesOfType(serviceType as string, domainName as string = "")

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Starts a search for services of a particular type within a specific domain.
Notes: serviceType: Type of the service to search for.
domainName: Domain name in which to perform the search.

This method returns immediately, sending a WillSearch event if the network was ready to initiate the search.The delegate receives subsequent didFindService event for each service discovered.

The serviceType argument must contain both the service type and transport layer information. To ensure that the mDNS responder searches for services, rather than hosts, make sure to prefix both the service name and transport layer name with an underscore character (,Äú_,Äù). For example, to search for an HTTP service on TCP, you would use the type string ,Äú_http._tcp.,Äú. Note that the period character at the end is required.

The domainName argument can be an explicit domain name, the generic local domain "local." (note trailing period, which indicates an absolute name), or the empty string (""), which indicates the default registration domains. Usually, you pass in an empty string. Note that it is acceptable to use an empty string for the domainName argument when publishing or browsing a service, but do not rely on this for resolution.

8.1.8 stop

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Halts a currently running search or resolution.
Notes: This method sends a DidStop event and causes the browser to discard any pending search results.

8.1.9 Properties

8.1.10 Handle as Integer

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: The internal object reference.
Notes: (Read only property)

8.1.11 includesPeerToPeer as Boolean

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Whether to browse over peer-to-peer Bluetooth and Wi-Fi, if available. NO, by default.
Notes: This property must be set before initiating a search to have an effect.
(Read and Write property)

8.1.12 Events

8.1.13 DidFindDomain(domainName as String, moreComing as Boolean)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Tells you the sender found a domain.
Notes: domainName: Name of the domain found by netServiceBrowser.
moreComing: True when netServiceBrowser is waiting for additional domains. false when there are no additional domains.

You use this event to compile a list of available domains. It should wait until moreComing is false to do a bulk update of user interface elements.

8.1.14 DidFindService(service as NSNetServiceMBS, moreComing as Boolean)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Tells you that it found a service.
Notes: Service: Network service found by netServiceBrowser.
moreComing: True when netServiceBrowser is waiting for additional services. False when there are no additional services.

You use this event to compile a list of available services. It should wait until moreComing is false to do a bulk update of user interface elements.

Special Considerations
If you choose to resolve netService, you need to create a new object with copy constructor in your subclass to catch events. And please store the new reference in an array or property.

8.1.15 DidNotSearch(error as Dictionary)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Tells you that a search was not successful.
Notes: error: Dictionary with the reasons the search was unsuccessful. Use the dictionary keys NSNetServicesErrorCode and NSNetServicesErrorDomain to retrieve the error information from the dictionary.

8.1.16 DidRemoveDomain(domainName as String, moreComing as Boolean)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Tells you that a domain has disappeared or has become unavailable.
Notes: domainName: Name of the domain that became unavailable.
moreComing: True when netServiceBrowser is waiting for additional domains. False when there are no additional domains.

You this event to compile a list of unavailable domains. It should wait until moreComing is false to do a bulk update of user interface elements.

8.1.17 DidRemoveService(service as NSNetServiceMBS, moreComing as Boolean)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Tells you a service has disappeared or has become unavailable.
Notes: Service: Network service that has become unavailable.
moreComing: True when netServiceBrowser is waiting for additional services. False when there are no additional services.

You this event to compile a list of unavailable services. It should wait until moreComing is false to do a bulk update of user interface elements.

8.1.18 DidStopSearch

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Tells you that a search was stopped.
Notes: Triggered by stop method.

8.1.19 WillSearch

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Tells you that a search is commencing.

Notes: This event is raised only if the underlying network layer is ready to begin a search.

8.2 class NSNetServiceMBS

8.2.1 class NSNetServiceMBS

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: A network service that broadcasts its availability using multicast DNS.
Notes: The NSNetServiceMBS class represents a network service, either one your application publishes or is a client of. This class and the NSNetServiceBrowserMBS class use multicast DNS to convey information about network services to and from your application. The API of NSNetServiceMBS provides a convenient way to publish the services offered by your application and to resolve the socket address for a service.

The types of services you access using NSNetServiceMBS are the same types that you access directly using BSD sockets. HTTP and FTP are two services commonly provided by systems. (For a list of common services and the ports used by those services, see the file /etc/services.) Applications can also define their own custom services to provide specific data to clients.

You can use the NSNetServiceMBS class as either a publisher of a service or a client of a service. If your application publishes a service, your code must acquire a port and prepare a socket to communicate with clients. Once your socket is ready, you use the NSNetServiceMBS class to notify clients that your service is ready. If your application is the client of a network service, you can either create an NSNetServiceMBS object directly (if you know the exact host and port information) or use an NSNetServiceBrowserMBS object to browse for services.

To publish a service, initialize your NSNetServiceMBS object with the service name, domain, type, and port information. All of this information must be valid for the socket created by your application. Once initialized, call the publish method to broadcast your service information to the network.

When connecting to a service, use the NSNetServiceBrowserMBS class to locate the service on the network and obtain the corresponding NSNetServiceMBS object. Once you have the object, call the resolve method to verify that the service is available and ready for your application. If it is, the addresses property provides the socket information you can use to connect to the service.

The methods of NSNetServiceMBS operate asynchronously so your application is not impacted by the speed of the network. All information about a service is returned to your application through events. You must subclass and fill event handlers to respond to messages and to handle errors appropriately.
Blog Entries

- Using Bonjour to find iOS companion app
- MBS Xojo Plugins, version 22.3pr6
- MBS Xojo Plugins, version 22.3pr5
- News from the MBS Xojo Plugins Version 21.1

- Video about MBS Xojo Plugins 21.1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 21.1
- MBS Xojo Plugins, version 21.1pr5
- NSNetService classes for Xojo

Videos

- MBS Xojo Plugins 21.1

Xojo Developer Magazine

- 19.3, page 10: News

8.2.2 Methods

8.2.3 addresses as String()

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: An array of addresses.
Notes: We take the raw addresses and decode IPv4 and IPv6 addresses for you.

8.2.4 addressesIPv4 as String()

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: An array of IPv4 addresses.
Notes: We take the raw addresses and decode only IPv4 addresses for you.

8.2.5 addressesIPv6 as String()

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: An array of IPv6 addresses.
Notes: We take the raw addresses and decode only IPv6 addresses for you.

8.2.6 addressesRaw as MemoryBlock()

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: A read-only array containing Memoryblock objects, each of which contains a socket address for the service.
Notes: An array containing Memoryblock objects, each of which contains a socket address for the service. Each Memoryblock object in the returned array contains an appropriate sockaddr structure that you can use to connect to the socket. The exact type of this structure depends on the service to which you are connecting. If no addresses were resolved for the service, the returned array contains zero elements.
It is possible for a single service to resolve to more than one address or not resolve to any addresses. A service might resolve to multiple addresses if the computer publishing the service is currently multihoming.

8.2.7 Constructor(Domain as String, Type as String, Name as String)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Returns the receiver, initialized as a network service of a given type and sets the initial host information.
Notes: domain: The domain for the service. To resolve in the default domains, pass in an empty string (""). To limit resolution to the local domain, use "local.".
If you are creating this object to resolve a service whose information your app stored previously, you should set this to the domain in which the service was originally discovered.
You can also use a NSNetServiceBrowserMBS object to obtain a list of possible domains in which you can discover and resolve services.
type: The network service type.
type must contain both the service type and transport layer information. To ensure that the mDNS responder searches for services, as opposed to hosts, prefix both the service name and transport layer name with an underscore character (,Äú_,Äù). For example, to search for an HTTP service on TCP, you would use the type string "_http._tcp.". Note that the period character at the end of the string, which indicates that the domain name is an absolute name, is required.
name: The name of the service to resolve.

Returns the receiver, initialized as a network service named name of type type in the domain domain.

This method is the appropriate initializer to use to resolve a service—to publish a service, use Constructor with port.
If you know the values for domain, type, and name of the service you wish to connect to, you can create an NSNetServiceMBS object using this initializer and call resolve on the result.

You cannot use this initializer to publish a service. This initializer passes an invalid port number to the designated initializer, which prevents the service from being registered. Calling publish on an NSNetService object initialized with this method generates a call to your didNotPublish event with an NSNetServicesBadArgumentError error.
See also:

- 8.2.8 Constructor(Domain as String, Type as String, Name as String, Port as Integer) 254
- 8.2.9 Constructor(other as NSNetServiceMBS) 255

8.2.8 Constructor(Domain as String, Type as String, Name as String, Port as Integer)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Initializes the receiver for publishing a network service of type type at the socket location specified by domain, name, and port.
Notes: domain: The domain for the service. To use the default registration domains, pass in an empty string (""). To limit registration to the local domain, use "local.".
You can also use a NSNetServiceBrowser object to obtain a list of possible domains in which you can publish your service.
type: The network service type.
type must contain both the service type and transport layer information. To ensure that the mDNS responder searches for services, as opposed to hosts, prefix both the service name and transport layer name with an underscore character (,Äú_,Äù). For example, to search for an HTTP service on TCP, you would use the type string "_http._tcp.". Note that the period character at the end of the string, which indicates that the domain name is an absolute name, is required.
name: The name by which the service is identified to the network. The name must be unique. If you pass the empty string (""), the system automatically advertises your service using the computer name as the service name.
port: The port on which the service is published.
If you specify the NSNetServiceListenForConnections flag, you may pass zero (0), in which case the service automatically allocates an arbitrary (ephemeral) port for your service. When the DidPublish event is called, you can determine the actual port chosen by calling the service object,Äôs NSNetServiceMBS method or accessing the corresponding property.
If your app is listening for connections on its own, the value of port must be a port number acquired by your application for the service.

You use this method to create a service that you wish to publish on the network. Although you can also use this method to create a service you wish to resolve on the network, it is generally more appropriate to use the Constructor method instead.

When publishing a service, you must provide valid arguments in order to advertise your service correctly. If the host computer has access to multiple registration domains, you must create separate NSNetServiceMBS objects for each domain. If you attempt to publish in a domain for which you do not have registration authority, your request may be denied.

It is acceptable to use an empty string for the domain argument when publishing or browsing a service, but do not rely on this for resolution.

This method is the designated initializer.
See also:

- 8.2.7 Constructor(Domain as String, Type as String, Name as String) 253
- 8.2.9 Constructor(other as NSNetServiceMBS) 255

8.2.9 Constructor(other as NSNetServiceMBS)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Creates a new object to catch events.
Notes: You can subclass and fill in events. Then create a copy with this constructor to connect events.
See also:

- 8.2.7 Constructor(Domain as String, Type as String, Name as String) 253
- 8.2.8 Constructor(Domain as String, Type as String, Name as String, Port as Integer) 254

8.2.10 dataFromTXTRecordDictionary(data as Dictionary) as Memoryblock

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Returns an Memoryblock object representing a TXT record formed from a given dictionary.
Notes: Data: A dictionary containing a TXT record.

Returns a Memoryblock representing TXT data formed from txtDictionary. Fails an assertion if data cannot be represented as a MemoryBlock.

8.2.11 Destructor

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: The destructor.

8.2.12 dictionaryFromTXTRecordData(data as Memoryblock) as Dictionary

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Returns a dictionary representing a TXT record given as a Memoryblock.
Notes: Data: A data object encoding a TXT record.

Returns a dictionary representing txtData. The dictionary,Äôs keys are strings. The values associated with all the dictionary,Äôs keys are Memoryblcoks that encapsulate strings or data.
Fails an assertion if txtData cannot be represented as an Dictionary object.

8.2.13 getStreams(byref inputStream as NSInputStreamMBS, byref outputStream as NSOutputStreamMBS) as Boolean

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Creates a pair of input and output streams for the receiver and returns a Boolean value that indicates whether they were retrieved successfully.
Notes: inputStream: Upon return, the input stream for the receiver.
outputStream: Upon return, the output stream for the receiver.

Returns yes if the streams are created successfully, otherwise false.

After this method is called, no events are called by the receiver.

8.2.14 isEqual(other as NSNetServiceMBS) as Boolean

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Checks whether two services are same.
Notes: Returns true if equal or false if not.

8.2.15 NSNetServicesErrorCode as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: This key identifies the error that occurred during the most recent operation.

8.2.16 NSNetServicesErrorDomain as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: This key identifies the originator of the error, which is either the NSNetService object or the mach network layer.
Notes: For most errors, you should not need the value provided by this key.

8.2.17 publish

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Attempts to advertise the receiver,Äôs on the network.

Notes: This method returns immediately, with success or failure indicated by the events.
This is equivalent to calling publish with the default options (0).
See also:

- 8.2.18 publish(options as Integer) 257

8.2.18 publish(options as Integer)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Attempts to advertise the receiver on the network, with the given options.
Notes: options: Options for the receiver. The supported options are described in constants.

This method returns immediately, with success or failure indicated by the events.
See also:

- 8.2.17 publish 256

8.2.19 resolve

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Starts a resolve process for the service.
Notes: Attempts to determine at least one address for the service. This method returns immediately, with success or failure indicated by the callbacks to the delegate.
See also:

- 8.2.20 resolve(timeout as Double) 257

8.2.20 resolve(timeout as Double)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Starts a resolve process of a finite duration for the service.
Notes: timeout: The maximum number of seconds to attempt a resolve. A value of 0.0 indicates no timeout and a resolve process of indefinite duration.

During the resolve period, the service sends DidResolveAddress event for each address it discovers that matches the service parameters. Once the timeout is hit, the service sends DidStop event. If no addresses resolve during the timeout period, the service sends didNotResolve event.
See also:

- 8.2.19 resolve 257

8.2.21 setTXTRecordData(Data as MemoryBlock) as Boolean

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Sets the TXT record for the receiver, and returns a Boolean value that indicates whether the operation was successful.
Notes: Data: The TXT record for the receiver.

True if recordData is successfully set as the TXT record, otherwise false.

8.2.22 startMonitoring

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Starts the monitoring of TXT-record updates for the receiver.
Notes: Please implement didUpdateTXTRecordData event, which is called when the TXT record for the receiver is updated.

8.2.23 stop

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Halts a currently running attempt to publish or resolve a service.
Notes: We raise DidStop event after the service stops.
It is safe to remove all strong references to the service immediately after calling stop.

8.2.24 stopMonitoring

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Stops the monitoring of TXT-record updates for the receiver.

8.2.25 Properties

8.2.26 Address as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: First address decoded.
Notes: Can be IPv4 or IPv6.

(Read only property)

8.2.27 AddressIPv4 as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: First IPv4 address decoded.
Notes: (Read only property)

8.2.28 AddressIPv6 as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: First IPv6 address decoded.
Notes: (Read only property)

8.2.29 description as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: The description string for debugging.
Notes: (Read only property)

8.2.30 domain as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: A string containing the domain for this service.
Notes: This can be an explicit domain name or it can contain the generic local domain name, "local." (note the trailing period, which indicates an absolute name).

This property,Äôs value is set when the object is first initialized, whether by your code or by a browser object. See Constructor for more information.
(Read only property)

8.2.31 Handle as Integer

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: The internal object reference.
Notes: (Read only property)

8.2.32 hostName as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: A string containing the DNS hostname for this service.
Notes: This value is "" until the service has been resolved (when addresses is non-nil).
(Read only property)

8.2.33 includesPeerToPeer as Boolean

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Specifies whether to also publish, resolve, or monitor this service over peer-to-peer Bluetooth and Wi-Fi, if available.
Notes: False by default.

This property must be set before calling publish, resolve, or startMonitoring in order to take effect.
(Read and Write property)

8.2.34 name as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: A string containing the name of this service.
Notes: This value is set when the object is first initialized, whether by your code or by a browser object. See Constructor for more information.
(Read only property)

8.2.35 port as Integer

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: The port on which the service is listening for connections.
Notes: If the object was initialized by calling Constructor (whether by your code or by a browser object), then the value was set when the object was first initialized.
If the object was initialized by calling Constructor without port, the value of this property is not valid (-1) until after the service has successfully been resolved (when addresses is non-nil).

(Read only property)

8.2.36 TXTRecordData as MemoryBlock

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: Returns the TXT record for the receiver.
Notes: (Read only property)

8.2.37 type as String

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: All.

Function: The type of the published service.
Notes: This value is set when the object is first initialized, whether by your code or by a browser object. See Constructor for more information.
(Read only property)

8.2.38 Events

8.2.39 DidAcceptConnection(InputStream as NSInputStreamMBS, outputStream as NSOutputStreamMBS)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Called when a client connects to a service managed by Bonjour.
Notes: inputStream: A stream object for receiving data from the client.
outputStream: A stream object for sending data to the client.

When you publish a service, if you set the NSNetServiceListenForConnections flag in the service options, the service object accepts connections on behalf of your app. Later, when a client connects to that service, the service object calls this method to provide the app with a pair of streams for communicating with that client.

8.2.40 DidNotPublish(Error as Dictionary)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Notifies the delegate that a service could not be published.
Notes: error: A dictionary containing information about the problem. The dictionary contains the keys

NSNetServicesErrorCode and NSNetServicesErrorDomain.

This method may be called long after a WillPublish event has been delivered.

8.2.41 DidNotResolve(Error as Dictionary)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Informs that an error occurred during resolution of a given service.
Notes: error: A dictionary containing information about the problem. The dictionary contains the keys NSNetServicesErrorCode and NSNetServicesErrorDomain.

Clients may try to resolve again upon receiving this error. For example, a DNS rotary may yield different IP addresses on different resolution requests. A common error condition is that no addresses were resolved during the timeout period specified in resolve.

8.2.42 DidPublish

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Notifies you that a service was successfully published.

8.2.43 DidResolveAddress

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Informs you that the address for a given service was resolved.
Notes: The delegate can use the addresses method to retrieve the service,Äôs address. If the delegate needs only one address, it can stop the resolution process using stop. Otherwise, the resolution will continue until the timeout specified in resolve is reached.

8.2.44 DidStop

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Informs you that a publish or resolveWithTimeout: request was stopped.

8.2.45 DidUpdateTXTRecordData(data as MemoryBlock)

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Notifies the delegate that the TXT record for a given service has been updated.
Notes: data: The new TXT record.

8.2.46 WillPublish

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Notifies you that the network is ready to publish the service.
Notes: Publication of the service proceeds asynchronously and may still generate a call to the didNotPublish event if an error occurs.

8.2.47 WillResolve

Plugin Version: 21.1, Platforms: macOS, iOS, Targets: .

Function: Notifies you that the network is ready to resolve the service.
Notes: Resolution of the service proceeds asynchronously and may still generate a call to the didNotResolve event if an error occurs.

8.2.48 Constants

NetService Options

Constant	Value	Description
NSNetServiceListenForConnections	2	Specifies that a TCP listener should be started for both IPv4 and IPv6 on t port specified by this service. If the listening port can't be opened, the serv calls its didNotPublish event to report the error. The listener supports only TCP connections. If the service,Äôs type does r end with _tcp, publication fails with NSNetServicesBadArgumentError. Whenever a client connects to the listening socket, the service calls its didA ceptConnection event with a pair of NSStream objects.
NSNetServiceNoAutoRename	1	Specifies that the network service should not rename itself in the event o name collision.

Errors

Constant	Value	Description
NSNetServicesActivityInProgress	-72003	The net service cannot process the request at this time. N mation about the network state is known.
NSNetServicesBadArgumentError	-72004	An invalid argument was used when creating the NSNetSer
NSNetServicesCancelledError	-72005	The client canceled the action.
NSNetServicesCollisionError	-72001	The service could not be published because the name is al name could be in use locally or on another system.
NSNetServicesInvalidError	-72006	The net service was improperly configured.
NSNetServicesMissingRequiredConfigurationError	-72008	Missing required configuration error.
NSNetServicesNotFoundError	-72002	The service could not be found on the network.
NSNetServicesTimeoutError	-72007	The net service has timed out.
NSNetServicesUnknownError	-72000	An unknown error occurred.

8.3 class NSURLSessionConfigurationMBS

8.3.1 class NSURLSessionConfigurationMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A configuration object that defines behavior and policies for a URL session.
Notes: An NSURLSessionConfigurationMBS object defines the behavior and policies to use when uploading and downloading data using an NSURLSessionMBS object. When uploading or downloading data, creating a configuration object is always the first step you must take. You use this object to configure the timeout values, caching policies, connection requirements, and other types of information that you intend to use with your NSURLSessionMBS object.

It is important to configure your NSURLSessionConfigurationMBS object appropriately before using it to initialize a session object. Session objects make a copy of the configuration settings you provide and use those settings to configure the session. Once configured, the session object ignores any changes you make to the NSURLSessionConfigurationMBS object. If you need to modify your transfer policies, you must update the session configuration object and use it to create a new NSURLSessionMBS object.

Note
In some cases, the policies defined in this configuration may be overridden by policies specified by an NSURLRequestMBS object provided for a task. Any policy specified on the request object is respected unless the session,Äôs policy is more restrictive. For example, if the session configuration specifies that cellular networking should not be allowed, the NSURLRequestMBS object cannot request cellular networking.

For more information about using configuration objects to create sessions, see NSURLSessionMBS class.

Types of Session Configurations

The behavior and capabilities of a URL session are largely determined by the kind of configuration used to create the session.

The singleton shared session (which has no configuration object) is for basic requests. It,Äôs not as customizable as sessions that you create, but it serves as a good starting point if you have very limited requirements. You access this session by calling the shared class method. See that method,Äôs discussion for more information about its limitations.

Default sessions behave much like the shared session (unless you customize them further), but let you obtain data incrementally using a delegate. You can create a default session configuration by calling the default method on the URLSessionConfiguration class.

Ephemeral sessions are similar to default sessions, but they don,Äôt write caches, cookies, or credentials to disk. You can create an ephemeral session configuration by calling the ephemeral method on the URLSes-

sionConfiguration class.

Background sessions let you perform uploads and downloads of content in the background while your app isn,Äôt running. You can create a background session configuration by calling the backgroundSessionConfiguration(_:) method on the URLSessionConfiguration class.
Blog Entries

- Adding NSURLSession classes for Xojo

8.3.2 Methods

8.3.3 available as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.9 or newer.
A lot of properties require higher MacOS versions.

8.3.4 backgroundSessionConfiguration(identifier as String) as NSURLSessionConfigurationMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a session configuration object that allows HTTP and HTTPS uploads or downloads to be performed in the background.
Notes: identifier: The unique identifier for the configuration object. This parameter must not be nil or an empty string.

Returns a configuration object that causes the system to perform upload and download tasks in a separate process.

Use this method to initialize a configuration object suitable for transferring data files while the app runs in the background. A session configured with this object hands control of the transfers over to the system, which handles the transfers in a separate process. In iOS, this configuration makes it possible for transfers to continue even when the app itself is suspended or terminated.

If an iOS app is terminated by the system and relaunched, the app can use the same identifier to create a new configuration object and session and to retrieve the status of transfers that were in progress at the time of termination. This behavior applies only for normal termination of the app by the system. If the user terminates the app from the multitasking screen, the system cancels all of the session,Äôs background transfers. In addition, the system does not automatically relaunch apps that were force quit by the user.

The user must explicitly relaunch the app before transfers can begin again.

You can configure an background session to schedule transfers at the discretion of the system for optimal performance using the discretionary property. When transferring large amounts of data, you are encouraged to set the value of this property to true. For an example of using the background configuration, see Downloading Files in the Background.

Requires MacOS 10.10 or newer.

8.3.5 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The constructor.
Notes: Creates a new object for shared session.

8.3.6 copy as NSURLSessionConfigurationMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a copy of the configuration.

8.3.7 defaultSessionConfiguration as NSURLSessionConfigurationMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A default session configuration object.
Notes: The default session configuration uses a persistent disk-based cache (except when the result is downloaded to a file) and stores credentials in the user,Äôs keychain. It also stores cookies (by default) in the same shared cookie store as the NSURLConnectionMBS and NSURLDownloadMBS classes.

If you,Äôre porting code based on the NSURLConnectionMBS class, use this method to obtain an initial configuration object and then customize that object as needed.

Modifying the returned session configuration object does not affect any configuration objects returned by future calls to this method, and does not change the default behavior for existing sessions. It is therefore always safe to use the returned object as a starting point for additional customization.

8.3.8 ephemeralSessionConfiguration as NSURLSessionConfigurationMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A session configuration that uses no persistent storage for caches, cookies, or credentials.
Notes: An ephemeral session configuration object is similar to a default session configuration (see defaultSessionConfiguration), except that the corresponding session object doesn,Äôt store caches, credential stores, or any session-related data to disk. Instead, session-related data is stored in RAM. The only time an ephemeral session writes data to disk is when you tell it to write the contents of a URL to a file.

It is possible to customize a default session configuration object to obtain the same behavior (or any portion thereof) provided by an ephemeral session configuration object, but the use of this method is more convenient.

Privacy and Performance Considerations
The main advantage to using ephemeral sessions is privacy. By not writing potentially sensitive data to disk, you make it less likely that the data will be intercepted and used later. For this reason, ephemeral sessions are ideal for private browsing modes in web browsers and other similar situations.
Because an ephemeral session doesn,Äôt write cached data to disk, the size of the cache is limited by available RAM. This limitation means that previously fetched resources are less likely to be in the cache (and are guaranteed to not be there if the user quits and relaunches your app). This behavior may reduce perceived performance, depending on your app.
When your app invalidates the session, all ephemeral session data is purged automatically. Additionally, in iOS, the in-memory cache isn,Äôt purged automatically when your app is suspended but may be purged when your app is terminated or when the system experiences memory pressure.

8.3.9 Properties

8.3.10 allowsCellularAccess as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that determines whether connections should be made over a cellular network.
Notes: This property controls whether tasks in sessions based on this session configuration are allowed to make connections over a cellular network.
The default value is true.

For more information, read Restrict Cellular Networking Correctly on Apple website.
(Read and Write property)

8.3.11 allowsConstrainedNetworkAccess as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether connections may use the network when the user has specified Low Data Mode.
Notes: In iOS 13 and later, users can set their device to use Low Data Mode as one of the Cellular Data Options in the Settings app. Users can turn on Low Data Mode to reduce your app,Äôs network data usage. This property controls a URL session,Äôs behavior when the user turns on Low Data Mode. If there are no nonconstrained network interfaces available and the session,Äôs allowsConstrainedNetworkAccess property is false, any task created from the session fails. In this case, the error provided when the task fails has a networkUnavailableReason property whose value is NSURLErrorNetworkUnavailableReasonConstrained.
Limit your app,Äôs of use of constrained network access to user-initiated tasks, and put off discretionary tasks until a nonconstrained interface becomes available. To do this, set allowsConstrainedNetworkAccess (and allowsExpensiveNetworkAccess) to false and waitsForConnectivity to true. This way, your NSURLSessionTaskMBS waits for a suitable interface to become available before sending or receiving data.

Available in MacOS 10.15 or newer.
(Read and Write property)

8.3.12 allowsExpensiveNetworkAccess as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether connections may use a network interface that the system considers expensive.
Notes: The system determines what constitutes ‚Äúexpensive,Äù based on the nature of the network interface and other factors. iOS 13 considers most cellular networks and personal hotspots expensive. If there are no nonexpensive network interfaces available and the session,Äôs allowsExpensiveNetworkAccess property is false, any task created from the session fails. In this case, the error provided when the task fails has a networkUnavailableReason property whose value is NSURLErrorNetworkUnavailableReasonExpensive.

Limit your app,Äôs of use of expensive network access to user-initiated tasks, and put off discretionary tasks until an nonexpensive interface becomes available. To do this, set allowsExpensiveNetworkAccess (and allowsConstrainedNetworkAccess) to false and waitsForConnectivity to true. This way, your NSURLSessionTaskMBS waits for a suitable interface to become available before sending or receiving data.

Available in MacOS 10.15 or newer.
(Read and Write property)

8.3.13 connectionProxyDictionary as Dictionary

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A dictionary containing information about the proxy to use within this session.
Notes: This property controls which proxy tasks within sessions based on this configuration use when connecting to remote hosts.

The default value is nil, which means that tasks use the default system settings.
See Global Proxy Configuration for more information about these dictionaries.
(Read and Write property)

8.3.14 discretionary as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that determines whether background tasks can be scheduled at the discretion of the system for optimal performance.
Notes: For configuration objects created using the backgroundSessionConfigurationWithIdentifier method, use this property to give the system control over when transfers should occur. This property is ignored for configuration objects created using other methods.
When transferring large amounts of data, you are encouraged to set the value of this property to true. Doing so lets the system schedule those transfers at times that are more optimal for the device. For example, the system might delay transferring large files until the device is plugged in and connected to the network via Wi-Fi. The default value of this property is false.
The session object applies the value of this property only to transfers that your app starts while it is in the foreground. For transfers started while your app is in the background, the system always starts transfers at its discretion—in other words, the system assumes this property is true and ignores any value you specified.

Available in MacOS 10.10 or newer.
(Read and Write property)

8.3.15 Handle as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

8.3.16 HTTPAdditionalHeaders as Dictionary

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A dictionary of additional headers to send with requests.
Notes: This property specifies additional headers that are added to all tasks within sessions based on this configuration. For example, you might set the User-Agent header so that it is automatically included in every request your app makes through sessions based on this configuration.

An NSURLSessionMBS object is designed to handle various aspects of the HTTP protocol for you. As a result, you should not modify the following headers:

- Authorization
- Connection
- Host
- Proxy-Authenticate
- Proxy-Authorization
- WWW-Authenticate

Additionally, if the length of your upload body data can be determined automatically—for example, if you provide the body content with an MemoryBlock object—the value of Content-Length is set for you.
If the same header appears in both this array and the request object (where applicable), the request object,Äôs value takes precedence.
The default value is an empty array.
(Read and Write property)

8.3.17 HTTPCookieAcceptPolicy as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A policy constant that determines when cookies should be accepted.
Notes: This property determines the cookie accept policy for all tasks within sessions based on this configuration.
The default value is CookieAcceptPolicyOnlyFromMainDocumentDomain. You can change it to any of the constants defined in the CookieAcceptPolicy enumerated type.
If you want more direct control over what cookies are accepted, set this value to CookieAcceptPolicyNever and then use the allHeaderFields and cookiesWithResponseHeaderFields methods to extract cookies from the URL response object yourself.
(Read and Write property)

8.3.18 HTTPCookieStorage as NSHTTPCookieStorageMBS

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The cookie store for storing cookies within this session.
Notes: This property determines the cookie storage object used by all tasks within sessions based on this configuration.
To disable cookie storage, set this property to nil.
For default and background sessions, the default value is the sharedHTTPCookieStorage cookie storage object.
For ephemeralSessionConfiguration sessions, the default value is a private cookie storage object that stores

data in memory only, and is destroyed when you invalidate the session.
(Read and Write property)

8.3.19 HTTPMaximumConnectionsPerHost as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The maximum number of simultaneous connections to make to a given host.
Notes: This property determines the maximum number of simultaneous connections made to each host by tasks within sessions based on this configuration.
This limit is per session, so if you use multiple sessions, your app as a whole may exceed this limit. Additionally, depending on your connection to the Internet, a session may use a lower limit than the one you specify.
The default value is 6 in macOS, or 4 in iOS.
(Read and Write property)

8.3.20 HTTPShouldSetCookies as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that determines whether requests should contain cookies from the cookie store.
Notes: This property controls whether tasks within sessions based on this configuration should automatically provide cookies from the shared cookie store when making requests.
If you want to provide cookies yourself, set this value to false and provide a Cookie header either through the session,Äôs HTTPAdditionalHeaders property or on a per-request level using a custom NSURLRequestMBS object.
The default value is true.
(Read and Write property)

8.3.21 HTTPShouldUsePipelining as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that determines whether the session should use HTTP pipelining.
Notes: This property determines whether tasks within sessions based on this configuration should use HTTP pipelining. You can also enable pipelining on a per-task basis by creating the task with an NSURLRequestMBS object.
The default value is false.
(Read and Write property)

8.3.22 identifier as String

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The background session identifier of the configuration object.
Notes: The value of this property is set only when you use the backgroundSessionConfigurationWithIdentifier method to create the configuration object. The string uniquely identifies a background session object. In iOS, you use this string in cases where the app was terminated while transfers were occurring in the background. When the app relaunches, it uses the string to recreate the configuration and session objects associated with the transfers.
(Read only property)

8.3.23 NetworkServiceType as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The type of network service for all tasks within sessions based on this configuration.
Notes: The network service type provides a hint to the operating system about what the underlying traffic is used for. This hint enhances the system's ability to prioritize traffic, determine how quickly it needs to wake up the cellular or Wi-Fi radio, and so on. By providing accurate information, you improve the ability of the system to optimally balance battery life, performance, and other considerations.

For example, specify the NetworkServiceTypeBackground type if your app is performing a download that wasn,Äôt requested by the user, like prefetching content so that it,Äôs available when the user chooses to view it.
This setting can also affect the Wi-Fi Quality of Service (QoS) Priority.
The default value is NetworkServiceTypeDefault.
(Read and Write property)

8.3.24 RequestCachePolicy as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A predefined constant that determines when to return a response from the cache.
Notes: This property determines the request caching policy used by tasks within sessions based on this configuration.
Set this property to one of the constants defined in CachePolicy constants to specify whether the cache policy should depend on expiration dates and age, whether the cache should be disabled entirely, and whether the server should be contacted to determine if the content has changed since it was last requested.
The default value is CachePolicyUseProtocolCachePolicy.
(Read and Write property)

8.3.25 sharedContainerIdentifier as String

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The identifier for the shared container into which files in background URL sessions should be downloaded.
Notes: To create a URL session for use by an app extension, set this property to a valid identifier for a container shared between the app extension and its containing app.

Available in MacOS 10.10 or newer.
(Read and Write property)

8.3.26 shouldUseExtendedBackgroundIdleMode as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether TCP connections should be kept open when the app moves to the background.
Notes: In addition to requesting that the connection be kept open, setting this value to true asks the system to delay reclaiming the connection when the app moves to the background.

Available in MacOS 10.11 or newer.
(Read and Write property)

8.3.27 timeoutIntervalForRequest as Double

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The timeout interval to use when waiting for additional data.
Notes: This property determines the request timeout interval for all tasks within sessions based on this configuration. The request timeout interval controls how long (in seconds) a task should wait for additional data to arrive before giving up. The timer associated with this value is reset whenever new data arrives. When the request timer reaches the specified interval without receiving any new data, it triggers a timeout. The default value is 60.

Important
Any upload or download tasks created by a background session are automatically retried if the original request fails due to a timeout. To configure how long an upload or download task should be allowed to be retried or transferred, use the timeoutIntervalForResource property.
(Read and Write property)

8.3.28 timeoutIntervalForResource as Double

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The maximum amount of time that a resource request should be allowed to take.
Notes: This property determines the resource timeout interval for all tasks within sessions based on this configuration. The resource timeout interval controls how long (in seconds) to wait for an entire resource to transfer before giving up. The resource timer starts when the request is initiated and counts until either the request completes or this timeout interval is reached, whichever comes first.
The default value is 7 days.
(Read and Write property)

8.3.29 URLCache as NSURLCacheMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The URL cache for providing cached responses to requests within the session.
Notes: This property determines the URL cache object used by tasks within sessions based on this configuration.
To disable caching, set this property to nil.
For default sessions, the default value is the shared URL cache object.
For background sessions, the default value is nil.
For ephemeral sessions, the default value is a private cache object that stores data in memory only, and is destroyed when you invalidate the session.
(Read and Write property)

8.3.30 URLCredentialStorage as NSURLCredentialStorageMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A credential store that provides credentials for authentication.
Notes: This property determines the credential storage object used by tasks within sessions based on this configuration.
If you don,Äôt want to use a credential store, set this property to nil.
For default and background sessions, the default value is the sharedCredentialStorage credential store object.
For ephemeralSessionConfiguration sessions, the default value is a private credential store object that stores data in memory only, and is destroyed when you invalidate the session.
(Read and Write property)

8.3.31 waitsForConnectivity as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether the session should wait for connectivity to become available, or fail immediately.
Notes: Connectivity might be temporarily unavailable for several reasons. For example, a device might only have a cellular connection when allowsCellularAccess is set to false, or the device might require a VPN connection but none is available. If the value of this property is true and sufficient connectivity is unavailable, the session calls the taskIsWaitingForConnectivity: method of NSURLSessionTaskDelegate and waits for connectivity. When connectivity becomes available, the task begins its work and ultimately calls the delegate or completion handler as usual.
If the value of the property is false and connectivity is unavailable, the connection fails immediately with an error, such as NSURLErrorNotConnectedToInternet.
This property is relevant only during the establishment of a connection. If a connection is established and then drops, the completion handler or delegate receives an error, such as NSURLErrorNetworkConnectionLost. For help dealing with dropped connections, see Handling ,ÄúThe network connection was lost,Äù Errors.
This property is ignored by background sessions, which always wait for connectivity.

Available in MacOS 10.13 or newer.
(Read and Write property)

8.3.32 Constants

Cache Policy

Constant	Value	Description
CachePolicyReloadIgnoringCacheData	1	The URL load should be loaded only from the originat
CachePolicyReloadIgnoringLocalAndRemoteCacheData	4	Ignore local cache data, and instruct proxies and other gard their caches so far as the protocol allows.
CachePolicyReloadIgnoringLocalCacheData	1	The URL load should be loaded only from the originat
CachePolicyReloadRevalidatingCacheData	5	Use cache data if the origin source can validate it; ot origin.
CachePolicyReturnCacheDataDontLoad	3	Use existing cache data, regardless or age or expirati cached data is available.
CachePolicyReturnCacheDataElseLoad	2	Use existing cache data, regardless or age or expirati originating source only if there is no cached data.
CachePolicyUseProtocolCachePolicy	0	Use the caching logic defined in the protocol implem particular URL load request.

Cookie Accept Policy

Constant	Value	Description
CookieAcceptPolicyAlways	0	Accept all cookies. This is the default cookie accept polic
CookieAcceptPolicyNever	1	Reject all cookies.
CookieAcceptPolicyOnlyFromMainDocumentDomain	2	Accept cookies only from the main document domain.

Multipath TCP Modes

Constant	Value	Description
MultipathServiceTypeAggregate	3	A service that aggregates the capacities of other Multipath options in an at- tempt to increase throughput and minimize latency.
MultipathServiceTypeHandover	1	A Multipath TCP service that provides seamless handover between Wi-Fi and cellular in order to preserve the connection.
MultipathServiceTypeInteractive	2	A service whereby Multipath TCP attempts to use the lowest-latency interface.
MultipathServiceTypeNone	0	The default service type indicating that Multipath TCP should not be used.

Network Service Types

Constant	Value	Description
NetworkServiceTypeAVStreaming	8	A service type for streaming audio/video data.
NetworkServiceTypeBackground	3	A service type for background traffic. You should specify this type if your app is performing a download that not requested by the user—for example, prefetching content so that it wil available when the user chooses to view it.
NetworkServiceTypeCallSignaling	11	A service type for call signaling. Use this service type with network traffic that establishes, maintains, or t down a VoIP call. Use the NSURLNetworkServiceTypeVoIP type for the ac media of a call.
NetworkServiceTypeDefault	0	A service type for standard network traffic.
NetworkServiceTypeResponsiveAV	9	A service type for responsive (time-sensitive) audio/video data.
NetworkServiceTypeResponsiveData	6	A service type for data that the user is actively waiting for. This service type,Äôs priority is higher than NSURLNetworkServiceType fault. Use this service type for interactive situations where the user is an pating a quick response, like instant messaging or completing a purchase.
NetworkServiceTypeVideo	2	A service type for video traffic.
NetworkServiceTypeVoice	4	A service type for voice traffic.
NetworkServiceTypeVoIP	1	A service type for VoIP traffic. With the VoIP service type, the kernel continues to listen for incoming tr while your app is in the background, then wakes up your app whenever new c arrives. This should be used only for connections that are used to communi with a VoIP service.

8.4 class NSURLSessionDataTaskMBS

8.4.1 class NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A URL session task that returns downloaded data directly to the app in memory.
Notes: A NSURLSessionDataTaskMBS is a concrete subclass of NSURLSessionTaskMBS. The methods in the NSURLSessionDataTaskMBS class are documented in NSURLSessionTaskMBS.

A data task returns data directly to the app (in memory) as one or more NSData objects. When you use a data task:

- During upload of the body data (if your app provides any), the session periodically calls the taskDidSendBodyData event with status information.
- After receiving an initial response, the session calls the dataTaskDidReceiveResponse event to let you examine the status code and headers, and optionally convert the data task into a download task.
- During the transfer, the session calls dataTaskDidReceiveData event to provide your app with the content as it arrives.
- Upon completion, the session calls the dataTaskWillCacheResponse event to let you determine whether the response should be cached.

For examples of using data tasks for fetching and uploading data, see Fetching Website Data into Memory and Uploading Data to a Website on Apple website.
Subclass of the NSURLSessionTaskMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Adding NSURLSession classes for Xojo

8.4.2 Methods

8.4.3 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The private constructor.

8.5 class NSURLSessionDownloadTaskMBS

8.5.1 class NSURLSessionDownloadTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A URL session task that stores downloaded data to file.
Notes: An NSURLSessionDownloadTaskMBS is a concrete subclass of NSURLSessionTask. Most of the methods associated with this class are documented in NSURLSessionTaskMBS.

Download tasks directly write the server,Äôs response data to a temporary file, providing your app with progress updates as data arrives from the server. When you use download tasks in background sessions, these downloads continue even when your app is suspended or is otherwise not running.

You can pause (cancel) download tasks and resume them later (assuming the server supports doing so). You can also resume downloads that failed because of network connectivity problems.

When you use a download task, your NSURLSessionMBS subclass receives several callbacks unique to download scenarios.

- During download, the session periodically calls the downloadTaskDidWriteData event with status information.
- Upon successful completion, the session calls the downloadTaskDidFinishDownloadingToURL event or completion handler. In that method, you must either open the file for reading or move it to a permanent location in your app,Äôs sandbox container directory.
- Upon unsuccessful completion, the session calls the taskDidCompleteWithError method or completion handler. Unlike NSURLSessionDataTaskMBS or NSURLSessionUploadTaskMBS, a download task reports server-side errors reported through HTTP status codes into corresponding NSError objects.

Subclass of the NSURLSessionTaskMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Adding NSURLSession classes for Xojo

8.5.2 Methods

8.5.3 cancelByProducingResumeData(Handler as ProducingResumeDataCompletedMBS, tag as variant = nil)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Cancels a download and calls a callback with resume data for later use.
Notes: A download can be resumed only if the following conditions are met:

- The resource has not changed since you first requested it
- The task is an HTTP or HTTPS GET request
- The server provides either the ETag or Last-Modified header (or both) in its response
- The server supports byte-range requests
- The temporary file hasn,Äôt been deleted by the system in response to disk space pressure

Calls the handler later when finished.

8.5.4 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The private constructor.

8.5.5 NSURLSessionDownloadTaskResumeData as string

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Key in the userInfo dictionary of an NSErrorMBS received during a failed download.

8.5.6 Delegates

8.5.7 ProducingResumeDataCompletedMBS(downloadTask as NSURLSessionDownloadTaskMBS, resumeData as MemoryBlock, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A completion handler that is called when the download has been successfully canceled.
Notes: If the download is resumable, the completion handler is provided with a resumeData object. Your app can later pass this object to a session,Äôs downloadTaskWithResumeDat methods in NSURLSessionMBS class to create a new task that resumes the download where it left off.

8.6 class NSURLSessionMBS

8.6.1 class NSURLSessionMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: An object that coordinates a group of related, network data-transfer tasks.
Notes: Read more on Apple's website:
https://developer.apple.com/documentation/foundation/nsurlsession

MBS Plugin implements all delegates within NSURLSessionMBS class, so you can subclass it and fill events.
Blog Entries

- MBS Xojo Plugins, version 22.3pr1
- NSNetService classes for Xojo
- Three new controls for iOS in Xojo
- MBS Xojo Plugins, version 20.3pr10
- New in the MBS Xojo Plugins Version 20.2
- MonkeyBread Software Releases the MBS Xojo Plugins in version 20.2
- Adding NSURLSession classes for Xojo
- MBS Xojo Plugins, version 20.2pr3

8.6.2 Methods

8.6.3 available as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Whether the class is available.
Notes: Returns true on MacOS 10.9 or newer.

8.6.4 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates new object referencing shared session.
See also:

- 8.6.5 Constructor(configuration as NSURLSessionConfigurationMBS) 282

8.6.5 Constructor(configuration as NSURLSessionConfigurationMBS)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a session with the specified session configuration.
Notes: configuration: A configuration object that specifies certain behaviors, such as caching policies, timeouts, proxies, pipelining, TLS versions to support, cookie policies, credential storage, and so on.
See NSURLSessionConfigurationMBS class for more information.
See also:

- 8.6.4 Constructor 281

8.6.6 dataTaskWithRequest(request as NSURLRequestMBS) as NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that retrieves the contents of a URL based on the specified URL request object.
Notes: request: A URL request object that provides request-specific information such as the URL, cache policy, request type, and body data or body stream.

Returns he new session data task.

By creating a task based on a request object, you can tune various aspects of the task,Äôs behavior, including the cache policy and timeout interval.
After you create the task, you must start it by calling its resume method.
See also:

- 8.6.7 dataTaskWithRequest(request as NSURLRequestMBS, handler as NSURLSessionDataTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS 282

8.6.7 dataTaskWithRequest(request as NSURLRequestMBS, handler as NSURLSessionDataTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that retrieves the contents of a URL based on the specified URL request object, and calls a handler upon completion.
Notes: request: A URL request object that provides the URL, cache policy, request type, body data or body stream, and so on.
completionHandler: The completion handler to call when the load request is complete.
See also:

- 8.6.6 dataTaskWithRequest(request as NSURLRequestMBS) as NSURLSessionDataTaskMBS 282

8.6.8 dataTaskWithURL(URL as String) as NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that retrieves the contents of the specified URL.
Notes: URL: The URL to be retrieved.

After you create the task, you must start it by calling its resume method. The task calls methods on the session,Äôs delegate to provide you with the response metadata, response data, and so on.
See also:

- 8.6.9 dataTaskWithURL(URL as String, handler as NSURLSessionDataTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS 283

8.6.9 dataTaskWithURL(URL as String, handler as NSURLSessionDataTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that retrieves the contents of the specified URL, then calls a handler upon completion.
Notes: url: The URL to be retrieved.
handler: The completion handler to call when the load request is complete.
See also:

- 8.6.8 dataTaskWithURL(URL as String) as NSURLSessionDataTaskMBS 283

8.6.10 downloadTaskWithRequest(request as NSURLRequestMBS) as NSURLSessionDownloadTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a download task that retrieves the contents of a URL based on the specified URL request object and saves the results to a file.
Notes: request: A URL request object that provides the URL, cache policy, request type, body data or body stream, and so on.

Returns the new session download task.

By creating a task based on a request object, you can tune various aspects of the task,Äôs behavior, including the cache policy and timeout interval.
After you create the task, you must start it by calling its resume method. The task calls methods on the session,Äôs delegate to provide you with progress notifications, the location of the resulting temporary file, and so on.
See also:

8.6.11 downloadTaskWithRequest(request as NSURLRequestMBS, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a download task that retrieves the contents of a URL based on the specified URL request object, saves the results to a file, and calls a handler upon completion.
Notes: request: A URL request object that provides the URL, cache policy, request type, body data or body stream, and so on.
Handler: The completion handler to call when the load request is complete.
See also:

8.6.12 downloadTaskWithResumeData(resumeData as MemoryBlock) as NSURLSessionDownloadTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a download task to resume a previously canceled or failed download.
Notes: resumeData: A data object that provides the data necessary to resume a download.

After you create the task, you must start it by calling its resume method.
This method is equivalent to the downloadTaskWithResumeData:completionHandler: with a nil completion handler. For detailed usage information, including ways to obtain a resume data object, see that method.
See also:

8.6.13 downloadTaskWithResumeData(resumeData as MemoryBlock, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a download task to resume a previously canceled or failed download and calls a handler upon completion.
Notes: resumeData: A data object that provides the data necessary to resume the download.

Handler: The completion handler to call when the load request is complete.
See also:

- 8.6.12 downloadTaskWithResumeData(resumeData as MemoryBlock) as NSURLSessionDownloadTaskMBS 284

8.6.14 downloadTaskWithURL(URL as String) as NSURLSessionDownloadTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a download task that retrieves the contents of the specified URL and saves the results to a file.
Notes: url: The URL to download.

After you create the task, you must start it by calling its resume method.
See also:

- 8.6.15 downloadTaskWithURL(URL as String, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS 285

8.6.15 downloadTaskWithURL(URL as String, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a download task that retrieves the contents of the specified URL, saves the results to a file, and calls a handler upon completion.
Notes: url: An URL that provides the URL to download.
Handler: The completion handler to call when the load request is complete.
See also:

- 8.6.14 downloadTaskWithURL(URL as String) as NSURLSessionDownloadTaskMBS 285

8.6.16 finishTasksAndInvalidate

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Invalidates the session, allowing any outstanding tasks to finish.
Notes: This method returns immediately without waiting for tasks to finish. Once a session is invalidated, new tasks cannot be created in the session, but existing tasks continue until completion. After the last task finishes and the session makes the last delegate call related to those tasks, the session calls the DidBecomeInvalidWithError event, then breaks references to the delegate and callback objects. After invalidation, session objects cannot be reused.
To cancel all outstanding tasks, call invalidateAndCancel instead.

Important
Calling this method on the session returned by the sharedSession method has no effect.

8.6.17 flush(Handler as NSURLSessionFlushCompletedMBS = nil, tag as variant = nil)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Flushes cookies and credentials to disk, clears transient caches, and ensures that future requests occur on a new TCP connection.
Notes: Handler: The completion handler to call when the flush operation is complete.

8.6.18 invalidateAndCancel

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Cancels all outstanding tasks and then invalidates the session.
Notes: Once invalidated, references to the delegate and callback objects are broken. After invalidation, session objects cannot be reused.
To allow outstanding tasks to run until completion, call finishTasksAndInvalidate instead.

Important
Calling this method on the session returned by the sharedSession method has no effect.

8.6.19 reset(Handler as NSURLSessionResetCompletedMBS = nil, tag as variant = nil)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Resets the session.
Notes: Empties all cookies, caches and credential stores, removes disk files, flushes in-progress downloads to disk, and ensures that future requests occur on a new socket.

Handler: The completion handler to call when the reset operation is complete.

8.6.20 sharedSession as NSURLSessionMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The shared singleton session object.
Notes: For basic requests, the NSURLSessionMBS class provides a shared singleton session object that gives you a reasonable default behavior for creating tasks. Use the shared session to fetch the contents of a URL to memory with just a few lines of code.
Unlike the other session types, you don,Äôt create the shared session; you merely access it by using this property directly. As a result, you don,Äôt provide a delegate or a configuration object.

Limitations of the Shared Session
Because the shared session has neither a delegate nor a customizable configuration object, the shared session has important limitations:

- You can,Äôt obtain data incrementally as it arrives from the server.
- You can,Äôt significantly customize the default connection behavior.
- Your ability to perform authentication is limited.
- You can,Äôt perform background downloads or uploads when your app isn,Äôt running.

The shared session uses the shared NSURLCacheMBS, NSHTTPCookieStorageMBS, and NSURLCredentialStorageMBS objects, uses a shared custom networking protocol lis, and is based on a default configuration.

In general, when working with a shared session, you should avoid customizing the cache, cookie storage, or credential storage (unless you are already doing so with NSURLConnectionMBS). There,Äôs a good chance that you,Äôll outgrow the capabilities of the default session, at which point you,Äôll have to rewrite all of those customizations to work with your custom URL sessions.
In other words, if you,Äôre doing anything with caches, cookies, authentication, or custom networking protocols, you should probably be using a default session instead of the shared session.

8.6.21 streamTaskWithHostName(hostname as String, Port as Integer) as NSURLSessionStreamTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that establishes a bidirectional TCP/IP connection to a specified hostname and port.
Notes: hostname: The hostname of the connection endpoint.
port: The port of the connection endpoint.

Returns the new session stream task.

After you create the task, you must start it by calling its resume method.

8.6.22 Tasks as NSURLSessionTaskMBS()

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Queries all tasks for the session.
Notes: Please use the asynchronous variant if possible.
See also:

- 8.6.23 Tasks(Handler as NSURLSessionTasksCompletedMBS, tag as variant = nil) 288

8.6.23 Tasks(Handler as NSURLSessionTasksCompletedMBS, tag as variant = nil)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Asynchronously calls a completion callback with all data, upload, and download tasks in a session.
Notes: Handler: The completion handler to call with the list of tasks. This handler is executed on the delegate queue.

The arrays passed to the completion handler contain any tasks that you have created within the session, not including any tasks that have been invalidated after completing, failing, or being cancelled.
See also:

- 8.6.22 Tasks as NSURLSessionTaskMBS() 288

8.6.24 uploadTaskWithRequest(request as NSURLRequestMBS, data as MemoryBlock) as NSURLSessionUploadTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that performs an HTTP request for the specified URL request object and uploads the provided data.
Notes: request: A URL request object that provides the URL, cache policy, request type, and so on. The body stream and body data in this request object are ignored.
Data: The body data for the request.

Returns the new session upload task.

An HTTP upload request is any request that contains a request body, such as a POST or PUT request. Upload tasks require you to create a request object so that you can provide metadata for the upload, like HTTP request headers.
After you create the task, you must start it by calling its resume method. The task calls methods on the session,Äôs delegate to provide you with the upload,Äôs progress, response metadata, response data, and so

on.
See also:

8.6.25 uploadTaskWithRequest(request as NSURLRequestMBS, data as MemoryBlock, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that performs an HTTP request for the specified URL request object, uploads the provided data, and calls a handler upon completion.
Notes: request: A URL request object that provides the URL, cache policy, request type, and so on. The body stream and body data in this request object are ignored.
bodyData: The body data for the request.
Handler: The completion handler to call when the load request is complete.

Returns the new session upload task.

An HTTP upload request is any request that contains a request body, such as a POST or PUT request. Upload tasks require you to create a request object so that you can provide metadata for the upload, like HTTP request headers.

Unlike uploadTaskWithRequest, this method returns the response body after it has been received in full, and does not require you to write a custom delegate to obtain the response body.

By using a completion handler, the task bypasses calls to delegate methods for response and data delivery, and instead provides any resulting data, response, or error inside the completion handler. Delegate methods for handling authentication challenges, however, are still called.

Typically you pass a nil completion handler only when creating tasks in sessions whose delegates include a dataTaskDidReceiveData method. However, if you do not need the response data, use key-value observing to watch for changes to the task,Äôs status to determine when it completes.

After you create the task, you must start it by calling its resume method.

If the request completes successfully, the data parameter of the completion handler block contains the resource data, and the error parameter is nil. If the request fails, the data parameter is nil, and the error parameter contains information about the failure. If a response from the server is received, regardless of whether the request completes successfully or fails, the response parameter contains that information.
See also:

- 8.6.24 uploadTaskWithRequest(request as NSURLRequestMBS, data as MemoryBlock) as NSURLSessionUploadTaskMBS 288
- 8.6.26 uploadTaskWithRequest(request as NSURLRequestMBS, file as folderItem) as NSURLSessionUploadTaskMBS 290
- 8.6.27 uploadTaskWithRequest(request as NSURLRequestMBS, file as FolderItem, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS 291

8.6.26 uploadTaskWithRequest(request as NSURLRequestMBS, file as folderItem) as NSURLSessionUploadTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that performs an HTTP request for uploading the specified file.
Notes: request: A URL request object that provides the URL, cache policy, request type, and so on. The body stream and body data in this request object are ignored.
file: The file to upload.

Returns the new session upload task.

An HTTP upload request is any request that contains a request body, such as a POST or PUT request. Upload tasks require you to create a request object so that you can provide metadata for the upload, like HTTP request headers.
After you create the task, you must start it by calling its resume method. The task calls methods on the session,Äôs delegate to provide you with the upload,Äôs progress, response metadata, response data, and so on.
See also:

- 8.6.24 uploadTaskWithRequest(request as NSURLRequestMBS, data as MemoryBlock) as NSURLSessionUploadTaskMBS 288
- 8.6.25 uploadTaskWithRequest(request as NSURLRequestMBS, data as MemoryBlock, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS 289
- 8.6.27 uploadTaskWithRequest(request as NSURLRequestMBS, file as FolderItem, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS 291

8.6.27 uploadTaskWithRequest(request as NSURLRequestMBS, file as FolderItem, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that performs an HTTP request for uploading the specified file, then calls a handler upon completion.
Notes: request: An NSURLRequestMBS instance that provides the URL, cache policy, request type, and so on. The body stream and body data in this request object are ignored.
file: The file to upload.
Handler: The completion handler to call when the load request is complete.

An HTTP upload request is any request that contains a request body, such as a POST or PUT request. Upload tasks require you to create a request object so that you can provide metadata for the upload, like HTTP request headers.

Unlike uploadTaskWithRequest, this method returns the response body after it has been received in full, and does not require you to write a custom delegate to obtain the response body.

By using a completion handler, the task bypasses calls to delegate methods for response and data delivery, and instead provides any resulting data, response, or error inside the completion handler. Delegate methods for handling authentication challenges, however, are still called.

Typically you usually pass a nil completion handler only when creating tasks in sessions whose delegates include a dataTaskDidReceiveData method. However, if you do not need the response data, use key-value observing to watch for changes to the task,Äôs status to determine when it completes.

After you create the task, you must start it by calling its resume method.

If the request completes successfully, the data parameter of the completion handler block contains the resource data, and the error parameter is nil. If the request fails, the data parameter is nil, and the error parameter contains information about the failure. If a response from the server is received, regardless of whether the request completes successfully or fails, the response parameter contains that information.
See also:

- 8.6.24 uploadTaskWithRequest(request as NSURLRequestMBS, data as MemoryBlock) as NSURLSessionUploadTaskMBS 288
- 8.6.25 uploadTaskWithRequest(request as NSURLRequestMBS, data as MemoryBlock, handler as NSURLSessionUploadTaskCompletedMBS, tag as Variant = nil) as NSURLSessionDataTaskMBS 289
- 8.6.26 uploadTaskWithRequest(request as NSURLRequestMBS, file as folderItem) as NSURLSessionUploadTaskMBS 290

8.6.28 uploadTaskWithStreamedRequest(request as NSURLRequestMBS) as NSURLSessionUploadTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a task that performs an HTTP request for uploading data based on the specified URL request.
Notes: request: A URL request object that provides the URL, cache policy, request type, and so on. The body stream and body data in this request object are ignored, and the session calls its taskNeedNewBodyStream event to provide the body data.

Returns the new session upload task.

An HTTP upload request is any request that contains a request body, such as a POST or PUT request. Upload tasks require you to provide a request object so that you can provide metadata for the upload, such as HTTP request headers.
After you create the task, you must start it by calling its resume method. The task calls methods on the session,Äôs delegate to provide you with the upload,Äôs progress, response metadata, response data, and so on. The session must have a taskNeedNewBodyStream event that provides the body data to upload.

8.6.29 webSocketTaskWithRequest(request as NSURLRequestMBS) as NSURLSessionWebSocketTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a WebSocket task for the provided URL request.
Notes: request: A URL request that indicates a WebSockets endpoint with which to connect.

You can modify the request,Äôs properties prior to calling resume on the task. The task uses these properties during the HTTP handshake phase.
To add custom protocols, add a header with the key Sec-WebSocket-Protocol, and a comma-separated list of protocols you want to negotiate with the server. The custom HTTP headers provided by the client remain unchanged for the handshake with the server.

8.6.30 webSocketTaskWithURL(URL as String) as NSURLSessionWebSocketTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a WebSocket task for the provided URL.
Notes: url: The WebSocket URL with which to connect.

The provided URL must have a ws or wss scheme.
See also:

- 8.6.31 webSocketTaskWithURL(URL as String, Protocols() as String) as NSURLSessionWebSocketTaskMBS 293

8.6.31 webSocketTaskWithURL(URL as String, Protocols() as String) as NSURLSessionWebSocketTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Creates a WebSocket task given a URL and an array of protocols.
Notes: url: The WebSocket URL with which to connect.
protocols: An array of protocols to negotiate with the server.

During the WebSocket handshake, the task uses the provided protocols to negotiate a preferred protocol with the server.

The protocol doesn,Äôt affect the WebSocket framing. More details on the protocol are available in RFC 6455, The WebSocket Protocol.
See also:

- 8.6.30 webSocketTaskWithURL(URL as String) as NSURLSessionWebSocketTaskMBS 292

8.6.32 Properties

8.6.33 configuration as NSURLSessionConfigurationMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A copy of the configuration object for this session.
Notes: Beginning in iOS 9 and OS X 10.11, NSURLSession objects store a copy of the NSURLSessionConfiguration object passed to their initializers, such that a session,Äôs configuration is immutable after initialization. Any further changes to mutable properties on the configuration object passed to a session,Äôs initializer or the value returned from a session,Äôs configuration property do not affect the behavior of that session. However, you can create a new session with the modified configuration object.
(Read only property)

8.6.34 Handle as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

8.6.35 sessionDescription as String

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: An app-defined descriptive label for the session.
Notes: This property contains a human-readable string that you can use for debugging purposes. This value may be "" and defaults to "". The value is ignored by the session.
(Read and Write property)

8.6.36 Events

8.6.37 dataTaskDidBecomeDownloadTask(dataTask as NSURLSessionDataTaskMBS, downloadTask as NSURLSessionDownloadTaskMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The data task was changed to a download task.
Notes: dataTask: The data task that was replaced by a download task.
downloadTask: The new download task that replaced the data task.

When your dataTaskDidReceiveResponse event uses the ResponseBecomeDownload disposition to convert the request to use a download, the session calls this event to provide you with the new download task. After this call, the session receives no further event calls related to the original data task.

8.6.38 dataTaskDidBecomeStreamTask(dataTask as NSURLSessionDataTaskMBS, downloadTask as NSURLSessionStreamTaskMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The data task was changed to a stream task.
Notes: dataTask: The data task that was replaced by a stream task.
streamTask: The new stream task that replaced the data task.

When your dataTaskDidReceiveResponse event uses the ResponseBecomeStream disposition to convert the request to use a stream, the session calls this event to provide you with the new stream task. After this call, the session receives no further event calls related to the original data task.

For requests that were pipelined, the stream task allows only reading, and the object immediately sends the delegate message writeClosedForStreamTask. You can disable pipelining for all requests in a session by setting the HTTPShouldUsePipelining property on its NSURLSessionConfigurationMBS object, or for individual requests by setting the HTTPShouldUsePipelining property on an NSURLRequestMBS object.

8.6.39 dataTaskDidReceiveData(dataTask as NSURLSessionDataTaskMBS, data as MemoryBlock)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The data task has received some of the expected data.
Notes: dataTask: The data task that provided data.
data: A data object containing the transferred data.

This event may be called more than once, and each call provides only data received since the previous call. The app is responsible for accumulating this data if needed.

8.6.40 dataTaskDidReceiveResponse(dataTask as NSURLSessionDataTaskMBS, response as NSURLResponseMBS) as Integer

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The data task received the initial reply (headers) from the server.
Notes: dataTask:

The data task that received an initial reply.
response: A URL response object populated with headers.

Return your decision whether to continue a transfer, passing a NSURLSessionResponseDisposition constant to indicate whether the transfer should continue as a data task or should become a download task.

- If you pass ResponseAllow, the task continues as a data task.
- If you pass ResponseCancel, the task is canceled.
- If you pass ResponseBecomeDownload, your delegate,Äôs dataTaskDidBecomeDownloadTask method is called to provide the new download task that supersedes the current task.

Implementing this method is optional unless you need to cancel the transfer or convert it to a download task when the response headers are first received. If you don,Äôt provide this event, the session always allows the task to continue.
You also implement this method if you need to support the fairly obscure multipart/x-mixed-replace content

type. With that content type, the server sends a series of parts, each of which is intended to replace the previous part. The session calls this method at the beginning of each part, followed by one or more calls to dataTaskDidReceiveData with the contents of that part.

Each time the dataTaskDidReceiveResponse method is called for a part, collect the data received for the previous part (if any) and process the data as needed for your application. This processing can include storing the data to the filesystem, parsing it into custom types, or displaying it to the user. Next, begin receiving the next part by calling the completion handler with the NSURLSessionResponseAllow constant. Finally, if you have also implemented taskDidCompleteWithError, the session will call it after sending all the data for the last part.

8.6.41 dataTaskWillCacheResponse(dataTask as NSURLSessionDataTaskMBS, proposedResponse as NSCachedURLResponseMBS) as NSCachedURLResponseMBS

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: Asks the event whether the data (or upload) task should store the response in the cache.
Notes: dataTask: The data (or upload) task.
proposedResponse: The default caching behavior. This behavior is determined based on the current caching policy and the values of certain received headers, such as the Pragma and Cache-Control headers.

Please return the new respnose:

Provide either the original proposed response, a modified version of that response, or nil to prevent caching the response.

The session calls this event after the task finishes receiving all of the expected data. If you don,Äôt implement this method, the default behavior is to use the caching policy specified in the session,Äôs configuration object. The primary purpose of this method is to prevent caching of specific URLs or to modify the userInfo dictionary associated with the URL response.

This method is called only if the NSURLProtocol handling the request decides to cache the response. As a rule, responses are cached only when all of the following are true:

- The request is for an HTTP or HTTPS URL (or your own custom networking protocol that supports caching).
- The request was successful (with a status code in the 200–299 range).
- The provided response came from the server, rather than out of the cache.
- The session configuration,Äôs cache policy allows caching.

- The provided NSURLRequestMBS object's cache policy (if applicable) allows caching.
- The cache-related headers in the server,Äôs response (if present) allow caching.
- The response size is small enough to reasonably fit within the cache. (For example, if you provide a disk cache, the response must be no larger than about 5% of the disk cache size.)

8.6.42 didBecomeInvalid(error as NSErrorMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: Tells the URL session that the session has been invalidated.
Notes: error: The error that caused invalidation, or nil if the invalidation was explicit.

If you invalidate a session by calling its finishTasksAndInvalidate method, the session waits until after the final task in the session finishes or fails before calling this event. If you call the invalidateAndCancel method, the session calls this event immediately.

8.6.43 didReceiveChallenge(challenge as NSURLAuthenticationChallengeMBS, byref disposition as Integer, byref credential as NSURLCredentialMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: Requests credentials from the delegate in response to a session-level authentication request from the remote server.
Notes: session: The session containing the task that requested authentication.
challenge: An object that contains the request for authentication.

disposition—One of several constants that describes how the challenge should be handled.
credential—The credential that should be used for authentication if disposition is NSURLSessionAuthChallengeUseCredential, otherwise nil.

This method is called in two situations:

- When a remote server asks for client certificates or Windows NT LAN Manager (NTLM) authentication, to allow your app to provide appropriate credentials
- When a session first establishes a connection to a remote server that uses SSL or TLS, to allow your app to verify the server,Äôs certificate chain

If you do not implement this event, the session calls its delegate,Äôs taskDidReceiveChallenge method instead.
Note

This method handles only the NSURLAuthenticationMethodNTLM, NSURLAuthenticationMethodNegotiate, NSURLAuthenticationMethodClientCertificate, and NSURLAuthenticationMethodServerTrust authentication types. For all other authentication schemes, the session calls only the taskDidReceiveChallenge method.

8.6.44 downloadTaskDidFinishDownloadingToURL(downloadTask as NSURLSessionDownloadTaskMBS, location as String, file as FolderItem)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: A download task has finished downloading.
Notes: downloadTask: The download task that finished.
location: A file URL for the temporary file. Because the file is temporary, you must either open the file for reading or move it to a permanent location in your app,Äôs sandbox container directory before returning from this event.

8.6.45 downloadTaskDidResumeAtOffset(downloadTask as NSURLSessionDownloadTaskMBS, fileOffset as Int64, expectedTotalBytes as Int64)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The download task has resumed downloading.
Notes: downloadTask: The download task that resumed. See explanation in the discussion.
fileOffset: If the file's cache policy or last modified date prevents reuse of the existing content, then this value is zero. Otherwise, this value is an integer representing the number of bytes on disk that do not need to be retrieved again.

In some situations, it may be possible for the transfer to resume earlier in the file than where the previous transfer ended.
expectedTotalBytes: The expected length of the file, as provided by the Content-Length header. If this header was not provided, the value is NSURLSessionTransferSizeUnknown (-1).

If a resumable download task is canceled or fails, you can request a resumeData object that provides enough information to restart the download in the future. Later, you can call downloadTaskWithResumeData with that data.

When you call those methods, you get a new download task. As soon as you resume that task, the session calls this method with that new task to indicate that the download is resumed.

8.6.46 downloadTaskDidWriteData(downloadTask as NSURLSessionDownloadTaskMBS, bytesWritten as Int64, totalBytesWritten as Int64, totalBytesExpectedToWrite as Int64)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: Periodically informs the delegate about the download,Äôs progress.
Notes: downloadTask: The download task.
bytesWritten: The number of bytes transferred since the last time this event was called.
totalBytesWritten: The total number of bytes transferred so far.
totalBytesExpectedToWrite: The expected length of the file, as provided by the Content-Length header. If this header was not provided, the value is NSURLSessionTransferSizeUnknown (-1).

8.6.47 streamTaskBetterRouteDiscoveredForStreamTask(streamTask as NSURLSessionStreamTaskMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: A better route to the host has been detected for the stream.
Notes: streamTask: The stream task that discovered a better route.

This method is called when the URL loading system determines that a better route to the endpoint host is available. For example, this method may be called when a Wi-Fi interface becomes available.
You should consider completing pending work and creating a new stream task in order to take advantage of better routes when they become available.

8.6.48 streamTaskDidBecomeInputStream(streamTask as NSURLSessionStreamTaskMBS, inputStream as NSInputStreamMBS, outputStream as NSOutputStreamMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The stream task has been completed as a result of the stream task calling the captureStreams method.
Notes: streamTask: The stream task that has been completed.
inputStream: The created input stream. This NSInputStream object is unopened.
outputStream: The created output stream. This NSOutputStream object is unopened

This event will only be called after all enqueued reads and writes for the stream task have been completed.

8.6.49 streamTaskReadClosedForStreamTask(streamTask as NSURLSessionStreamTaskMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The read side of the underlying socket has been closed.
Notes: streamTask: The stream task that closed reads.

This method may be called even if no reads are currently in progress. This method does not indicate that the stream reached end-of-file (EOF), such that no more data can be read.

8.6.50 streamTaskWriteClosedForStreamTask(streamTask as NSURLSessionStreamTaskMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The write side of the underlying socket has been closed.
Notes: streamTask: The stream task that closed writes.

This method may be called even if no writes are currently in progress.

8.6.51 taskDidCompleteWithError(task as NSURLSessionTaskMBS, error as NSErrorMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The task finished transferring data.
Notes: task: The task whose request finished transferring data.
error: If an error occurred, an error object indicating how the transfer failed, otherwise nil.

Server errors are not reported through the error parameter. The only errors your delegate receives through the error parameter are client-side errors, such as being unable to resolve the hostname or connect to the host.

8.6.52 taskDidFinishCollectingMetrics(task as NSURLSessionTaskMBS, metrics as NSURLSessionTaskMetricsMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The session finished collecting metrics for the task.
Notes: task: The task whose metrics have been collected.

metrics: The collected metrics.

8.6.53 taskDidSendBodyData(task as NSURLSessionTaskMBS, bytesSent as Int64, totalBytesSent as Int64, totalBytesExpectedToSend as Integer)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: Periodically informs the delegate of the progress of sending body content to the server.
Notes: task: The data task.
bytesSent: The number of bytes sent since the last time this event was called.
totalBytesSent: The total number of bytes sent so far.
totalBytesExpectedToSend: The expected length of the body data. The URL loading system can determine the length of the upload data in three ways:

- From the length of the NSData object provided as the upload body.
- From the length of the file on disk provided as the upload body of an upload task (not a download task).
- From the Content-Length in the request object, if you explicitly set it.

Otherwise, the value is NSURLSessionTransferSizeUnknown (-1) if you provided a stream or body data object, or zero (0) if you did not.

The totalBytesSent and totalBytesExpectedToSend parameters are also available as NSURLSessionTaskMBS properties countOfBytesSent and countOfBytesExpectedToSend.

8.6.54 taskIsWaitingForConnectivity(task as NSURLSessionTaskMBS)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The task is waiting until suitable connectivity is available before beginning the network load.
Notes: task: The task that is waiting for a change in connectivity.

This method is called if the waitsForConnectivity property of NSURLSessionConfigurationMBS is true, and sufficient connectivity is unavailable. The delegate can use this opportunity to update the user interface; for example, by presenting an offline mode or a cellular-only mode.

This method is called, at most, once per task, and only if connectivity is initially unavailable. It is never called for background sessions because waitsForConnectivity is ignored for those sessions.

8.6.55 taskWillPerformHTTPRedirection(task as NSURLSessionTaskMBS, response as NSURLResponseMBS, request as NSURLRequestMBS) as NSURLRequestMBS

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The remote server requested an HTTP redirect.
Notes: task: The task whose request resulted in a redirect.
response: An object containing the server,Äôs response to the original request.
request: A URL request object filled out with the new location.

Return either the value of the request parameter, a modified URL request object, or NULL to refuse the redirect and return the body of the redirect response.

This method is called only for tasks in default and ephemeral sessions. Tasks in background sessions automatically follow redirects.

8.6.56 webSocketTaskDidCloseWithCode(webSocketTask as NSURLSessionWebSocketTaskMBS, closeCode as Integer, reason as MemoryBlock)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The WebSocket task received a close frame from the server endpoint, optionally including a close code and reason from the server.
Notes: webSocketTask: The WebSocket task that closed.
closeCode: The close code provided by the server. If the close frame didn,Äôt include a close code, this value is 0.
reason: The close reason provided by the server. If the close frame didn,Äôt include a reason, this value is nil.

8.6.57 webSocketTaskDidOpenWithProtocol(webSocketTask as NSURLSessionWebSocketTaskMBS, protocol as String)

Plugin Version: 20.2, Platform: macOS, Targets: .

Function: The WebSocket task successfully negotiated the handshake with the endpoint, indicating the negotiated protocol.
Notes: webSocketTask: The WebSocket task that opened.
protocol: The protocol picked during the handshake phase. This parameter is nil if the server did not pick a protocol, or if the client did not advertise protocols when creating the task.

If the handshake fails, the task doesn,Äôt call this event.

8.6.58 Constants

Auth Challenge Disposition Modes

Constant	Value	Description
AuthChallengeCancelAuthenticationChallenge	2	The entire request will be canceled; the credential parameter is i
AuthChallengePerformDefaultHandling	1	Default handling for the challenge - as if this delegate were not the credential parameter is ignored.
AuthChallengeRejectProtectionSpace	3	This challenge is rejected and the next authentication protection be tried; the credential parameter is ignored.
AuthChallengeUseCredential	0	Use the specified credential, which may be nil

Delayed Request Disposition

Constant	Value	Description
DelayedRequestCancel	2	Cancel the task; the request parameter is ignored.
DelayedRequestContinueLoading	0	Use the original request provided when the task was created; the request parameter is ignored.
DelayedRequestUseNewRequest	1	Use the specified request, which may not be nil.

Response Disposition

Constant	Value	Description
ResponseAllow	1	Allow the load operation to continue.
ResponseBecomeDownload	2	Convert the response for this request to use a NSURLSessionDownloadTaskMBS.
ResponseBecomeStream	3	Convert the response for this request to use a NSURLSessionStreamTaskMBS.
ResponseCancel	0	Cancel the load.

8.6.59 Delegates

8.6.60 NSURLSessionAllTasksCompletedMBS(tasks() as NSURLSessionTaskMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Asynchronously calls a completion callback with all tasks in a session.
Notes: Handler: The completion handler to call with the list of tasks.

8.6.61 NSURLSessionDataTaskCompletedMBS(data as MemoryBlock, response as NSURLResponseMBS, error as NSErrorMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The completion handler to call when the load request is complete.
Notes: data: The data returned by the server.
response: An object that provides response metadata, such as HTTP headers and status code. If you are making an HTTP or HTTPS request, the returned object is actually an NSHTTPURLResponseMBS object.
error: An error object that indicates why the request failed, or nil if the request was successful.

8.6.62 NSURLSessionDownloadTaskCompletedMBS(location as String, file as FolderItem, response as NSURLResponseMBS, error as NSErrorMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The completion handler to call when the load request is complete.
Notes: location: The location of a temporary file where the server,Äôs response is stored. You must move this file or open it for reading before your completion handler returns. Otherwise, the file is deleted, and the data is lost.
response: An object that provides response metadata, such as HTTP headers and status code. If you are making an HTTP or HTTPS request, the returned object is actually an NSHTTPURLResponse object.
error: An error object that indicates why the request failed, or nil if the request was successful.

For your convenience we provide a folderitem for the location URL.

8.6.63 NSURLSessionFlushCompletedMBS(tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The completion handler to call when the flush operation is complete.

8.6.64 NSURLSessionResetCompletedMBS(tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The completion handler to call when the reset operation is complete.

8.6.65 NSURLSessionTasksCompletedMBS(dataTasks() as NSURLSessionDataTaskMBS, uploadTasks() as NSURLSessionUploadTaskMBS, downloadTasks() as NSURLSessionDownloadTaskMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The completion handler to call with the list of tasks.
Notes: The arrays passed to the completion handler contain any tasks that you have created within the session, not including any tasks that have been invalidated after completing, failing, or being cancelled.

8.6.66 NSURLSessionUploadTaskCompletedMBS(data as MemoryBlock, response as NSURLResponseMBS, error as NSErrorMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The completion handler to call when the load request is complete.
Notes: data: The data returned by the server.
response: An object that provides response metadata, such as HTTP headers and status code. If you are making an HTTP or HTTPS request, the returned object is actually an NSHTTPURLResponse object.
error: An error object that indicates why the request failed, or nil if the request was successful.

8.7 class NSURLSessionStreamTaskMBS

8.7.1 class NSURLSessionStreamTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A URL session task that is stream-based.
Notes: NSURLSessionStreamTaskMBS is a concrete subclass of NSURLSessionTaskMBS. Many of the methods in the NSURLSessionStreamTaskMBS class are documented in NSURLSessionTaskMBS.
The NSURLSessionStreamTaskMBS class provides an interface a TCP/IP connection created via NSURLSession. Tasks may be created from an NSURLSession using the streamTaskWithHostName and streamTaskWithNetService methods. They may also created as a result of an NSURLSessionDataTaskMBS being upgraded via the HTTP Upgrade: response header and appropriate use of the HTTPShouldUsePipelining option of NSURLSessionConfigurationMBS.

See RFC 2817 and RFC 6455 for information about the Upgrade: header.
An NSURLSessionStreamTask object perform sasynchronous reads and writes, which are enqueued and executed serially, calling a handler upon completion being on the session delegate queue. If the task is canceled, all enqueued reads and writes will call their completion handlers with an appropriate error.

When working with APIs that accept NSStreamMBS objects, you can create NSInputStreamMBS and NSOutputStreamMBS objects from an NSURLSessionStreamTaskMBS object by calling the captureStreams method.
Subclass of the NSURLSessionTaskMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Adding NSURLSession classes for Xojo

8.7.2 Methods

8.7.3 captureStreams

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Completes any already enqueued reads and writes, and then invokes the streamTaskDidBecomeInputStream event.

8.7.4 closeRead

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Completes any enqueued reads and writes, and then closes the read side of the underlying socket.
Notes: You may continue to write data using the writeData method after calling this method. Any calls to

readData after calling this method will result in an error.

8.7.5 closeWrite

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Completes any enqueued reads and writes, and then closes the write side of the underlying socket.
Notes: You may continue to read data using the readDat method after calling this method. Any calls to writeData after calling this method will result in an error.
Because the server may continue to write bytes to the client, it is recommended that you continue reading until the stream reaches end-of-file (EOF).

8.7.6 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The private constructor.

8.7.7 readData(minBytes as Integer, maxBytes as Integer, timeout as Double, Handler as NSURLSessionStreamTaskReadDataCompletedMBS, tag as variant = nil)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Asynchronously reads a number of bytes from the stream, and calls a handler upon completion.
Notes: minBytes: The minimum number of bytes to read.
maxBytes: The maximum number of bytes to read.
timeout: A timeout for reading bytes. If the read is not completed within the specified interval, the read is canceled and the completionHandler is called with an error. Pass 0 to prevent a read from timing out.

Handler: The completion handler to call when all bytes are read, or an error occurs.

8.7.8 startSecureConnection

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Completes any enqueued reads and writes, and establishes a secure connection.
Notes: Authentication callbacks are sent to the taskDidReceiveChallenge event in NSURLSessionMBS class.

8.7.9 writeData(data as MemoryBlock, timeout as Double, Handler as NSURLSessionStreamTaskWriteDataCompletedMBS, tag as variant = nil)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Asynchronously writes the specified data to the stream, and calls a handler upon completion.
Notes: data: The data to be written.
timeout: A timeout for writing bytes. If the write is not completed within the specified interval, the write is canceled and the completionHandler is called with an error. Pass 0 to prevent a write from timing out.

completionHandler: The completion handler to call when all bytes are written, or an error occurs.

There is no guarantee that the remote side of the stream has received all of the written bytes at the time that completionHandler is called, only that all of the data has been written to the kernel.

8.7.10 Delegates

8.7.11 NSURLSessionStreamTaskReadDataCompletedMBS(streamTask as NSURLSessionStreamTaskMBS, data as MemoryBlock, atEOF as Boolean, error as NSErrorMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The completion handler to call when all bytes are read, or an error occurs.
Notes: data: The data read from the stream.
atEOF: Whether or not the stream reached end-of-file (EOF), such that no more data can be read.
error: An error object that indicates why the read failed, or nil if the read was successful.

8.7.12 NSURLSessionStreamTaskWriteDataCompletedMBS(streamTask as NSURLSessionStreamTaskMBS, error as NSErrorMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The completion handler to call when all bytes are written, or an error occurs.
Notes: error: An error object that indicates why the write failed, or nil if the write was successful.

8.8 class NSURLSessionTaskMBS

8.8.1 class NSURLSessionTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A task, like downloading a specific resource, performed in a URL session.
Notes: The NSURLSessionTaskMBS class is the base class for tasks in a URL session. Tasks are always part of a session; you create a task by calling one of the task creation methods on a NSURLSession instance. The method you call determines the type of task.

- Use NSURLSessionMBS,Äôs dataTaskWithURL and related methods to create NSURLSessionDataTaskMBS instances. Data tasks request a resource, returning the server,Äôs response as one or more NSData objects in memory. They are supported in default, ephemeral, and shared sessions, but are not supported in background sessions.
- Use NSURLSessionMBS,Äôs uploadTaskWithRequest and related methods to create NSURLSessionUploadTaskMBS instances. Upload tasks are like data tasks, except that they make it easier to provide a request body so you can upload data before retrieving the server,Äôs response. Additionally, upload tasks are supported in background sessions.
- Use NSURLSessionMBS,Äôs downloadTaskWithURL and related methods to create NSURLSessionDownloadTaskMBS instances. Download tasks download a resource directly to a file on disk. Download tasks are supported in any type of session.
- Use NSURLSessionMBS,Äôs streamTaskWithHostName or streamTaskWithNetService to create NSURLSessionStreamTaskMBS instances. Stream tasks establish a TCP/IP connection from a host name and port or a net service object.

After you create a task, you start it by calling its resume method. The session then maintains a strong reference to the task until the request finishes or fails; you don,Äôt need to maintain a reference to the task unless it,Äôs useful for your app,Äôs internal bookkeeping.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Xojo Plugins, version 22.2pr7
- Adding NSURLSession classes for Xojo

8.8.2 Methods

8.8.3 available as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.9 or newer.

8.8.4 Cancel

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Cancels the task.
Notes: This method returns immediately, marking the task as being canceled. Once a task is marked as being canceled, taskDidCompleteWithError event is called, passing an error in the domain NSURLErrorDomain with the code NSURLErrorCancelled. A task may, under some circumstances, send messages to its delegate before the cancelation is acknowledged.
This method may be called on a task that is suspended.

8.8.5 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The private constructor.

8.8.6 copy as NSURLSessionTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Copies the task.

8.8.7 PriorityDefault as Single

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: One of the priorities.
Notes: The default URL session task priority, used implicitly for any task you have not prioritized. The floating point value of this constant is 0.5.

8.8.8 PriorityHigh as Single

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: One of the priorities.
Notes: A high URL session task priority, with a floating point value above the default value and below the maximum of 1.0.

8.8.9 PriorityLow as Single

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: One of the priorities.
Notes: A low URL session task priority, with a floating point value above the minimum of 0 and below the default value.

8.8.10 resume

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Resumes the task, if it is suspended.
Notes: Newly-initialized tasks begin in a suspended state, so you need to call this method to start the task.

8.8.11 suspend

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Temporarily suspends a task.
Notes: A task, while suspended, produces no network traffic and is not subject to timeouts. A download task can continue transferring data at a later time. All other tasks must start over when resumed.

8.8.12 Properties

8.8.13 countOfBytesClientExpectsToReceive as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A best-guess upper bound on the number of bytes the client expects to receive.
Notes: The value set for this property should account for the size of both HTTP response headers and the response body. If no value is specified, the system uses -1 instead. This property is used by the system to optimize the scheduling of URL session tasks. Developers are strongly encouraged to provide an approximate upper bound, or an exact byte count, if possible, rather than accept the default.
(Read only property)

8.8.14 countOfBytesClientExpectsToSend as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A best-guess upper bound on the number of bytes the client expects to send.

Notes: The value set for this property should account for the size of HTTP headers and body data or body stream. If no value is specified, the system uses -1 instead. This property is used by the system to optimize the scheduling of URL session tasks. Developers are strongly encouraged to provide an approximate upper bound, or an exact byte count, if possible, rather than accept the default.
(Read only property)

8.8.15 countOfBytesExpectedToReceive as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The number of bytes that the task expects to receive in the response body.
Notes: This value is determined based on the Content-Length header received from the server. If that header is absent, the value is NSURLSessionTransferSizeUnknown = -1.
(Read only property)

8.8.16 countOfBytesExpectedToSend as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The number of bytes that the task expects to send in the request body.
Notes: The URL loading system can determine the length of the upload data in three ways:

- From the length of the data object provided as the upload body.
- From the length of the file on disk provided as the upload body of an upload task (not a download task).
- From the Content-Length in the request object, if you explicitly set it.

Otherwise, the value is NSURLSessionTransferSizeUnknown (-1) if you provided a stream or body data object, or zero (0) if you did not.
(Read only property)

8.8.17 countOfBytesReceived as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The number of bytes that the task has received from the server in the response body.
Notes: To be notified when this value changes, implement the dataTaskDidReceiveData event (for data and upload tasks) or the downloadTaskDidWriteData event (for download tasks).
(Read only property)

8.8.18 countOfBytesSent as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The number of bytes that the task has sent to the server in the request body.
Notes: This byte count includes only the length of the request body itself, not the request headers.
To be notified when this value changes, implement the taskDidSendBodyData event in your NSURLSessionMBS class.
(Read only property)

8.8.19 currentRequest as NSURLRequestMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The URL request object currently being handled by the task.
Notes: This value is typically the same as the initial request (originalRequest) except when the server has responded to the initial request with a redirect to a different URL.
(Read only property)

8.8.20 earliestBeginDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The earliest date at which the network load should begin.
Notes: For tasks created from background NSURLSessionMBS instances, this property indicates that the network load should not begin any earlier than this date. Setting this property does not guarantee that the load will begin at the specified date, but only that it will not begin sooner. If not specified, no start delay is used.
This property has no effect for tasks created from nonbackground sessions.
(Read and Write property)

8.8.21 earliestBeginDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The earliest date at which the network load should begin.
Notes: For tasks created from background NSURLSessionMBS instances, this property indicates that the network load should not begin any earlier than this date. Setting this property does not guarantee that the load will begin at the specified date, but only that it will not begin sooner. If not specified, no start delay is used.
This property has no effect for tasks created from nonbackground sessions.
(Read and Write property)

8.8.22 error as NSErrorMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: An error object that indicates why the task failed.
Notes: This value is nil if the task is still active or if the transfer completed successfully.
(Read only property)

8.8.23 Handle as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

8.8.24 originalRequest as NSURLRequestMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The original request object passed when the task was created.
Notes: This value is typically the same as the currently active request (currentRequest) except when the server has responded to the initial request with a redirect to a different URL.
(Read only property)

8.8.25 Priority as Single

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The relative priority at which you,Äôd like a host to handle the task, specified as a floating point value between 0.0 (lowest priority) and 1.0 (highest priority).
Notes: To provide hints to a host on how to prioritize URL session tasks from your app, specify a priority for each task. Specifying a priority provides only a hint and does not guarantee performance. If you don,Äôt specify a priority, a URL session task has a priority of NSURLSessionTaskPriorityDefault, with a value of 0.5.

There are three named priorities you can employ, described in URL Session Task Priority.

You can specify or change a task,Äôs priority at any time, but not all networking protocols respond to changes after a task has started. There is no API to let you determine the effective priority for a task from a host,Äôs perspective.
(Read and Write property)

8.8.26 response as NSURLResponseMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The server,Äôs response to the currently active request.
Notes: This object provides information about the request as provided by the server. This information always includes the original URL. It may also include an expected length, MIME type information, encoding information, a suggested filename, or a combination of these.
(Read only property)

8.8.27 state as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The current state of the task—active, suspended, in the process of being canceled, or completed.
Notes: (Read only property)

8.8.28 taskDescription as String

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: An app-provided string value for the current task.
Notes: The system doesn,Äôt interpret this value; use it for whatever purpose you see fit. For example, you could store a description of the task for debugging purposes, or a key to track the task in your own data structures.
(Read and Write property)

8.8.29 taskIdentifier as UInt64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: An identifier uniquely identifying the task within a given session.
Notes: This value is unique only within the context of a single session; tasks in other sessions may have the same taskIdentifier value.
(Read only property)

8.8.30 Constants

States

Constant	Value	Description
StateCanceling	2	The task has received a cancel message. The delegate may or may not have received a taskDidCompleteWithError message yet. A task in this state is not subject to timeouts.
StateCompleted	3	The task has completed (without being canceled), and the task's delegate receives no further callbacks. If the task completed successfully, the task,Äôs error property is nil. Otherwise, it provides an error object that tells what went wrong. A task in this state is not subject to timeouts.
StateRunning	0	The task is currently being serviced by the session. A task in this state is subject to the request and resource timeouts specified in the session configuration object.
StateSuspended	1	The task was suspended by the app. No further processing takes place until the task is resumed. A task in this state is not subject to timeouts.

8.9 class NSURLSessionTaskMetricsMBS

8.9.1 class NSURLSessionTaskMetricsMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: An object encapsulating the metrics for a session task.
Notes: Each NSURLSessionTaskMetricsMBS object contains the taskInterval and redirectCount, as well as metrics for each request-and-response transaction made during the execution of the task.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.9.2 Methods

8.9.3 available as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.12 or newer.

8.9.4 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The private constructor.

8.9.5 transactionMetrics as NSURLSessionTaskTransactionMetricsMBS()

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: An array of metrics for each individual request-response transaction made during the execution of the task.

8.9.6 Properties

8.9.7 Handle as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

8.9.8 redirectCount as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The number of redirects that occurred during the execution of the task.
Notes: (Read only property)

8.9.9 taskInterval as NSDateIntervalMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The time interval between when a task is instantiated and when the task is completed.
Notes: (Read only property)

8.10 class NSURLSessionTaskTransactionMetricsMBS

8.10.1 class NSURLSessionTaskTransactionMetricsMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: An object that encapsualtes the performance metrics collected by the URL Loading System during the execution of a session task.
Notes: Each NSURLSessionTaskTransactionMetricsMBS object consists of a request and response property, corresponding to the request and response of the corresponding task. It also contains temporal metrics, starting with fetchStartDate and ending with responseEndDate, as well as other characteristics like networkProtocolName and resourceFetchType.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.10.2 Methods

8.10.3 available as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Wether this class is available.
Notes: Returns true on MacOS 10.12 or later.
Some properties are MacOS 10.15 or later.

8.10.4 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The private constructor.

8.10.5 Properties

8.10.6 Cellular as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether the connection operates over a cellular interface.
Notes: You permit or deny use of cellular interfaces with the allowsCellularAccess property on NSURLSessionConfigurationMBS or allowsCellularAccess on NSMutableURLRequestMBS.
(Read only property)

8.10.7 connectEndDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time immediately after the task finished establishing the connection to the server.
Notes: This value accounts for completion of security-related and other handshakes. The value will be nil if a persistent connection is used, or if the resource is retrieved from local resources.
(Read only property)

8.10.8 connectEndDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time immediately after the task finished establishing the connection to the server.
Notes: This value accounts for completion of security-related and other handshakes. The value will be nil if a persistent connection is used, or if the resource is retrieved from local resources.
(Read only property)

8.10.9 connectStartDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time immediately before the task started establishing a TCP connection to the server.
Notes: This value will be nil if a persistent connection is used, or if the resource is retrieved from local resources.
(Read only property)

8.10.10 connectStartDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time immediately before the task started establishing a TCP connection to the server.
Notes: This value will be nil if a persistent connection is used, or if the resource is retrieved from local resources.
(Read only property)

8.10.11 Constrained as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Whether this is a constrained network.
Notes: (Read only property)

8.10.12 countOfRequestBodyBytesBeforeEncoding as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The size of the upload body data, file, or stream, in bytes.
Notes: (Read only property)

8.10.13 countOfRequestBodyBytesSent as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The number of bytes transferred for the request body.
Notes: This value includes protocol-specific framing, transfer encoding, and content encoding.
(Read only property)

8.10.14 countOfRequestHeaderBytesSent as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The number of bytes transferred for the request header.
Notes: (Read only property)

8.10.15 countOfResponseBodyBytesAfterDecoding as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The size of data delivered to your delegate or completion handler.
Notes: (Read only property)

8.10.16 countOfResponseBodyBytesReceived as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The number of bytes transferred for the response body.
Notes: This value includes protocol-specific framing, transfer encoding, and content encoding.
(Read only property)

8.10.17 countOfResponseHeaderBytesReceived as Int64

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The number of bytes transferred for the response header.
Notes: (Read only property)

8.10.18 domainLookupEndDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time after the name lookup was completed.
Notes: This value will be nil if a persistent connection was used, or if the resource was retrieved from local resources.
(Read only property)

8.10.19 domainLookupEndDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time after the name lookup was completed.
Notes: This value will be nil if a persistent connection was used, or if the resource was retrieved from local resources.
(Read only property)

8.10.20 domainLookupStartDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time immediately before the task started the name lookup for the resource.
Notes: This value will be nil if a persistent connection was used, or if the resource was retrieved from local resources.
(Read only property)

8.10.21 domainLookupStartDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time immediately before the task started the name lookup for the resource.
Notes: This value will be nil if a persistent connection was used, or if the resource was retrieved from local resources.

(Read only property)

8.10.22 Expensive as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether the connection operates over an expensive interface.
Notes: An expensive interface is one which is more costly or consumes more power, such as 3G or LTE as compared to ethernet or Wi-Fi. You permit or deny use of expensive interfaces with the allowsExpensiveNetworkAccess property on NSURLSessionConfigurationMBS or allowsExpensiveNetworkAccess on NSMutableURLRequestMBS.
(Read only property)

8.10.23 fetchStartDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time when the task started fetching the resource, from the server or locally.
Notes: (Read only property)

8.10.24 fetchStartDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time when the task started fetching the resource, from the server or locally.
Notes: (Read only property)

8.10.25 Handle as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

8.10.26 localAddress as String

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The IP address string of the local interface for the connection.
Notes: For multipath protocols, this is the local address of the initial flow. If the app didn,Äôt use the

connection, this value is empty.
(Read only property)

8.10.27 localPort as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The port number of the local interface for the connection.
Notes: For multipath protocols, this is the local port of the initial flow. If the app didn,Äôt use the connection, this value is 0.
(Read only property)

8.10.28 Multipath as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether the connection uses a successfully negotiated multipath protocol.
Notes: You configure the use of multipath protocols with the multipathServiceType property on NSURLSessionConfigurationMBS.
(Read only property)

8.10.29 negotiatedTLSCipherSuite as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The TLS cipher suite the task negotiated with the endpoint for the connection.
Notes: This value is a 2-byte sequence in host byte order. See TLSCipherSuite* constants for possible values. If the task didn,Äôt negotiate an encrypted connection, this value is 0.
(Read only property)

8.10.30 negotiatedTLSProtocolVersion as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The TLS protocol version the task negotiated with the endpoint for the connection.
Notes: This value is a 2-byte sequence in host byte order. See TLSProtocolVersion* constants for possible values. If the task didn,Äôt negotiate an encrypted connection, this value is 0.
(Read only property)

8.10.31 networkProtocolName as String

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The network protocol used to fetch the resource.
Notes: When a proxy is configured and a tunnel connection is established, this attribute returns the value for the tunneled protocol, which is identified by the ALPN Protocol ID Identification Sequence, as per RFC 7310. For example:

- If no proxy is used, and HTTP/2 is negotiated, then h2 is returned.
- If HTTP/1.1 is used with the proxy, and the tunneled connection is HTTP/2, then h2 is returned.
- If HTTP/1.1 is used with the proxy, and there,Äôs no tunnel, then http/1.1 is returned.

(Read only property)

8.10.32 ProxyConnection as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that indicastes whether the task used a proxy connection to fetch the resource.
Notes: (Read only property)

8.10.33 remoteAddress as String

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The IP address string of the remote interface for the connection.
Notes: For multipath protocols, this is the remote address of the initial flow. If the app didn,Äôt use the connection, this value is empty.
(Read only property)

8.10.34 remotePort as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The port number of the remote interface for the connection.
Notes: For multipath protocols, this is the remote port of the initial flow. If the app didn,Äôt use the connection, this value is 0.
(Read only property)

8.10.35 request as NSURLRequestMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The transaction request.
Notes: (Read only property)

8.10.36 requestEndDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time immediately after the task finished requesting the resource, regardless of whether it was retrieved from the server or local resources.
Notes: (Read only property)

8.10.37 requestEndDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time immediately after the task finished requesting the resource, regardless of whether it was retrieved from the server or local resources.
Notes: (Read only property)

8.10.38 requestStartDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time immediately before the task started requesting the resource, regardless of whether it is retrieved from the server or local resources.
Notes: (Read only property)

8.10.39 requestStartDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time immediately before the task started requesting the resource, regardless of whether it is retrieved from the server or local resources.
Notes: (Read only property)

8.10.40 resourceFetchType as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A value that indicates whether the resource was loaded, pushed, or retrieved from the local cache.
Notes: (Read only property)

8.10.41 response as NSURLResponseMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The transaction response.
Notes: This property is nil if an error occurred and no response was generated.
(Read only property)

8.10.42 responseEndDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time immediately after the task received the last byte of the resource.
Notes: (Read only property)

8.10.43 responseEndDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time immediately after the task received the last byte of the resource.
Notes: (Read only property)

8.10.44 responseStartDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time immediately after the task received the first byte of the response from the server or from local resources.
Notes: (Read only property)

8.10.45 responseStartDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time immediately after the task received the first byte of the response from the server or from local resources.
Notes: (Read only property)

8.10.46 ReusedConnection as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether the task used a persistent connection to fetch the resource.
Notes: (Read only property)

8.10.47 secureConnectionEndDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time immediately after the security handshake completed.
Notes: This value is nil if an encrypted connection isn,Äôt used, if a persistent connection is used, or if the resource is retrieved from local resources.
(Read only property)

8.10.48 secureConnectionEndDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time immediately after the security handshake completed.
Notes: This value is nil if an encrypted connection isn,Äôt used, if a persistent connection is used, or if the resource is retrieved from local resources.
(Read only property)

8.10.49 secureConnectionStartDate as Date

Plugin Version: 20.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time immediately before the task started the TLS security handshake to secure the current connection.
Notes: This value is nil if an encrypted connection isn,Äôt used, if a persistent connection is used, or if the resource is retrieved from local resources.

(Read only property)

8.10.50 secureConnectionStartDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time immediately before the task started the TLS security handshake to secure the current connection.
Notes: This value is nil if an encrypted connection isn,Äôt used, if a persistent connection is used, or if the resource is retrieved from local resources.
(Read only property)

8.10.51 Constants

Fetch Types

Constant	Value	Description
FetchTypeLocalCache	3	The resource was retrieved from the local storage.
FetchTypeNetworkLoad	1	The resource was loaded over the network.
FetchTypeServerPush	2	The resource was pushed by the server to the client.
FetchTypeUnknown	0	The manner in which the resource was fetched could not be determined.

TLS Chipher Suites

Constant	Value	Description
TLSCipherSuite_AES_128_GCM_SHA256	&h1301	AES 128 GCM SHA256
TLSCipherSuite_AES_256_GCM_SHA384	&h1302	AES 256 GCM SHA384
TLSCipherSuite_CHACHA20_POLY1305_SHA256	&h1303	CHACHA20 POLY1305 SH
TLSCipherSuite_ECDHE_ECDSA_WITH_3DES_EDE_CBC_SHA	&hC008	ECDHE ECDSA with 3DE
TLSCipherSuite_ECDHE_ECDSA_WITH_AES_128_CBC_SHA	&hC009	ECDHE ECDSA with AES
TLSCipherSuite_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	&hC023	ECDHE ECDSA with AES
TLSCipherSuite_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	&hC02B	ECDHE ECDSA with AES
TLSCipherSuite_ECDHE_ECDSA_WITH_AES_256_CBC_SHA	&hC00A	ECDHE ECDSA with AES
TLSCipherSuite_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384	&hC024	ECDHE ECDSA with AES
TLSCipherSuite_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	&hC02C	ECDHE ECDSA with AES
TLSCipherSuite_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256	&hCCA9	ECDHE ECDSA with CH
TLSCipherSuite_ECDHE_RSA_WITH_3DES_EDE_CBC_SHA	&hC012	ECDHE RSA with 3DES E
TLSCipherSuite_ECDHE_RSA_WITH_AES_128_CBC_SHA	&hC013	ECDHE RSA with AES 12
TLSCipherSuite_ECDHE_RSA_WITH_AES_128_CBC_SHA256	&hC027	ECDHE RSA with AES 12
TLSCipherSuite_ECDHE_RSA_WITH_AES_128_GCM_SHA256	&hC02F	ECDHE RSA with AES 12
TLSCipherSuite_ECDHE_RSA_WITH_AES_256_CBC_SHA	&hC014	ECDHE RSA with AES 25
TLSCipherSuite_ECDHE_RSA_WITH_AES_256_CBC_SHA384	&hC028	ECDHE RSA with AES 25
TLSCipherSuite_ECDHE_RSA_WITH_AES_256_GCM_SHA384	&hC030	ECDHE RSA with AES 25
TLSCipherSuite_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256	&hCCA8	ECDHE RSA WITH CHA
TLSCipherSuite_RSA_WITH_3DES_EDE_CBC_SHA	&h000A	RSA with 3DES EDE CBC
TLSCipherSuite_RSA_WITH_AES_128_CBC_SHA	&h002F	RSA with AES 128 CBC S
TLSCipherSuite_RSA_WITH_AES_128_CBC_SHA256	&h003C	RSA with AES 128 CBC S
TLSCipherSuite_RSA_WITH_AES_128_GCM_SHA256	&h009C	RSA with AES 1128 GCM
TLSCipherSuite_RSA_WITH_AES_256_CBC_SHA	&h0035	RSA with AES 256 CBC S
TLSCipherSuite_RSA_WITH_AES_256_CBC_SHA256	&h003D	RSA with AES 256 CBC S
TLSCipherSuite_RSA_WITH_AES_256_GCM_SHA384	&h009D	RSA with AES 256 GCM

TLS Protocol Version

Constant	Value	Description
TLSProtocolVersionDTLSv10	&hfeff	The DTLS 1.0 protocol.
TLSProtocolVersionDTLSv12	&hfefd	The DTLS 1.2 protocol.
TLSProtocolVersionTLSv10	&h0301	The TLS 1.0 protocol.
TLSProtocolVersionTLSv11	&h0302	The TLS 1.1 protocol.
TLSProtocolVersionTLSv12	&h0303	The TLS 1.2 protocol.
TLSProtocolVersionTLSv13	&h0304	The TLS 1.3 protocol.

8.11 class NSURLSessionUploadTaskMBS

8.11.1 class NSURLSessionUploadTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A URL session task that uploads data to the network in a request body.
Notes: The NSURLSessionUploadTaskMBS class is a subclass of NSURLSessionDataTaskMBS, which in turn is a concrete subclass of NSURLSessionTaskMBS. The methods associated with the NSURLSessionUploadTaskMBS class are documented in NSURLSessionTaskMBS.
Upload tasks are used for making HTTP requests that require a request body (such as POST or PUT). They behave similarly to data tasks, but you create them by calling different methods on the session that are designed to make it easier to provide the content to upload. As with data tasks, if the server provides a response, upload tasks return that response as one or more MemoryBlock objects in memory.

Unlike data tasks, you can use upload tasks to upload content in the background.

When you create an upload task, you provide a NSURLRequestMBS instance that contains any additional headers that you might need to send alongside the upload, such as the content type, content disposition, and so on. In iOS, when you create an upload task for a file in a background session, the system copies that file to a temporary location and streams data from there.
While the upload is in progress, the task calls the session taskDidSendBodyData event in NSURLSessionMBS class periodically to provide you with status information.

When the upload phase of the request finishes, the task behaves like a data task, calling events on the session to provide you with the server,Äôs response—headers, status code, content data, and so on.
Subclass of the NSURLSessionDataTaskMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Adding NSURLSession classes for Xojo

8.11.2 Methods

8.11.3 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The private constructor.

8.12 class NSURLSessionWebSocketMessageMBS

8.12.1 class NSURLSessionWebSocketMessageMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The client can create a WebSocket message object that will be passed to the send calls and will be delivered from the receive calls.
Notes: The message can be initialized with data or string. If initialized with data, the string property will be nil and vice versa.
Available on MacOS 10.15 or newer.

8.12.2 Methods

8.12.3 available as Boolean

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

8.12.4 Constructor(data as MemoryBlock)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Create a message with data type
See also:

- 8.12.5 Constructor(text as string) 332

8.12.5 Constructor(text as string)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Create a message with string type
See also:

- 8.12.4 Constructor(data as MemoryBlock) 332

8.12.6 Properties

8.12.7 data as MemoryBlock

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The data for a data message.
Notes: (Read only property)

8.12.8 Handle as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

8.12.9 string as String

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The text of a text message.
Notes: (Read only property)

8.12.10 type as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The type of message.
Notes: (Read only property)

8.12.11 Constants

Types

Constant	Value	Description
TypeData	0	Data Message
TypeString	1	Text Message

8.13 class NSURLSessionWebSocketTaskMBS

8.13.1 class NSURLSessionWebSocketTaskMBS

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A WebSocket task can be created with a ws or wss url.
Notes: A client can also provide a list of protocols it wishes to advertise during the WebSocket handshake phase.
Once the handshake is successfully completed the client will be notified through an optional delegate.
All reads and writes enqueued before the completion of the handshake will be queued up and executed once the hanshake succeeds. Before the handshake completes, the client can be called to handle redirection or authentication using the same delegates as NSURLSessionTask. WebSocket task will also provide support for cookies and will store cookies to the cookie storage on the session and will attach cookies to outgoing HTTP handshake requests.

Available on MacOS 10.15 or newer.
Subclass of the NSURLSessionTaskMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Adding NSURLSession classes for Xojo

8.13.2 Methods

8.13.3 cancel(closeCode as Integer, reason as MemoryBlock)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Sends a close frame with the given closeCode.
Notes: An optional reason can be provided while sending the close frame.
Simply calling cancel on the task will result in a cancellation frame being sent without any reason.

8.13.4 Constructor

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The private constructor.

8.13.5 receiveMessage(Handler as NSURLSessionWebSocketTaskReceiveMessageCompletedMBS, tag as variant = nil)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Reads a WebSocket message once all the frames of the message are available.
Notes: If the maximumMessage size is hit while buffering the frames, the receiveMessage call will error out and all outstanding work will also fail resulting in the end of the task.

Calls handler later when job is done.

8.13.6 sendMessage(message as NSURLSessionWebSocketMessageMBS, Handler as NSURLSessionWebSocketTaskSendMessageCompletedMBS, tag as variant = nil)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Sends a WebSocket message.
Notes: If an error occurs, any outstanding work will also fail.
Note that invocation of the completion handler does not guarantee that the remote side has received all the bytes, only that they have been written to the kernel.

Calls handler on completion.

8.13.7 sendPing(Handler as NSURLSessionWebSocketTaskSendPingWithPongReceivedMBS, tag as variant = nil)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Sends a ping frame from the client side.
Notes: The pongReceiveHandler is invoked when the client receives a pong from the server endpoint.
If a connection is lost or an error occurs before receiving the pong from the endpoint, the handler will be invoked with an error.
Note - the pongReceiveHandler will always be called in the order in which the pings were sent.

8.13.8 Properties

8.13.9 closeCode as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A task can be queried for it's close code at any point.
Notes: When the task is not closed, it will be set to CloseCodeInvalid.
(Read only property)

8.13.10 closeReason as MemoryBlock

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: A task can be queried for it's close reason at any point.
Notes: A nil value indicates no closeReason or that the task is still running
(Read only property)

8.13.11 maximumMessageSize as Integer

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The maximum number of bytes to be buffered before erroring out.
Notes: This includes the sum of all bytes from continuation frames. Recieve calls will error out if this value is reached.
(Read and Write property)

8.13.12 Constants

Close Codes

Constant	Value	Description
CloseCodeAbnormalClosure	1006	Abnormal Closure
CloseCodeGoingAway	1001	Going Away
CloseCodeInternalServerError	1011	Internal Server Error
CloseCodeInvalid	0	Invalid
CloseCodeInvalidFramePayloadData	1007	Invalid Frame Payload Data
CloseCodeMandatoryExtensionMissing	1010	Mandatory Extension Missing
CloseCodeMessageTooBig	1009	Message Too Big
CloseCodeNormalClosure	1000	Normal Closure
CloseCodeNoStatusReceived	1005	No Status Received
CloseCodePolicyViolation	1008	Policy Violation
CloseCodeProtocolError	1002	Protocol Error
CloseCodeTLSHandshakeFailure	1015	TLS Handshake Failure
CloseCodeUnsupportedData	1003	Unsupported Data

8.13.13 Delegates

8.13.14 NSURLSessionWebSocketTaskReceiveMessageCompletedMBS(webSocketTask as NSURLSessionWebSocketTaskMBS, message as NSURLSessionWebSocketMessageMBS, error as NSErrorMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The handler to be called when receiving finished.

8.13.15 NSURLSessionWebSocketTaskSendMessageCompletedMBS(webSocketTask as NSURLSessionWebSocketTaskMBS, error as NSErrorMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: Sending a web socket message succeeded.

8.13.16 NSURLSessionWebSocketTaskSendPingWithPongReceivedMBS(webSocketTask as NSURLSessionWebSocketTaskMBS, error as NSErrorMBS, tag as variant)

Plugin Version: 20.2, Platform: macOS, Targets: All.

Function: The ping answer may have been received.

Chapter 9

Cocoa Threading

9.1 class NSOperationMBS

9.1.1 class NSOperationMBS

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class to do operations in Cocoa.
Notes: Requires Mac OS X 10.5.

The NSOperation class manages the execution of a single encapsulated task. Operations are typically scheduled by adding them to an operation queue object (an instance of the NSOperationQueue class), although you can also execute them directly by explicitly invoking their start method.

Operation objects are single-shot objects, that is, they perform their task once. You cannot reuse the same NSOperation object to perform a task (or a slight variant of the task) multiple times in succession. Attempting to execute an operation that has already finished results in an exception.

When manually executing operations, you are responsible for making sure the object is ready to execute. Starting an operation that is not in the ready state generally results in an exception being thrown. If you use an operation queue to manage the execution, the NSOperationQueue object ensures that the operation is executed only when it is ready.

9.1.2 Methods

9.1.3 addDependency(op as NSOperationMBS)

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Makes the receiver dependent on the completion of the specified operation.
Notes: op: The operation on which the operation is dependent. The same dependency should not be added more than once to the operation, and the results of doing so are undefined.

The dependent is not considered ready to execute until all of its dependent operations finish executing. If the receiver is already executing its task, adding dependencies is unlikely to have any practical effect. This method may change the isReady and dependencies properties of the dependent.

It is a programmer error to create any circular dependencies among a set of operations. Doing so can cause a deadlock among the operations and may freeze your program.

Please setup dependencies before you add the operation to a queue. Once the operation is in the queue it may be executed directly.

9.1.4 cancel

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Advises the operation object that it should stop executing its task.
Notes: This method does not force your operation code to stop. The code for your operation must invoke the isCancelled method periodically to determine whether the operation should be stopped. Once cancelled, an operation cannot be restarted.

If the operation is already finished executing, this method has no effect. Canceling an operation that is currently in an operation queue, but not yet executing, causes it to be removed from the queue (although not necessarily right away).

9.1.5 Constructor

Plugin Version: 17.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor.
See also:

- 9.1.6 Constructor(Handle as Integer) 341

9.1.6 Constructor(Handle as Integer)

Plugin Version: 17.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor.
Notes: You can pass in handle to NSOperation object.
See also:

- 9.1.5 Constructor 340

9.1.7 dependencies as NSOperationMBS()

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: the operations on which the operation is dependent.
Notes: The receiver is not considered ready to execute until all of its dependent operations finish executing.

9.1.8 dependenciesCount as Integer

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The number of the dependencies.

9.1.9 dependency(index as Integer) as NSOperationMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the dependency at the given index.
Notes: The receiver is not considered ready to execute until all of its dependent operations finish executing.

Operations are not removed from this dependency list as they finish executing. You can therefore use this list to track all dependent operations, including those that have already finished executing. The only way to remove an operation from this list is to use the removeDependency method.

Available in Mac OS X v10.5 and later.

9.1.10 isCancelled as boolean

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a Boolean value indicating whether the operation has been cancelled.
Notes: True if the operation was explicitly cancelled by an invocation of the operation's cancel method;

otherwise, false. This method may return true even if the operation is currently executing.

Discussion
Canceling an operation does not actively stop the operation's code from executing. An operation object is responsible for calling this method periodically and stopping itself if the method returns true.

9.1.11 isConcurrent as boolean

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a Boolean value indicating whether the operation runs asynchronously.
Notes: True if the operation is asynchronous; otherwise, false if the operation runs synchronously on whatever thread started it. This method returns false by default.

9.1.12 isExecuting as boolean

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a Boolean value indicating whether the operation is currently executing.
Notes: True if the operation is executing; otherwise, false if the operation has not been started or is already finished.

9.1.13 isFinished as boolean

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: A Boolean value indicating whether the operation is done executing.
Notes: True if the operation is no longer executing; otherwise, false.

9.1.14 isReady as boolean

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a Boolean value indicating whether the operation can be performed now.
Notes: True if the operation can be performed now; otherwise, false.

Operations may not be ready due to dependencies on other operations or because of external conditions that might prevent needed data from being ready. The NSOperation class manages dependencies on other operations and reports the readiness of the receiver based on those dependencies.

Note: If the operation is cancelled before it starts, operations that are dependent on the completion of the receiver will never become ready.

9.1.15 Lock

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Locks the semaphore.
Example:

```
dim o as NSOperationMBS // your operation
dim myarray(-1) as window

o.lock
myarray.append window1
o.unlock
```

Notes: You need to pair all calls to Xojo runtime into lock and unlock to make sure you don't crash. Xojo is not reentrant safe, so you need to lock.

Be aware that locking costs performance. You should do locks often, so in the time between two locks another thread can get a lock. Also you should group locks nearby so you don't waste too much time waiting for the lock. Finally you need your main application thread to run nice so it doesn't lock too much, too.

9.1.16 main

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Performs the operation's non-concurrent task.
Notes: This will just call to the work event.

9.1.17 removeDependency(op as NSOperationMBS)

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Removes the operation's dependence on the specified operation.
Notes: This method may change the isReady and dependencies properties of the operation.

9.1.18 start

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Begins the execution of the operation.
Notes: The default implementation of this method configures the execution environment for a non-concurrent operation and invokes the operation's main method. As part of the default configuration, this method performs several checks to ensure that the non-concurrent operation can actually run and generates appropriate KVO notifications for each change in the operation's state. If the operation's operation has already been performed, was cancelled, or is not yet ready to run, this method throws an NSInvalidArgumentException exception. If the operation is to be performed on a separate thread, this method may return before the operation itself completes on the other thread.

9.1.19 Unlock

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Unlocks the semaphore.
Example:

```
dim o as NSOperationMBS // your operation
dim myarray(-1) as window

o.lock
myarray.append window1
o.unlock
```

Notes: You need to pair all calls to Xojo runtime into lock and unlock to make sure you don't crash. Xojo is not reentrant safe, so you need to lock.

Be aware that locking costs performance. You should do locks often, so in the time between two locks another thread can get a lock. Also you should group locks nearby so you don't waste too much time waiting for the lock. Finally you need your main application thread to run nice so it doesn't lock too much, too.

9.1.20 waitUntilFinished

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Spend time waiting for the operation to finish.

9.1.21 Properties

9.1.22 Handle as Integer

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The handle to the internal used NSOperation reference.
Notes: (Read and Write property)

9.1.23 queuePriority as Integer

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The priority of the operation in an operation queue.
Notes: The relative priority of the operation. The returned value always corresponds to one of the predefined constants. If no priority is explicitly set, this method returns NSOperationQueuePriorityNormal.

You should use priority values only as needed to classify the relative priority of non-dependent operations. Priority values should not be used to implement dependency management among different operation objects. If you need to establish dependencies between operations, use the addDependency method instead.

If you attempt to specify a priority value that does not match one of the defined constants, this method automatically adjusts the value you specify towards the NSOperationQueuePriorityNormal priority, stopping at the first valid constant value. For example, if you specified the value -10, this method would adjust that value to match the NSOperationQueuePriorityVeryLow constant. Similarly, if you specified +10, this method would adjust the value to match the NSOperationQueuePriorityVeryHigh constant.
(Read and Write computed property)

9.1.24 threadPriority as Double

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The thread priority to use when executing the operation.
Notes: A floating-point number in the range 0.0 to 1.0, where 1.0 is the highest priority. The default thread priority is 0.5.

Available in Mac OS X v10.6 and later.
(Read and Write computed property)

9.1.25 Events

9.1.26 Close

Plugin Version: 8.0, Platform: macOS, Targets: .

Function: The event called just before the operation object is destroyed.

9.1.27 Finished

Plugin Version: 8.0, Platform: macOS, Targets: .

Function: The event called after work has finished.
Notes: This event is called asynchronously on the main thread, so you can do GUI stuff here to show the result.
Not called if object is released earlier.

9.1.28 Open

Plugin Version: 8.0, Platform: macOS, Targets: .

Function: The event called when the object is created.
Notes: Called on the main thread.

9.1.29 Work

Plugin Version: 8.0, Platform: macOS, Targets: .

Function: The event called for an operation to do the work.
Notes: You should test isCancelled regularly to see whether operation was cancelled.

Please read on the ThreadMBS.Work event for more details.
(NSOperationMBS is a Mac OS X feature, but the ThreadMBS class, does nearly the same on all platforms)

9.1.30 Constants

Constants

Constant	Value	Description
NSOperationQueuePriorityHigh	4	One of the constants for the priority property. Operations receive high priority for execution.
NSOperationQueuePriorityLow	-4	One of the constants for the priority property. Operations receive low priority for execution.
NSOperationQueuePriorityNormal	0	One of the constants for the priority property. Operations receive the normal priority for execution.
NSOperationQueuePriorityVeryHigh	8	One of the constants for the priority property. Operations receive very high priority for execution.
NSOperationQueuePriorityVeryLow	-8	One of the constants for the priority property. Operations receive very low priority for execution.

9.2 class NSOperationQueueMBS

9.2.1 class NSOperationQueueMBS

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Queues NSOperations for later execution.
Notes: Available in Mac OS X v10.5 and later.

The NSOperationQueue class manages a set of NSOperation objects in a priority queue and regulates their execution. Operations remain in the queue until they are explicitly cancelled or finish executing. An application may create multiple operation queues, with each queue running up to its designated maximum number of operations.

A specific NSOperation object can be in only one operation queue at a time. Operations within a single queue coordinate their execution order using both priority levels and inter-operation object dependencies. Operation objects in different queues can coordinate their execution order using dependencies, which are not queue-specific.

Inter-operation dependencies provide an absolute execution order for operations. An operation object is not considered ready to execute until all of its dependent operations have finished executing. For operations that are ready to execute, the operation queue always executes the one with the highest priority relative to the other ready operations. For details on how to set priority levels and dependencies, see NSOperation Class Reference.

You should never manually start an operation while it is sitting in an operation queue. Once added, an operation stays in its queue until it finishes executing or is cancelled.

9.2.2 Methods

9.2.3 addOperation(op as NSOperationMBS)

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Adds the specified operation object to the operation queue.
Notes: An operation object can be in at most one operation queue at a time and cannot be added if it is currently executing or finished. This method throws an NSInvalidArgumentException exception if any of these conditions is true.

Once added, the specified operation remains in the queue until it is executed or cancelled.

Please setup dependencies before you add the operation to a queue. Once the operation is in the queue it

may be executed directly.

9.2.4 addOperations(ops() as NSOperationMBS, wait as boolean)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Adds the specified array of operations to the queue.
Notes: ops: The array of NSOperation objects that you want to add to the receiver.
wait: If true, the current thread is blocked until all of the specified operations finish executing. If false, the operations are added to the queue and control returns immediately to the caller.

An operation object can be in at most one operation queue at a time and cannot be added if it is currently executing or finished. This method throws an NSInvalidArgumentException exception if any of those error conditions are true for any of the operations in the ops parameter.

Once added, the specified operation remains in the queue until it its isFinished method returns true.

Available in Mac OS X v10.6 and later.

9.2.5 areAllOperationsFinished as boolean

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns whether all operations have been finished.
Notes: True if all operations have finished.

9.2.6 cancelAllOperations

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Cancels all queued and executing operations.
Notes: This method sends a cancel message to all operations currently in the queue or executing. Queued operations are cancelled before they begin executing. If an operation is already executing, it is up to that operation to recognize the cancellation and stop what it is doing.

9.2.7 Constructor

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor creating a new operation queue.
Notes: On success the handle property is not 0.

9.2.8 currentQueue as NSOperationQueueMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the operation queue that launched the current operation.
Notes: Returns the operation queue that started the operation or nil if the queue could not be determined.

You can use this method from within a running operation object to get a reference to the operation queue that started it. Calling this method from outside the context of a running operation typically results in nil being returned.

Available in Mac OS X v10.6 and later.

9.2.9 isOneOperationExecuting as boolean

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether at least one operation is still executing.
Notes: True if one of the operations is executing.
False if no operation is executing.

9.2.10 mainQueue as NSOperationQueueMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the operation queue associated with the main thread.
Notes: The returned queue executes operations serially on the main thread. The main thread's run loop controls the execution times of these operations.
Available in Mac OS X v10.6 and later.

9.2.11 operation(index as UInt32) as NSOperationMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a noperations currently in the queue at the given index.
Notes: You can use this method to access the operations queued at any given moment. Operations remain queued until they finish their task. Therefore, the returned array may contain operations that are either

executing or waiting to be executed.

Available in Mac OS X v10.5 and later.

9.2.12 operationCount as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the number of operations currently in the queue.
Notes: The value returned by this method reflects the instantaneous number of objects in the queue and changes as operations are completed. As a result, by the time you use the returned value, the actual number of operations may be different. You should therefore use this value only for approximate guidance and should not rely on it for object enumerations or other precise calculations.

Available in Mac OS X v10.6 and later.

9.2.13 operations as NSOperationMBS()

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The operations currently in the queue.

9.2.14 waitUntilAllOperationsAreFinished

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Blocks the current thread until all of the receiver's queued and executing operations finish executing.
Notes: When called, this method blocks the current thread and waits for the receiver's current and pending operations to finish executing. While the thread is blocked, the receiver continues to launch already queued operations and monitor those that are executing. During this time, the current thread cannot add operations to the queue, but other threads may. Once all of the pending operations are finished, this method returns.

9.2.15 Properties

9.2.16 Handle as Integer

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The handle to the internal used NSOperationQueue reference.
Notes: (Read and Write property)

9.2.17 isSuspended as boolean

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: A Boolean value indicating whether the receiver is scheduling queued operations for execution.
Notes: True if operations are being scheduled for execution; otherwise, false.
(Read and Write computed property)

9.2.18 maxConcurrentOperationCount as Integer

Plugin Version: 8.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The maximum number of concurrent operations that the queue can execute.
Notes: (Read and Write computed property)

9.2.19 name as string

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The name of this queue.
Notes: The default value of this string is "NSOperationQueue <id>", where <id>is the memory address of the operation queue. If you want to know when a queue's name changes, configure a KVO observer to observe the name key path of the operation queue.
Available in Mac OS X v10.6 and later.
(Read and Write computed property)

9.2.20 Constants

Constants

Constant	Value	Description
NSOperationQueueDefaultMaxConcurrentOperationCount	-1	One of the constants to be used with the maxConcur erty. The default maximum number of operations is deter NSOperationQueue object based on current system

Chapter 10

Collaboration

10.1 class CBGroupIdentityMBS

10.1.1 class CBGroupIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: An object of the CBGroupIdentity class represents a group identity and is used for viewing the attributes of group identities from an identity authority.
Example:

```
// get staff group
dim a as CBIdentityAuthorityMBS = CBIdentityAuthorityMBS.localIdentityAuthority
dim i as CBGroupIdentityMBS = CBGroupIdentityMBS.groupIdentityWithPosixGID(20,a)
MsgBox i.fullName
```

Notes: The principal attributes of a CBGroupIdentity object are a POSIX group identifier (GID) and a list of members.
Available in OS X v10.5 and later.
Subclass of the CBIdentityMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Collaboration Framework: CBIdentityPickerMBS class

10.1.2 Methods

10.1.3 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The private constructor.

10.1.4 copy as CBGroupIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

10.1.5 groupIdentityWithPosixGID(groupID as Integer, authority as CBIdentityAuthorityMBS) as CBGroupIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the group identity with the given POSIX GID in the specified identity authority.
Example:

```
// get staff group
dim a as CBIdentityAuthorityMBS = CBIdentityAuthorityMBS.localIdentityAuthority
dim i as CBGroupIdentityMBS = CBGroupIdentityMBS.groupIdentityWithPosixGID(20,a)

MsgBox i.fullName
```

Notes: groupID: The GID of the group identity you are searching for.
authority: An identity authority in which to search for the group identity.

Returns the group identity object with the given GID in the specified identity authority, or nil if no identity exists with the specified GID.

10.1.6 members as CBIdentityMBS()

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: An array of CBIdentity objects each representing a member of the group identity.
Example:

```
// get staff group
dim a as CBIdentityAuthorityMBS = CBIdentityAuthorityMBS.localIdentityAuthority
dim i as CBGroupIdentityMBS = CBGroupIdentityMBS.groupIdentityWithPosixGID(20,a)

MsgBox i.fullName

dim members() as CBIdentityMBS = i.members
for each m as CBIdentityMBS in members
MsgBox m.fullName
next
```

Notes: This method only returns direct members of a group, it does not return members of members. Both user and group identities can be members of a group, but a group cannot be a member of itself. You also cannot have ”circular” membership, i.e. a group be a member of another group that is a member of the first group.

10.1.7 posixGID as Integer

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the POSIX GID of the identity.
Notes: The POSIX GID is an integer that can identify a group within an identity authority. GIDs are not guaranteed to be unique within an identity authority.

10.2 class CBIdentityAuthorityMBS

10.2.1 class CBIdentityAuthorityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: An identity authority is a database that stores information about identities.
Notes: The CBIdentityAuthority class defines one or more identity authorities. This database can be searched for identities in conjunction with the CBIdentity class factory methods.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Collaboration Framework: CBIdentityPickerMBS class

10.2.2 Methods

10.2.3 Available as Boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Whether this class is available.
Example:

```
if CBIdentityAuthorityMBS.Available then
MsgBox "CBIdentityAuthorityMBS class is available"
else
MsgBox "CBIdentityAuthorityMBS class is not available"
end if
```

Notes: Returns true on Mac OS X 10.5 and newer.

10.2.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The private constructor.

10.2.5 CSIdentityAuthority as Variant

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns an identity authority for use with the Core Services Identity API.
Notes: Returns CSIdentityAuthorityMBS object.
This method, along with identityAuthorityWithCSIdentityAuthority:, is used for interoperability with the Core Services Identity API.
Available in OS X v10.5 and later.

10.2.6 defaultIdentityAuthority as CBIdentityAuthorityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns an identity authority that contains the identities in both the local and the network-bound authorities.
Example:

MsgBox CBIdentityAuthorityMBS.defaultIdentityAuthority.localizedName

Notes: The default identity authority is the logical union of the identities in the local and managed authorities.

10.2.7 identityAuthorityWithCSIdentityAuthority(CSIdentityAuthority as Variant) as CBIdentityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns an identity authority specified by a given Core Services Identity authority object.
Notes: CSIdentityAuthority: The Core Services Identity opaque object. Must be a CSIdentityAuthorityMBS.
Returns the identity authority object for use with the Collaboration framework.
This method, along with CSIdentityAuthority, is used for interoperability with the Core Services Identity API.
Available in OS X v10.5 and later.

10.2.8 localIdentityAuthority as CBIdentityAuthorityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the identity authority on the local system.
Example:

MsgBox CBIdentityAuthorityMBS.localIdentityAuthority.localizedName

Notes: Any identities stored on the local system are contained within this identity authority.

10.2.9 localizedName as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the localized name of the identity authority.
Notes: The computer's name if the authority is local, or Managed Network Directory if the authority is managed.

10.2.10 managedIdentityAuthority as CBIdentityAuthorityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the identity authority that contains all the identities in bound network directory servers.
Example:

MsgBox CBIdentityAuthorityMBS.managedIdentityAuthority.localizedName

Notes: If you are bound to a network directory server (such as an LDAP server) that has an identity authority, use this method to search those authorities.

10.2.11 Properties

10.2.12 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

10.3 class CBIdentityMBS

10.3.1 class CBIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: A CBIdentity object is used for accessing the attributes of an identity stored in an identity authority.
Notes: You can use an identity object for finding identities, and storing them in an access control list (ACL). If you need to edit these attributes, take advantage of the CSIdentity class in Core Services.

You can obtain a CBIdentity object from one of the following class factory methods: identityWithName, identityWithUUIDString, identityWithPersistentReference, or identityWithCSIdentity.

There are two subclasses of CBIdentity: CBGroupIdentity and CBUserIdentity. If you are working specifically with a group identity, use CBGroupIdentityMBS. Similarly, if you are working with a user identity, use CBUserIdentityMBS.

see also
http://developer.apple.com/library/mac/#documentation/Networking/Conceptual/IdentityServices_ProgGuide/Introduction/Introduction.html#//apple_ref/doc/uid/TP40004490
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Collaboration Framework: CBIdentityPickerMBS class

10.3.2 Methods

10.3.3 aliases as string()

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns an array of aliases (alternate names) for the identity.
Notes: Returns an array of strings containing the alternate names for the identity.
An identity can have zero or more aliases. Like the full and short names, two identities cannot share an alias.

10.3.4 authority as CBIdentityAuthorityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the identity authority where the identity is stored.

10.3.5 Available as Boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on Mac OS X 10.5 and newer.

10.3.6 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The private constructor.

10.3.7 copy as CBIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

10.3.8 CSIdentity as Variant

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns an opaque object for use with the Core Services Identity API.
Notes: This method, along with identityWithCSIdentity, is used for interoperability with the Core Services Identity API.
Available in OS X v10.5 and later.

10.3.9 emailAddress as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the email address of an identity.
Notes: The email address of an identity or "" if none exists.

10.3.10 fullName as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the full name of the identity.

10.3.11 identityWithCSIdentity(CSIdentity as Variant) as CBIdentityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns an identity object created from the specified Core Services Identity opaque object.
Notes: csIdentity: The Core Services Identity opaque object. Must be a CSIdentityMBS object.

Returns the identity object for use with the Collaboration framework.
This method is used for interoperability with the Core Services Identity API.

Available in OS X v10.5 and later.

10.3.12 identityWithName(name as string, authority as CBIdentityAuthorityMBS) as CBUserIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the identity object with the given name from the specified identity authority.
Example:

```
dim name as string = "cs" // put your name here
dim a as CBIdentityAuthorityMBS = CBIdentityAuthorityMBS.localIdentityAuthority
dim i as CBIdentityMBS = CBIdentityMBS.identityWithName(name, a)

MsgBox i.fullName+": "+Join(i.aliases,", ")
```

Notes: name: The name of the identity.
authority: The identity authority to search.

Returns the identity object, or nil if no identity is found with the specified name.
The name is compared against all valid identity names, including full names, short names, email addresses, and aliases.

10.3.13 identityWithPersistentReference(ref as Memoryblock) as CBUserIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the identity object matching the persistent reference data.
Notes: ref: The persistent data object that refers to an identity.

Returns the identity object matching the persistent data object, or nil if the identity is not found.
A persistent reference is an opaque data object suitable for persistent storage.

10.3.14 identityWithUUIDString(uuid as string, authority as CBIdentityAuthorityMBS) as CBUserIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the identity object with the given UUID from the specified identity authority.
Notes: uuid: The UUID of the identity you are searching for.
authority: The identity authority to search.

Returns the identity object, or nil if no identity is found with the matching criteria.

10.3.15 image as NSImageMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the image associated with an identity.
Notes: The image associated with an identity, or nil if none exists.

10.3.16 isHidden as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns a Boolean value indicating the state of the identity's hidden property.
Notes: A hidden identity does not show up in the Identity Picker. A hidden identity refers to system identities such as root, www, and wheel.
True if the identity is hidden; false if it is not.

10.3.17 isMemberOfGroup(g as CBGroupIdentityMBS) as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns a Boolean value indicating whether the identity is a member of the specified group.
Notes: g: The group to check for membership.

Returns true if the identity is a member of the group; false if it is not.

10.3.18 persistentReference as MemoryBlock

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns a persistent reference to store a reference to an identity.
Notes: Returns a memoryblock that uniquely references an identity.

A persistent reference data object is an object generated from an identity. Persistent data objects can be written to and read from a file, making them extremely useful for storing identities in an ACL.

10.3.19 posixName as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the POSIX name of the identity.
Notes: The POSIX name is also referred to as the "short name" for an identity. It can only contain the characters A-Z, a-z, 0-9, -, _, ., and @.

10.3.20 UUIDString as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the UUID of the identity as a string.
Notes: The UUID string is generated so it is unique across all identity authorities. When storing ACLs, one method is to store the UUID of each identity. However, it is recommended that you use a persistent data object instead (see persistentReference).

10.3.21 Properties

10.3.22 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

10.4 class CBIdentityPickerMBS

10.4.1 class CBIdentityPickerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A CBIdentityPicker object allows a user to select identities—for example, user or group objects—that it wants one or more services or shared resources to have access to.
Example:

```
dim c as new CBIdentityPickerMBS
c.Title = "Please choose your identity"

dim n as Integer = c.runModal
if n = c.NSOKButton then
for each i as CBIdentityMBS in c.identities
MsgBox i.fullName
next
end if
```

Notes: An identity picker can be displayed either as an application-modal dialog or as a sheet attached to a document window. An identity picker returns the selected records to be added to access control lists using Collaboration. If a selected record is not a user or group identity, then an identity picker prompts the end user for additional information—such as a password—to promote that record to a sharing account.
Blog Entries

- Collaboration Framework: CBIdentityPickerMBS class

10.4.2 Methods

10.4.3 Available as Boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Whether this class is available.
Notes: Returns true on Mac OS X 10.5 and newer.

10.4.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

10.4.5 identities as CBIdentityMBS()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns an array of the identities selected using the identity picker.

10.4.6 runModal as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Runs the receiver as an application-modal dialog.
Notes: NSOKButton if the user selected OK; otherwise, NSCancelButton.
The receiver may create identities for selected records if necessary.

10.4.7 runModalForWindow(win as DesktopWindow)

Plugin Version: 22.0, Platform: macOS, Targets: Desktop only.

Function: Runs the receiver modally as a sheet attached to a specified window.
Notes: window: The parent window for the sheet.

Calls identityPickerDidEnd event later.
See also:

- 10.4.8 runModalForWindow(win as window) 365

10.4.8 runModalForWindow(win as window)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Runs the receiver modally as a sheet attached to a specified window.
Notes: window: The parent window for the sheet.

Calls identityPickerDidEnd event later.
See also:

- 10.4.7 runModalForWindow(win as DesktopWindow) 365

10.4.9 Properties

10.4.10 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

10.4.11 allowsMultipleSelection as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Allows a user to make select multiple identities.
Notes: By default, you cannot select multiple records.
Set to true if you can select multiple records; otherwise, false.
(Read and Write computed property)

10.4.12 title as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The title of the identity picker.
Example:

```
dim c as new CBIdentityPickerMBS
c.Title = "Please choose your identity"
```

Notes: (Read and Write computed property)

10.4.13 Events

10.4.14 identityPickerDidEnd(returnCode as Integer)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: The event called when runModalForWindow finished.
Notes: ReturnCode is NSOKButton if the user selected OK; otherwise, NSCancelButton.

10.4.15 Constants

Constants

Constant	Value	Description
NSCancelButton	0	One of the result codes you may need with this class.
NSOKButton	1	One of the result codes you may need with this class.

10.5 class CBUserIdentityMBS

10.5.1 class CBUserIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: An object of the CBUserIdentity class represents a user identity and is used for accessing the attributes of a user identity from an identity authority.
Notes: The principal attributes of CBUserIdentity are a POSIX user identifier (UID), password, and certificate.
Subclass of the CBIdentityMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Collaboration Framework: CBIdentityPickerMBS class

10.5.2 Methods

10.5.3 authenticateWithPassword(password as string) as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns a Boolean value indicating whether the given password is correct for the identity.
Notes: Returns true if the password is correct; otherwise, false.

10.5.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The private constructor.

10.5.5 copy as CBUserIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

10.5.6 isEnabled as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns a Boolean value indicating whether the identity is allowed to authenticate.
Notes: If the identity does not have authentication credentials (a password or certificate), it is not able to log in. However, an identity with authentication credentials does not ensure that it is enabled. Any identity can be disabled.
Returns true if the identity can authenticate; otherwise, false.

10.5.7 posixUID as Integer

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the POSIX UID of the identity.
Notes: The POSIX UID is a integer that can identify a user within an identity authority. UIDs are not guaranteed to be unique within an identity authority.

10.5.8 userIdentityWithPosixUID(userID as Integer, authority as CBIdentityAuthorityMBS) as CBUserIdentityMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the user identity with the given POSIX UID in the specified identity authority.
Example:

```
// get first user
dim a as CBIdentityAuthorityMBS = CBIdentityAuthorityMBS.localIdentityAuthority
dim i as CBUserIdentityMBS = CBUserIdentityMBS.userIdentityWithPosixUID(501,a)

MsgBox i.fullName
```

Notes: uid: The UID of the identity you are searching for.
authority: The identity authority to search.

Retruns the user identity with the given UID in the specified identity authority, or nil if no identity exists with the specified UID.
Available in OS X v10.5 and later.

10.6 class CSIdentityAuthorityMBS

10.6.1 class CSIdentityAuthorityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: A CSIdentityAuthority object represents an identity authority.
Example:

```
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.localIdentityAuthority
MsgBox a.localizedName
```

Notes: An identity authority is a logical repository of user and group information, such the users and groups database on a local system or on a directory server.

The local authority contains all users and groups defined on the local system. The managed authority contains all users and groups defined in directory servers to which the system is bound (LDAP, ActiveDirectory, etc.). The Default authority is a union of the local and managed authorities and is used to locate user/group info from both sources in one query.

Use one of the class factory methods to return an CSIdentityAuthority object, which can be used to search for an identity with an CSIdentityQuery object.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Xojo Plugins, version 23.5pr4
- MBS Real Studio Plugins, version 13.0pr6

10.6.2 Methods

10.6.3 Available as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Whether the CSIdentityAuthority functions are available.
Example:

```
if not CSIdentityAuthorityMBS.Available then
MsgBox "not supported."
end if
```

10.6.4 Constructor

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: The private constructor.

10.6.5 defaultIdentityAuthority as CSIdentityAuthorityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns the system's default identity authority.
Example:

```
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.defaultIdentityAuthority
MsgBox a.localizedName
```

Notes: The default identity authority is a pseudo-authority representing the union of the local identity authority and the managed identity authority. The function CSIdentityMBS.Authority will never return the default authority instance.

10.6.6 localIdentityAuthority as CSIdentityAuthorityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns the identity authority for identities defined on the local host.
Example:

```
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.localIdentityAuthority
MsgBox a.localizedName
```

10.6.7 managedIdentityAuthority as CSIdentityAuthorityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns the identity authority for identities defined in the system's managed directory server(s).
Example:

```
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.managedIdentityAuthority
MsgBox a.localizedName
```

Notes: There is always a valid managed identity authority instance, but if the system is not bound to any managed directory servers, the managed identity authority will contain no identities.

10.6.8 Properties

10.6.9 Handle as Integer

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

10.6.10 localizedName as string

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns the localized name of an identity authority.
Example:

```
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.localIdentityAuthority
MsgBox a.localizedName
```

Notes: (Read only property)

10.7 class CSIdentityMBS

10.7.1 class CSIdentityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: A CSIdentity object represents a user or group entity known to the system.
Notes: An identity object has the following required attributes: a class (user or group), a unique identitfier (UUID), a full name, a Posix ID (UID or GID), and a Posix name (a.k.a. "short" name). There are also a number of optional attributes such as email address, image data, etc.

Group identities have a membership which may include both users as well as other groups. An identity can be tested for membership in a specific group.

A CSIdentity object is a private copy of the identity information. It can be modified in memory, but requires authorization to commit changes back to the identity authority database. On OS X version 10.5, only local identities can be created, modified or deleted, and only by users with Administrator credentials.

Changes may be committed synchronously or asynchronously. All data validation occurs at commit time. Two identities are equal if they have the same class and UUID.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 23.5
- MBS Xojo Plugins, version 23.5pr4
- MBS Xojo Plugins, version 22.5pr7
- MBS Real Studio Plugins, version 13.0pr6

Xojo Developer Magazine

- 22.1, page 9: News

10.7.2 Methods

10.7.3 AddAlias(alias as string)

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Add a name alias to an identity.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
c.AddAlias "Hello"
MsgBox join(c.Aliases, EndOfLine)
```

Notes: This change must be committed.

10.7.4 AddMember(user as CSIdentityMBS)

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Add an identity to a group.
Notes: User: The identity to add to the group. Can be a user or group identity.

Please call only on group identities.
This change to the group must be committed.

10.7.5 Aliases as string()

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Retrieve the aliases of an identity.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox join(c.Aliases, EndOfLine)
```

Notes: Returns an array containing the identity's name aliases as strings. The array may be empty.

Aliases are alternate names for identities. As with all identity names, aliases must be unique within the entire namespace of of the identity authority.

10.7.6 AuthenticateUsingPassword(password as string) as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Attempt to autenticate a password for a user identity.
Notes: password: The password to authenticate
Returns true if the passord is correct for the specified user.
Please call only on user identity.

10.7.7 Available as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Whether the CSIdentity functions are available.
Example:

```
if not CSIdentityMBS.Available then
MsgBox "not supported."
end if
```

10.7.8 Commit as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Synchronously commit all pending changes to the identity authority database.
Notes: error: Optional variant for CFErrorMBS which will be set if this function returns false. When this occurs, the caller is responsible for releasing the error.
Returns true if successful, false if an error occurred.
See also:

- 10.7.9 Commit(byref error as Variant) as Boolean 375

10.7.9 Commit(byref error as Variant) as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Synchronously commit all pending changes to the identity authority database.
Notes: error: Optional variant for CFErrorMBS which will be set if this function returns false. When this occurs, the caller is responsible for releasing the error.
Returns true if successful, false if an error occurred.
See also:

- 10.7.8 Commit as Boolean 375

10.7.10 Constructor(identityClass as Integer, fullName as string, posixName as string, flags as Integer, authority as CSIdentityAuthorityMBS)

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Creates a new identity.
Example:

```
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.localIdentityAuthority
dim c as new CSIdentityMBS(CSIdentityMBS.kCSIdentityClassUser, "Test User", "TestUser", 0, a)
```

```
dim e as CFErrorMBS
dim v as Variant
if c.Commit(v) then
MsgBox "OK"
else
e = v
if e<>Nil then
MsgBox "Failed"+EndOfLine+e.Description
else
MsgBox "Failed"
end if
end if
```

Notes: identityClass: The type of identity to be created. Specifying kCSIdentityClassUser creates a user, while kCSIdentityClassGroup creates a group.
fullName: The primary name of the new identity.
posixName: The POSIX name of the new identity. Specify kCSIdentityGeneratePosixName to have a name generated autmatically from the full name.
flags: Attributes of the new identity
authority: The identity authority to host the identity. Caller must have write access to the identity authority or commit will fail. Currently, only local identities may be created, so callers must specify the local identity authority for this argument.

On success the handle property is not zero.

The new identity is allocated but is not committed to the identity authority's database. It will become persistent and available to other clients after being committed using Commit or CommitAsynchronously.

10.7.11 copy as CSIdentityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Creates a copy of an identity.
Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
dim v as CSIdentityMBS = u.copy
v.SetFullName "Hello World" // modify the copy only
MsgBox u.fullName+" "+v.fullName
```

10.7.12 CurrentUser as CSIdentityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Queries current user identity.
Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox u.fullName
```

10.7.13 Delete

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Permanently delete an identity from the identity database.
Notes: Sets an identity to deleted state. This change must be committed.

10.7.14 GroupMembershipQuery as CSIdentityQueryMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Creates a query to find a group's members.
Notes: Please call on the group identity whose members are to be queried
Returns the CSIdentityQueryMBS of the newly created object. The query is ready to be executed.
Using a query to lookup group membership allows the caller to execute the query synchronously or asynchronously.

10.7.15 IsMemberOfGroup(group as CSIdentityMBS) as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Check if an identity is a memeber of a group.
Notes: Please call only on a group identity.
group: The group identity whose membership is to be checked
Returns true if the identity is a member (directly or indirectly) of the specified group

10.7.16 kCSIdentityGeneratePosixName as string

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: A special string for posix names to use to auto generate the posix name.

10.7.17 PersistentReference as memoryblock

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Create an opaque, persistent data reference to an identity.
Example:

```
// get a reference
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
dim p as MemoryBlock = u.PersistentReference
u = nil

// and search back later:
dim q as CSIdentityQueryMBS = CSIdentityQueryMBS.CreateForPersistentReference(p)
if q.Execute then
dim r() as CSIdentityMBS = q.Results
MsgBox r(0).fullName
end if
```

Notes: Returns a new persistent reference for the identity.
A persistent identity reference is an opaque data object from which an identity object may queried the future (see CreateForPersistentReference). A persistent reference is suitable for storage in an external data store, for example, as an entry in an application-specific access control list associated with a shared resource. Use of a persistent identity reference is preferred over a pure UUID-based identity reference because the persistent reference contains additional information needed to optimize the identity query and to improve the user experience when working in a distributed identity environment (LDAP, Active Directory, etc.).

10.7.18 RemoveAlias(alias as string)

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Remove an alias name from an identity.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
c.AddAlias "Hello"
MsgBox join(c.Aliases, EndOfLine)
c.RemoveAlias "Hello"
MsgBox join(c.Aliases, EndOfLine)
```

Notes: alias: The alias name to remove
This change must be committed.

10.7.19 RemoveClient

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Invalidate an identity's client structure to stop client events.
Notes: After returning, this function guarantees that client event will never be invoked again. Use this function when releasing an identity which may have an outstanding asynchronous request. This function does not cancel an outstanding commit operation because a commit cannot be interrupted.

10.7.20 RemoveMember(user as CSIdentityMBS)

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Remove a member from a group.
Notes: Please call only on group identities.
member: The member identity to remove
This change to the group must be committed.

10.7.21 SetEmailAddress(email as string = "")

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Set an identity's email address.
Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser

u.SetEmailAddress("test@test.test")
MsgBox u.emailAddress
```

Notes: emailAddress: The user's new email address value. Pass "" to remove an email address.
This change must be committed.

10.7.22 SetFullName(name as string)

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Sets an identity's full name.
Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser

// get old name
dim o as string = u.fullName

// change
u.SetFullName("Hello World")

// and report
MsgBox o+" ->"+u.fullName
```

Notes: fullName: The new full name of the identity
This change must be committed.

10.7.23 SetImageData(data as memoryblock = nil, datatype as string = "public.jpeg")

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Set the internally-stored image data and data type for an identity.
Notes: imageData: The image data. Pass nil to remove image data.
imageDataType: The uniform type identitier (UTI) of the image data. Currently, kUTTypeJPEG ("public.jpeg") is the only type supported.
This change must be committed.

10.7.24 SetImageURL(URL as string)

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Set the URL of an identity's external image storage.
Notes: url: The URL file of the image. For local identities, this must be a file URL. Pass "" to remove the image URL from the identity.
This change must be committed.

10.7.25 SetIsEnabled(value as boolean)

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Enable or disable a user.
Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser

u.SetIsEnabled(true)
MsgBox str(u.isEnabled)
```

Notes: isEnabled: The new value of the isEnabled attribute
A disabled user account cannot authenticate. Credentials (password and certificate) are not affected. This change must be committed.

10.7.26 SetPassword(password as string)

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Set a user password.
Notes: Please call only on user identites.
password: The new password, or "" to remove the current password and disable password-based authentication.
Setting the password to "" removes the current password and disables password authentication for the user. Setting the password to a zero-length string allows authentication with a blank password. This change must be committed.

10.7.27 Properties

10.7.28 Authority as CSIdentityAuthorityMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns the identity authority of an identity.
Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox u.Authority.localizedName
```

Notes: (Read only property)

10.7.29 EmailAddress as string

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Retrieve the email address of a user identity.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox c.emailAddress
```

Notes: Returns the email address of the identity or "" if there is no email address.
(Read and Write property)

10.7.30 FullName as string

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Retrieve the full name of an identity.
Example:

```
dim i as CSIdentityMBS = CSIdentityMBS.CurrentUser

MsgBox i.fullName
```

Notes: The full name is the name that is displayed in the user interface.
(Read and Write property)

10.7.31 Handle as Integer

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

10.7.32 IdentityClass as Integer

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns an identity's class.
Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox str(u.IdentityClass) // shows 1 for user
```

Notes: (Read only property)

10.7.33 ImageData as memoryblock

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Retrieve the image associated with a user identity.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
dim data as MemoryBlock = c.ImageData
dim pic as Picture = JPEGStringToPictureMBS(data)
Backdrop = pic
```

Notes: Returns the identity's image data as a memoryblock or nil if there is no image data.
(Read only property)

10.7.34 ImageDataType as string

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Retrieve the uniform type identifier (UTI) of an identity's image.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox c.ImageDataType
```

Notes: Returns a UTI as a string for this identity's image data or "" if there is no image data. The identity object may release its reference to the return value when the identity is modified.
(Read only property)

10.7.35 ImageURL as string

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Retrieve the URL to an identity's image file.

Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox c.ImageURL
```

Notes: Returns a URL that contains the location of the user's image file, or niol if there is no image URL.
(Read and Write property)

10.7.36 IsCommitting as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Determine if a commit operation is in progress.
Notes: Returns true if a commit operation is in progress.
(Read only property)

10.7.37 IsEnabled as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Determine if a user is enabled.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox str(c.IsEnabled)
```

Notes: Returns true if the user is enabled. A user that is not enabled cannot authenticate.
A user that is not enabled cannot authenticate. This setting may be used to temporarily allow a user's access to all services and resources.
(Read and Write property)

10.7.38 IsGroup as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Checks if identity class is group.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox str(c.IsUser)+" "+str(c.IsGroup)
```

Notes: (Read only property)

10.7.39 IsHidden as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Determine if a identity's hidden attribute is enabled.
Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox str(u.IsHidden)
```

Notes: Returns true if the identity was created with the hidden attribute
(Read only property)

10.7.40 IsUser as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Checks if identity class is user.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox str(c.IsUser)+" "+str(c.IsGroup)
```

Notes: (Read only property)

10.7.41 PosixID as Integer

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Retrieve POSIX ID of an identity.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox str(c.PosixID)
```

Notes: Returns an identity's POSIX identifier (a UID or GID).
(Read only property)

10.7.42 PosixName as string

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Retrieve the POSIX name (short name) of an identity.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox c.PosixName
```

Notes: Returns an identity's POSIX name. This attribute is always non-empty.
The POSIX name cannot be changed after an identity has been created.
(Read only property)

10.7.43 UUID as string

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Returns an identity's UUID as string.
Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox c.UUID
```

Notes: (Read only property)

10.7.44 Constants

Constants

Constant	Value	Description
kCSIdentityFlagHidden	-1	One of the flags for identity creation. This flag causes the identity to be "hidden," that is, excluded from most user-visible identity lists. Hidden identities include administrative users and groups such as root, www, and mysql. System service access control groups should be created with the hidden flag.
kCSIdentityFlagNone	0	One of the flags for identity creation. Use this flag to set no optional attributes for a new identity.

Identity Class Constants

Constant	Value	Description
kCSIdentityClassGroup	2	The class value for group identities.
kCSIdentityClassUser	1	The class value for user identities.

10.8 class CSIdentityQueryMBS

10.8.1 class CSIdentityQueryMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: A CSIdentityQuery object provides synchronous or asynchronous access to a collection of identities managed by an identity authority.
Notes: Clients call one of the CSIdentityQueryCreate* functions to define the query criteria. A query can be executed exactly once, in either synchronous or asynchronous mode.

For synchronous execution, the client calls CSIdentityQueryExecute. This function will return when all identies matching the criteria have been found. The results are accessed as an array via Results(). No live updates to the results array are provided in synchronous mode.

To execute in asynchronous mode, the client calls ExecuteAsynchronously, specifying a client object to receive callbacks and a runloop/mode on which callbacks are scheduled.

ExecuteAsynchronously returns immediately, and events will be reported to the callback function as results are added by the query. The client may request live updates to the query which will track changes to the results as changes are made to the identity authority by other processes. Currently, only changes to the local identity authority are monitored.

Asynchronous clients must call Stop when done processing query results to prevent the client callbacks from being called again.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Real Studio Plugins, version 13.0pr6

10.8.2 Methods

10.8.3 Available as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Whether the CSIdentityQuery functions are available.
Example:

```
if not CSIdentityQueryMBS.Available then
MsgBox "not supported."
end if
```

10.8.4 Constructor

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: The private constructor.

10.8.5 Create(identityClass as Integer, authority as CSIdentityAuthorityMBS) as CSIdentityQueryMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Creates an identity query object for all identities in the specified authority.
Example:

```
dim c as CSIdentityQueryMBS = CSIdentityQueryMBS.Create(CSIdentityMBS.kCSIdentityClassUser, CSIdentityAuthorityMBS.localIdentityAuthority)

if c.Execute then
dim a() as CSIdentityMBS = c.Results

dim names() as string
for each p as CSIdentityMBS in a
names.append p.fullName
next

MsgBox join(names,EndOfLine)
end if
```

Notes: identityClass: The class of identity to find
authority: The identity authority to query

Returns a new CSIdentityQuery object.

The results of this query include all of the identities in the specified authority's database.

10.8.6 CreateForCurrentUser as CSIdentityQueryMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Creates a query for the current session user's identity.
Example:

```
dim q as CSIdentityQueryMBS = CSIdentityQueryMBS.CreateForCurrentUser
```

```
if q.Execute then
dim r() as CSIdentityMBS = q.Results

if UBound(r) = 0 then
dim i as CSIdentityMBS = r(0)

MsgBox i.fullName
end if
end if
```

10.8.7 CreateForName(name as string, comparisonMethod as Integer, identityClass as Integer, authority as CSIdentityAuthorityMBS) as CSIdentityQueryMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Creates an identity query object based on a name.
Example:

```
// search for short name and show full name
dim name as string = SystemInformationMBS.ShortUsername
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.defaultIdentityAuthority
dim f as Integer = CSIdentityQueryMBS.kCSIdentityQueryStringEquals
dim q as CSIdentityQueryMBS = CSIdentityQueryMBS.CreateForName(name, f, CSIdentityMBS.kCSIdentityClassUser, a)

if q.Execute then
dim r() as CSIdentityMBS = q.Results
MsgBox r(0).fullName
end if
```

Notes: name: The name criteria for the query.
comparisonMethod: The comparision function (equal or begins with)
identityClass: The class of identity to find
authority: The identity authority to query

Returns a new CSIdentityQuery object
The query finds identities by name. It searches the full names, posix names and aliases for matches.

10.8.8 CreateForPersistentReference(data as memoryblock) as CSIdentityQueryMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Creates an identity query object based on an identity reference data object.
Example:

```
// get a reference
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
dim p as MemoryBlock = u.PersistentReference
u = nil

// and search back later:
dim q as CSIdentityQueryMBS = CSIdentityQueryMBS.CreateForPersistentReference(p)
if q.Execute then
dim r() as CSIdentityMBS = q.Results
MsgBox r(0).fullName
end if
```

Notes: referenceData: The reference data that fully describes an identity
Returns a new CSIdentityQuery object.
Finds an identity by reference data obtained from ReferenceData.

10.8.9 CreateForPosixID(posixID as Integer, identityClass as Integer, authority as CSIdentityAuthorityMBS) as CSIdentityQueryMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Creates an identity query object based on a POSIX ID.
Example:

```
// search for short name and show full name
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.defaultIdentityAuthority
dim f as Integer = CSIdentityQueryMBS.kCSIdentityQueryStringEquals
dim q as CSIdentityQueryMBS = CSIdentityQueryMBS.CreateForPosixID(501, CSIdentityMBS.kCSIden-
tityClassUser, a)

if q.Execute then
dim r() as CSIdentityMBS = q.Results
MsgBox r(0).fullName
end if
```

Notes: posixID: The UID or GID of the identity to find
identityClass: The class of identity to find

authority: The identity authority to query

Returns a new CSIdentityQuery object
Finds an identity by its UID or GID

10.8.10 CreateForUUID(uuid as string, authority as CSIdentityAuthorityMBS) as CSIdentityQueryMBS

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Creates an identity query object based on a UUID.
Notes: uuid: The UUID of the identity to find
authority: The identity authority to query
Returns a new CSIdentityQuery object
Finds an identity by its UUID.

10.8.11 Execute(flags as Integer = 0) as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Execute an identity query synchronously.
Notes: flags: Execution options.
error: Optional pointer to a variant which is filled with CFErrorMBS object if function returns false.
Returns true if the query executed successfully, false if an error occurred.
See also:

- 10.8.12 Execute(flags as Integer, byref error as Variant) as Boolean 392

10.8.12 Execute(flags as Integer, byref error as Variant) as Boolean

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Execute an identity query synchronously.
Notes: flags: Execution options.
error: Optional pointer to a variant which is filled with CFErrorMBS object if function returns false.
Returns true if the query executed successfully, false if an error occurred.
See also:

- 10.8.11 Execute(flags as Integer = 0) as Boolean 392

10.8.13 Results as CSIdentityMBS()

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Retrieve the results of executing an identity query.

10.8.14 Stop

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: Invalidate an identity query client.
Notes: Invalidate a query client so that its callback will never be called in the future. Clients should call Stop when an query will no longer be used, prior to releasing the final query reference.

10.8.15 Properties

10.8.16 Handle as Integer

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

10.8.17 Constants

Execution flags

Constant	Value	Description
kCSIdentityQueryGenerateUpdateEvents	1	After the intial query phase is complete, monitor the result set for live
kCSIdentityQueryIncludeHiddenIdentities	2	Include all matching identities in the result set, including hidden "syst and groups (root, www, etc.).

String Operation

Constant	Value	Description
kCSIdentityQueryStringBeginsWith	2	The identity name must begin with the search string. When searching for identities by name, this value specifies the string comp son function.
kCSIdentityQueryStringEquals	1	The identity name must equal the search string. When searching for identities by name, this value specifies the string comp son function.

Chapter 11

CoreGraphics

11.1 module CGWindowMBS

11.1.1 module CGWindowMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: This module contains CoreGraphics functions related to windows.
Example:

```
// screenshot of all windows on screens
Backdrop = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, 0, 0, 0)
```

Blog Entries

- MBS Real Studio Plugins, version 11.2pr3

11.1.2 Methods

11.1.3 CreateWindowList(windowOption as Integer, WindowID as Integer = 0) as UInt32()

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Returns the list of window IDs associated with the specified windows in the current user session.
Example:

```
dim a(-1) as UInt32 = CGWindowMBS.CreateWindowList(0,0)

MsgBox str(UBound(a)+1) + " windows"
```

Notes: windowOption: The options describing which window IDs to return. Typical options let you obtain IDs for all windows or for windows above or below the window specified in the relativeToWindow parameter.

WindowID: The ID of the window to use as a reference point when determining which other windows to return. For options that do not require a reference window, this parameter can be kCGNullWindowID.

Returns an array of CGWindowID values corresponding to the desired windows. If there are no windows matching the desired criteria, the function returns an empty array. If you call this function from outside of a GUI security session or when no window server is running, this function returns nil.

Available in Mac OS X v10.5 and later.

May fail and cause a consent prompt on MacOS 10.15 to ask user whether he/she allows your app to take the picture.

11.1.4 CreateWindowListCGImage(left as Double, top as Double, width as Double, height as Double, windowOption as Integer, WindowID as Integer = 0, ImageOption as Integer = 0) as Variant

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Takes a screenshot from a list of windows.
Notes: Same as CreateWindowListImage, but returns a CGImageMBS. Declared as Variant to reduce plugin interdependencies.

May fail and cause a consent prompt on MacOS 10.15 to ask user whether he/she allows your app to take the picture.

11.1.5 CreateWindowListImage(left as Double, top as Double, width as Double, height as Double, windowOption as Integer, WindowID as Integer = 0, ImageOption as Integer = 0) as picture

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Takes a screenshot from a list of windows.
Example:

```
dim p as Picture
```

```
// Screenshot of everything:
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionAll,0,
CGWindowMBS.kCGWindowImageDefault)

// Screenshot of everything behind a window:
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionOnScreen-
BelowWindow, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageDefault)

// Screenshot of everything in front of a window (dock and menubar):
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionOnScreen-
AboveWindow, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageDefault)

// screenshot of a window
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionIncluding-
Window, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageDefault)

// only shadow of a window (will be in the mask)
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListOptionIncluding-
Window, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageOnlyShadows)

// desktop decoration is white
p = CGWindowMBS.CreateWindowListImage(0, 0, 0, 0, CGWindowMBS.kCGWindowListExcludeDesk-
topElements, CGWindowMBS.GetWindowID(window1), CGWindowMBS.kCGWindowImageShouldBeOpaque)
```

Notes: Parameters:

left	Left coordinate rectangle
top	Top coordinate rectangle
width	Width of rectangle
height	Height of rectangle
windowOption	A combination of kCGWindowListOption* flags
WindowID	The window ID or 0.
ImageOption	A combination of kCGWindowImage* flags

If you pass a rectangle with all values zero, you select the whole screen.
Returns the screenshot as picture or nil on any error.

Window Options:

Image Options:

May fail and cause a consent prompt on MacOS 10.15 to ask user whether he/she allows your app to take

kCGWindowListOptionAll	0	List all windows in this user session, including both on and off-screen windows. relativeToWindow should be kCGNullWindowID=0.
kCGWindowListOptionOnScreenOnly	1	List all on-screen windows in this user session, ordered from front to back. relativeToWindow should be kCGNullWindowID=0.
kCGWindowListOptionOnScreenAboveWindow	2	List all on-screen windows above the specified window ordered from front to back. relativeToWindow should be the window number.
kCGWindowListOptionOnScreenBelowWindow	4	List all on-screen windows below the specified window ordered from front to back. relativeToWindow should be the window number.
kCGWindowListOptionIncludingWindow	8	Include the named window in any list, effectively creating 'at-or-above' or 'at-or-below' lists. relativeToWindow should be the window number.
kCGWindowListExcludeDesktopElements	16	Exclude any windows from the list that are elements of the desktop, including the background picture and icons on the desktop.

kCGWindowImageDefault	0	Default behavior: If a rect of CGRectNull is used bounds computation includes the framing effects, such as a shadow.
kCGWindowImageBoundsIgnoreFraming	1	If a rect of CGRectNull is used, ignore framing effects for bounds computation
kCGWindowImageShouldBeOpaque	2	The captured image should be opaque. Empty areas are white
kCGWindowImageOnlyShadows	4	Capture only shadows.

the picture.

11.1.6 GetWindowID(w as DesktopWindow) as integer

Plugin Version: 22.0, Platform: macOS, Targets: Desktop only.

Function: Queries the CoreGraphics Window ID for the given window.
Notes: Returns 0 on any error.
This ID can be used for CreateWindowListImage.
See also:

- 11.1.7 GetWindowID(w as window) as Integer 398

11.1.7 GetWindowID(w as window) as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Queries the CoreGraphics Window ID for the given window.
Notes: Returns 0 on any error.
This ID can be used for CreateWindowListImage.
See also:

- 11.1.6 GetWindowID(w as DesktopWindow) as integer 398

11.1.8 GetWindowListInfo(windowOption as Integer, WindowID as Integer = 0) as dictionary()

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Generates and returns information about the selected windows in the current user session.
Example:

```
dim a(-1) as Dictionary = CGWindowMBS.GetWindowListInfo(0,0)

dim u as Integer = UBound(a)
if u >10 then u = 10 // show only 10 times

dim lines(-1) as string
for i as Integer = 0 to u
dim d as Dictionary = a(i)

lines.Append d.Value(CGWindowMBS.kCGWindowName)+" of "+d.Value(CGWindowMBS.kCGWindowOwnerName)

next

// shows 11 windows with names. Not all windows have names.
MsgBox Join(lines, EndOfLine)
```

Notes: option: The options describing which window dictionaries to return. Typical options let you return dictionaries for all windows or for windows above or below the window specified in the relativeToWindow parameter. For more information, see "Window List Option Constants."

WindowID: The ID of the window to use as a reference point when determining which other window dictionaries to return. For options that do not require a reference window, this parameter can be 0.

Returns an array of CFDictionaryRef types, each of which contains information about one of the windows in the current user session. If there are no windows matching the desired criteria, the function returns an empty array. If you call this function from outside of a GUI security session or when no window server is running, this function returns nil.

You can use this function to get detailed information about the configuration of one or more windows in the current user session. For example, you can use this function to get the bounds of the window, its window ID, and information about how it is managed by the window server. For the list of keys and values that may be present in the dictionary, see kCGWindow* constants.

Generating the dictionaries for system windows is a relatively expensive operation. As always, you should profile your code and adjust your usage of this function appropriately for your needs.

Available in Mac OS X v10.5 and later.

11.1.9 Constants

Constants

Constant	Value	Description
kCGNullWindowID	0	The number for an invalid window ID.

Backing Store Constants

Constant	Value	Description
kCGBackingStoreBuffered	2	
kCGBackingStoreNonretained	1	
kCGBackingStoreRetained	0	

Window Info Dictionary Key Constants

Constant	Value	Description
kCGWindowAlpha	"kCGWindowAlpha"	The alpha fade of the wind The value 1.0 is normal (op
kCGWindowBackingLocationVideoMemory	"kCGWindowBackingLocationVideoMemory"	Optional. If present, true if otherwise. If the key is not memory. The value of this
kCGWindowBounds	"kCGWindowBounds"	The bounds of the window corner of the main display.
kCGWindowIsOnscreen	"kCGWindowIsOnscreen"	Optional. If present, true i If the key is not present, th of this key is a boolean.
kCGWindowLayer	"kCGWindowLayer"	The window layer number signed integer value.
kCGWindowMemoryUsage	"kCGWindowMemoryUsage"	An estimate of the memor supporting data structures value.
kCGWindowName	"kCGWindowName"	Optional. If present, the na
kCGWindowNumber	"kCGWindowNumber"	The window ID, a unique va The value of this key is a 3
kCGWindowOwnerName	"kCGWindowOwnerName"	Optional. If present, the window. The value of this k
kCGWindowOwnerPID	"kCGWindowOwnerPID"	The process ID of the proc a 32-bit signed integer valu
kCGWindowSharingState	"kCGWindowSharingState"	The sharing state of the wi dowSharingReadOnly, or k key is a 32-bit signed integ
kCGWindowStoreType	"kCGWindowStoreType"	The backing store type of th BackingStoreNonretained, c is a 32-bit signed integer va
kCGWindowWorkspace	"kCGWindowWorkspace"	Optional. If present, the w window. The value of this k

Image Options Constants

Constant	Value	Description
kCGWindowImageBoundsIgnoreFraming	1	If null rect is passed as the screen bounds, then then bounds com excludes window frame ornamentation, such as a shadow.
kCGWindowImageDefault	0	If null rectangle is passed as the screen bounds, then then bounds com includes window frame ornamentation, such as a shadow.
kCGWindowImageOnlyShadows	4	Only draw the windows' shadows, not the windows themselves.
kCGWindowImageShouldBeOpaque	2	Force the created image to be opaque. Empty areas are white.

Window list option Constants

Constant	Value	Description
kCGWindowListExcludeDesktopElements	16	Exclude any windows from the list that are elements of the des
kCGWindowListOptionAll	0	List all windows in this user session, including both on- and off-s The parameter WindowID should be kCGNullWindowID.
kCGWindowListOptionIncludingWindow	8	Include the window specified by WindowID in any list, effective or-above' or 'at-or-below' lists.
kCGWindowListOptionOnScreenAboveWindow	2	List all on-screen windows above the window specified by Win from front to back.
kCGWindowListOptionOnScreenBelowWindow	4	List all on-screen windows below the window specified by Win from front to back.
kCGWindowListOptionOnScreenOnly	1	List all on-screen windows in this user session, ordered from fro parameter WindowID should be kCGNullWindowID.

Sharing State Constants

Constant	Value	Description
kCGWindowSharingNone	0	No sharing.
kCGWindowSharingReadOnly	1	Read only.
kCGWindowSharingReadWrite	2	Read and Write

Chapter 12

CoreLocation

12.1 class CLGeocodeCompletionHandlerMBS

12.1.1 class CLGeocodeCompletionHandlerMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The class to receive the Complete event from a geocoder.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.2pr1

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 22.2, page 68: Find Yourself, How to determine the location of devices with MBS under Windows and Mac by Stefanie Juchmes-Simonis
- 18.6, pages 70 to 71: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

12.1.2 Events

12.1.3 Completed(geocoder as CLGeocoderMBS, placemarks() as CLPlacemarkMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: The event to be called when a geocoding request is complete.
Notes: Upon completion of a geocoding request, a block of this form is called to give you a chance to process the results. The parameters of this block are as follows:

placemark: Contains an array of CLPlacemark objects. For most geocoding requests, this array should contain only one entry. However, forward-geocoding requests may return multiple placemark objects in situations where the specified address could not be resolved to a single location.
If the request was canceled or there was an error in obtaining the placemark information, this parameter is nil.
error: Contains an error object (if any) indicating why the placemark data was not returned. For a list of possible error codes, see CLLocationManager Class Reference.

Available in OS X v10.8 and later.
Tag parameter added in version 14.2.

12.2 class CLGeocoderMBS

12.2.1 class CLGeocoderMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The CLGeocoder class provides services for converting between a coordinate (specified as a latitude and longitude) and the user-friendly representation of that coordinate.
Notes: A user-friendly representation of the coordinate typically consists of the street, city, state, and country information corresponding to the given location, but it may also contain a relevant point of interest, landmarks, or other identifying information. A geocoder object is a single-shot object that works with a network-based service to look up placemark information for its specified coordinate value.

To use a geocoder object, create it and call one of its forward- or reverse-geocoding methods to begin the request. Reverse-geocoding requests take a latitude and longitude value and find a user-readable address. Forward-geocoding requests take a user-readable address and find the corresponding latitude and longitude value. Forward-geocoding requests may also return additional information about the specified location, such as a point of interest or building at that location. For both types of request, the results are returned using a CLPlacemark object. In the case of forward-geocoding requests, multiple placemark objects may be returned if the provided information yielded multiple possible locations.

To make smart decisions about what types of information to return, the geocoder server uses all the information provided to it when processing the request. For example, if the user is moving quickly along a highway, it might return the name of the overall region, and not the name of a small park that the user is passing through.

Applications should be conscious of how they use geocoding. Here are some rules of thumb for using this class effectively:

Send at most one geocoding request for any one user action.
If the user performs multiple actions that involve geocoding the same location, reuse the results from the initial geocoding request instead of starting individual requests for each action.
When you want to update the user's current location automatically (such as when the user is moving), issue new geocoding requests only when the user has moved a significant distance and after a reasonable amount of time has passed. For example, in a typical situation, you should not send more than one geocoding request per minute.
Do not start a geocoding request at a time when the user will not see the results immediately. For example, do not start a request if your application is inactive or in the background.
The computer or device must have access to the network in order for the geocoder object to return detailed placemark information. Although, the geocoder stores enough information locally to report the localized country name and ISO country code for many locations. If country information is not available for a specific location, the geocoder may still report an error to your completion block.

see also
https://developer.apple.com/library/mac/#documentation/CoreLocation/Reference/CLGeocoder_class/Ref-

erence/Reference.html
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.2pr1
- MonkeyBread Software Releases the MBS Real Studio plug-ins in version 12.3
- CoreLocation GeoCoder in Real Studio

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 22.2, page 69: Find Yourself, How to determine the location of devices with MBS under Windows and Mac by Stefanie Juchmes-Simonis
- 18.6, pages 70 to 71: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 10.6, page 9: News

12.2.2 Methods

12.2.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns true if this class is available.

12.2.4 cancelGeocode

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Cancels a pending geocoding request.
Notes: You can use this method to cancel a pending request and free up the resources associated with that request. Canceling a pending request causes the completion handler event to be called.

If the request is not pending, because it has already returned or has not yet begun, this method does nothing. Available in OS X v10.8 and later.

12.2.5 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The constructor.

12.2.6 geocodeAddressDictionary(addressDictionary as Dictionary, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Submits a forward-geocoding request using the specified address dictionary.
Notes: addressDictionary: An Address Book dictionary containing information about the address to look up.
completionHandler: A handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a forward-geocoding request, do not attempt to initiate another forward- or reverse-geocoding request.
Available in OS X v10.8 and later.

12.2.7 geocodeAddressString(addressString as string, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Submits a forward-geocoding request using the specified string.
Notes: addressString: A string describing the location you want to look up. For example, you could specify the string "1 Infinite Loop, Cupertino, CA" to locate Apple headquarters.
completionHandler: A handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a forward-geocoding request, do not attempt to initiate another forward- or reverse-geocoding request.
Available in OS X v10.8 and later.
See also:

- 12.2.8 geocodeAddressString(addressString as string, region as CLRegionMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil) 408
- 12.2.9 geocodeAddressString(addressString as string, region as CLRegionMBS, preferredLocale as NSLocaleMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as variant = nil) 408

12.2.8 geocodeAddressString(addressString as string, region as CLRegionMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Submits a forward-geocoding request using the specified string and region information.
Notes: addressString: A string describing the location you want to look up. For example, you could specify the string "1 Infinite Loop, Cupertino, CA" to locate Apple headquarters.
region: A geographical region to use as a hint when looking up the specified address. Specifying a region lets you prioritize the returned set of results to locations that are close to some specific geographical area, which is typically the user's current location. If nil and the application is authorized for location services, the set of results is prioritized based on the user's approximate location. Invoking this method does not trigger a location services authorization request.
completionHandler: A handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a forward-geocoding request, do not attempt to initiate another forward- or reverse-geocoding request.
Available in OS X v10.8 and later.
See also:

- 12.2.7 geocodeAddressString(addressString as string, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil) 407
- 12.2.9 geocodeAddressString(addressString as string, region as CLRegionMBS, preferredLocale as NSLocaleMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as variant = nil) 408

12.2.9 geocodeAddressString(addressString as string, region as CLRegionMBS, preferredLocale as NSLocaleMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as variant = nil)

Plugin Version: 17.4, Platform: macOS, Targets: All.

Function: Submits a forward-geocoding request using the specified string and region information.
Notes: addressString: A string describing the location you want to look up. For example, you could specify the string "1 Infinite Loop, Cupertino, CA" to locate Apple headquarters.
region: A geographical region to use as a hint when looking up the specified address. Specifying a region lets you prioritize the returned set of results to locations that are close to some specific geographical area, which is typically the user's current location. If nil and the application is authorized for location services, the set of results is prioritized based on the user's approximate location. Invoking this method does not trigger a location services authorization request.
completionHandler: A handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a forward-geocoding request, do not attempt to initiate another forward- or reverse-geocoding request.

Available in OS X v10.8 and later.
For macOS 10.13 or newer we can optionally pass preferred locale.
See also:

- 12.2.7 geocodeAddressString(addressString as string, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil) 407
- 12.2.8 geocodeAddressString(addressString as string, region as CLRegionMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil) 408

12.2.10 geocodePostalAddress(postalAddress as Variant, completionHandler as CLGeocodeCompletionHandlerMBS, tag as variant = nil)

Plugin Version: 17.4, Platform: macOS, Targets: All.

Function: Queries coordinates for postal address.
Notes: postalAddress must be a CNPostalAddressMBS.
For macOS 10.13 or newer.
See also:

- 12.2.11 geocodePostalAddress(postalAddress as Variant, preferredLocale as NSLocaleMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as variant = nil) 409

12.2.11 geocodePostalAddress(postalAddress as Variant, preferredLocale as NSLocaleMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as variant = nil)

Plugin Version: 17.4, Platform: macOS, Targets: All.

Function: Queries coordinates for postal address.
Notes: postalAddress must be a CNPostalAddressMBS.
For macOS 10.13 or newer.
See also:

- 12.2.10 geocodePostalAddress(postalAddress as Variant, completionHandler as CLGeocodeCompletionHandlerMBS, tag as variant = nil) 409

12.2.12 isGeocoding as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: A Boolean value indicating whether the receiver is in the middle of geocoding its value. (read-only)
Notes: This property contains the value true if the process is ongoing or false if the process is done or has not yet been initiated.
Available in OS X v10.8 and later.

12.2.13 reverseGeocodeLocation(location as CLLocationMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Submits a reverse-geocoding request for the specified location.
Notes: location: The location object containing the coordinate data to look up.
completionHandler: The handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a reverse-geocoding request, do not attempt to initiate another reverse- or forward-geocoding request.

Available in OS X v10.8 and later.
See also:

- 12.2.14 reverseGeocodeLocation(location as CLLocationMBS, preferredLocale as NSLocaleMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as variant = nil) 410

12.2.14 reverseGeocodeLocation(location as CLLocationMBS, preferredLocale as NSLocaleMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as variant = nil)

Plugin Version: 17.4, Platform: macOS, Targets: All.

Function: Submits a reverse-geocoding request for the specified location.
Notes: location: The location object containing the coordinate data to look up.
completionHandler: The handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a reverse-geocoding request, do not attempt to initiate another reverse- or forward-geocoding request.

Available in OS X v10.8 and later.
For macOS 10.13 or newer we can optionally pass preferred locale.

See also:

- 12.2.13 reverseGeocodeLocation(location as CLLocationMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil) 410

12.2.15 Properties

12.2.16 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

12.3 class CLHeadingMBS

12.3.1 class CLHeadingMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: A CLHeading object contains heading data generated by a CLLocationManager object.
Notes: The heading data consists of computed values for true and magnetic north. It also includes the raw data for the three-dimensional vector used to compute those values.

Typically, you do not create instances of this class yourself, nor do you subclass it. Instead, you receive instances of this class through the delegate assigned to the CLLocationManager object whose startUpdatingHeading method you called.

Note: If you want heading objects to contain valid data for the trueHeading property, your location manager object should also be configured to deliver location updates. You can start the delivery of these updates by calling the location manager object's startUpdatingLocation method.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

12.3.2 Methods

12.3.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns true if this class is available.

12.3.4 Constructor

Plugin Version: 13.1, Platform: macOS, Targets: All.

Function: The private constructor.

12.3.5 copy as CLHeadingMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Creates a clone of this object.

12.3.6 DateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time at which this heading was determined. (read-only)
Notes: Available in OS X v10.7 and later.

12.3.7 description as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns the heading data in a formatted text string.
Notes: A string of the form "magneticHeading <magnetic>trueHeading <heading>accuracy <accuracy>x <x>y <y>z <z>@ <date-time>" where <magnetic>, <heading>, <accuracy>, <x>, <y>, and <z>are formatted floating-point numbers and <date-time>is a formatted date string that includes date, time, and time zone information.

Available in OS X v10.7 and later.

12.3.8 headingAccuracy as Double

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The maximum deviation (measured in degrees) between the reported heading and the true geomagnetic heading. (read-only)
Notes: A positive value in this property represents the potential error between the value reported by the magneticHeading property and the actual direction of magnetic north. Thus, the lower the value of this property, the more accurate the heading. A negative value means that the reported heading is invalid, which can occur when the device is uncalibrated or there is strong interference from local magnetic fields.

Available in OS X v10.7 and later.

12.3.9 kCLHeadingFilterNone as Double

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Special value for heading filter to define that you don't want to filter.

12.3.10 magneticHeading as Double

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The heading (measured in degrees) relative to magnetic north. (read-only)
Notes: The value in this property represents the heading relative to the magnetic North Pole, which is different from the geographic North Pole. The value 0 means the device is pointed toward magnetic north, 90 means it is pointed east, 180 means it is pointed south, and so on. The value in this property should always be valid.

If the headingAccuracy property contains a negative value, the value in this property should be considered unreliable.

Available in OS X v10.7 and later.

12.3.11 timestamp as date

Plugin Version: 12.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time at which this heading was determined. (read-only)
Notes: Available in OS X v10.7 and later.

12.3.12 trueHeading as Double

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The heading (measured in degrees) relative to true north. (read-only)
Notes: The value in this property represents the heading relative to the geographic North Pole. The value 0 means the device is pointed toward true north, 90 means it is pointed due east, 180 means it is pointed due south, and so on. A negative value indicates that the heading could not be determined.

Important This property contains a valid value only if location updates are also enabled for the corresponding location manager object. Because the position of true north is different from the position of magnetic north on the Earth's surface, Core Location needs the current location of the device to compute the value of this property.

Available in OS X v10.7 and later.

12.3.13 x as Double

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The geomagnetic data (measured in microteslas) for the x-axis. (read-only)
Notes: This value represents the x-axis deviation from the magnetic field lines being tracked by the device. Available in OS X v10.7 and later.

12.3.14 y as Double

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The geomagnetic data (measured in microteslas) for the y-axis. (read-only)
Notes: This value represents the y-axis deviation from the magnetic field lines being tracked by the device. Available in OS X v10.7 and later.

12.3.15 z as Double

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The geomagnetic data (measured in microteslas) for the z-axis. (read-only)
Notes: This value represents the z-axis deviation from the magnetic field lines being tracked by the device. Available in OS X v10.7 and later.

12.3.16 Properties

12.3.17 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

12.4 class CLLocationCoordinate2DMBS

12.4.1 class CLLocationCoordinate2DMBS

Plugin Version: 14.1, Platform: macOS, Targets: All.

Function: The class for a location coordinate.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.1pr3

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 19.4, page 52: Maps,ÄîPart 10, Mapping GPS data with the MapKitMBS plugin by Markus Winter
- 19.4, pages 47 to 48: Maps,ÄîPart 10, Mapping GPS data with the MapKitMBS plugin by Markus Winter
- 18.6, page 74: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, page 71: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, page 61: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.5, pages 83 to 84: Maps (Part 6), A deep dive into Annotations by Markus Winter
- 18.5, page 81: Maps (Part 6), A deep dive into Annotations by Markus Winter
- 18.3, page 79: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter

12.4.2 Methods

12.4.3 Constructor(latitude as Double = 0.0, longitude as Double = 0.0)

Plugin Version: 14.1, Platform: macOS, Targets: All.

Function: Initializes a coordinate with values.

12.4.4 Properties

12.4.5 latitude as Double

Plugin Version: 14.1, Platform: macOS, Targets: All.

Function: The latitude.
Notes: (Read and Write property)

12.4.6 longitude as Double

Plugin Version: 14.1, Platform: macOS, Targets: All.

Function: The longitude.
Notes: (Read and Write property)

12.5 class CLLocationManagerMBS

12.5.1 class CLLocationManagerMBS

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The CoreLocation base class.
Example:

```
dim c as new CLLocationManagerMBS

c.startUpdatingLocation
```

Notes: The CLLocationManagerMBS class defines the interface for configuring the delivery of location- and heading-related events to your application. You use an instance of this class to establish the parameters that determine when location and heading events should be delivered. You can also a location manager object to retrieve the most recent location data.

To use a CLLocationManagerMBS object to deliver location events, create an instance, configure the desired accuracy and distance filter values, and call the startUpdatingLocation method. The location service returns an initial location as quickly as possible, returning cached information when available. After delivery of the initial event notification, the CLLocationManagerMBS object may deliver additional events if the minimum threshold distance (as specified by the distanceFilter property) is exceeded or a more accurate location value is determined.

Important: The user has the option of denying an application's access to the location service data. During its initial uses by an application, the Core Location framework prompts the user to confirm that using the location service is acceptable. If the user denies the request, the CLLocationManagerMBS object reports an appropriate error to its delegate during future requests.

See also documentation from Apple for the CLLocationManager class:
https://developer.apple.com/library/mac/#documentation/CoreLocation/Reference/CLLocationManager_Class/CLLocationManager/CLLocationManager.html

See WindowsLocationManagerMBS class for Windows.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.5pr4
- MBS Xojo / Real Studio Plugins, version 13.5pr1
- MBS REALbasic plug-in 9.6

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 22.2, page 68: Find Yourself, How to determine the location of devices with MBS under Windows and Mac by Stefanie Juchmes-Simonis

12.5.2 Methods

12.5.3 authorizationStatus as Integer

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Returns the application's authorization status for using location services.
Notes: The authorization status of a given application is managed by the system and determined by several factors. Applications must be explicitly authorized to use location services by the user and location services must themselves currently be enabled for the system. This authorization takes place automatically when your application first attempts to use location services.

Available on Mac OS X 10.7 or later.

12.5.4 CheckEvents

Plugin Version: 15.0, Platform: macOS, Targets: All.

Function: Checks for new events.
Notes: This is a helper app to make CoreLocation geocoder work in web projects.
Should not be called in desktop apps.
But for a web app, use a Timer (not WebTimer) to run it on main loop every few milliseconds (e.g. 500 ms).

12.5.5 Constructor

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The constructor.
Example:

```
dim c as new CLLocationManagerMBS

MsgBox str(c.Handle) // not zero on success
```

12.5.6 deferredLocationUpdatesAvailable as boolean

Plugin Version: 13.5, Platform: macOS, Targets: All.

Function: Returns true if the device supports deferred location updates, otherwise false.
Notes: Requires Mac OS X 10.9.

12.5.7 Destructor

Plugin Version: 13.0, Platform: macOS, Targets: All.

Function: The destructor.

12.5.8 dismissHeadingCalibrationDisplay

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Dismisses the heading calibration view from the screen immediately.
Notes: Core Location uses the heading calibration alert to calibrate the available heading hardware as needed. The display of this view is automatic, assuming your delegate supports displaying the view at all. If the view is displayed, you can use this method to dismiss it after an appropriate amount of time to ensure that your application's user interface is not unduly disrupted.

12.5.9 headingAvailable as boolean

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Returns a Boolean value indicating whether the location manager is able to generate heading-related events.
Example:

```
msgbox "headingAvailable available: "+str(CLLocationManagerMBS.headingAvailable)
```

Notes: Returns true if heading data is available or false if it is not.

Heading data may not be available on all iOS-based devices. You should check the value returned by this method before asking the location manager to deliver heading-related events.

Available on Mac OS X 10.7 or later.

12.5.10 kCLErrorDomain as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The domain for Core Location errors. This value is used in the NSError class.

12.5.11 kCLErrorUserInfoAlternateRegionKey as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: A key in the user information dictionary of an kCLErrorRegionMonitoringResponseDelayed error whose value is a CLRegionMBS object that the location services can more effectively monitor.

12.5.12 locationServicesAvailable as boolean

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: Whether the CoreLocation framework is available.
Example:

```
if CLLocationManagerMBS.locationServicesAvailable then
if CLLocationManagerMBS.locationServicesEnabled then
MsgBox "available and enabled"
else
MsgBox "available and not enabled"
end if
else
MsgBox "Not available"
end if
```

Notes: Returns true on Mac OS X 10.6 and false on all other systems.

12.5.13 locationServicesEnabled as boolean

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: A Boolean value indicating whether location services are enabled on the device.
Example:

```
if CLLocationManagerMBS.locationServicesAvailable then
if CLLocationManagerMBS.locationServicesEnabled then
MsgBox "available and enabled"
```

```
else
MsgBox "available and not enabled"
end if
else
MsgBox "Not available"
end if
```

12.5.14 monitoredRegions as CLRegionMBS()

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The array of shared regions monitored by all location manager objects.
Notes: You cannot add regions to this property directly. Instead, you must register regions by calling the startMonitoringForRegion method. The regions in this property are shared by all instances of the CLLocationManagerMBS class in your application.

The objects in this set may not necessarily be the same objects you specified at registration time. Only the region data itself is maintained by the system. Therefore, the only way to uniquely identify a registered region is using its identifier property.

The location manager persists region data between launches of your application. If your application is terminated and then relaunched, the contents of this property are repopulated with region objects that contain the previously registered data.

Available on Mac OS X 10.7 or later.

12.5.15 regionMonitoringAvailable as boolean

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Returns a Boolean indicating whether region monitoring is supported on the current device.
Example:

```
msgbox "regionMonitoringAvailable available: "+str(CLLocationManagerMBS.regionMonitoringAvailable)
```

Notes: Available on Mac OS X 10.7 or later.

Returns true if region monitoring is available or false if it is not.

Support for region monitoring may not be available on all devices and models. You should check the value of this property before attempting to set up any regions or initiate region monitoring.

Even if region monitoring support is present on a device, it may still be unavailable because the user disabled it for the current application or for all applications.

12.5.16 regionMonitoringEnabled as boolean

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Returns a Boolean indicating whether region monitoring is currently enabled.
Notes: Returns true if region monitoring is available and is currently enabled or false if it is unavailable or not enabled.

The user can enable or disable location services (including region monitoring) altogether from the System Preferences.

You should check the return value of this method before starting region monitoring updates to determine if the user currently allows location services to be used at all. If this method returns false and you start region monitoring updates anyway, the Core Location framework prompts the user with a confirmation panel asking whether location services should be reenabled.

This method does not check to see if region monitoring capabilities are actually supported by the device. Therefore, you should also check the return value of the regionMonitoringAvailable class method before attempting to start region monitoring services.

Available on Mac OS X 10.7 or later.

12.5.17 significantLocationChangeMonitoringAvailable as boolean

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Returns true if the device supports significant location change monitoring, otherwise false.
Example:

msgbox "significantLocationChangeMonitoringAvailable available: "+str(CLLocationManagerMBS.significantLocationChangeMonitoringAvailable)

Notes: Available on Mac OS X 10.7 or later.

This method indicates whether the device is able to report updates based on significant location changes only. (This primarily involves detecting changes in the cell tower currently associated with the device.) This capability provides tremendous power savings for applications that want to track a user's approximate location and do not need highly accurate position information.

12.5.18 startMonitoringForRegion(region as CLRegionMBS)

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Starts monitoring the specified region.
Notes: region: The region object that defines the boundary to monitor. This parameter must not be nil.

You must call this method separately for each region you want to monitor. If an existing region with the same identifier is already being monitored by the application, the old region is replaced by the new one. The regions you add using this method are shared by all location manager objects in your application and stored in the monitoredRegions property.

Region events are delivered to the didEnterRegion and didExitRegion events. If there is an error, the location manager calls the monitoringDidFailForRegion event instead.

12.5.19 startMonitoringSignificantLocationChanges

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: Starts the generation of updates based on significant location changes.
Example:

```
dim c as new CLLocationManagerMBS

c.startMonitoringSignificantLocationChanges
```

Notes: This method initiates the delivery of location events asynchronously, returning shortly after you call it. Location events are delivered to your delegate's didUpdateToLocation event. The first event to be delivered is usually the most recently cached location event (if any) but may be a newer event in some circumstances. Obtaining a current location fix may take several additional seconds, so be sure to check the timestamps on the location events in your event code.

After returning a current location fix, the receiver generates update events only when a significant change in the user's location is detected. For example, it might generate a new event when the device becomes associated with a different cell tower. It does not rely on the value in the distanceFilter property to generate events. Calling this method several times in succession does not automatically result in new events being generated. Calling stopMonitoringSignificantLocationChanges in between, however, does cause a new initial

event to be sent the next time you call this method.

In addition to your subclass implementing the didUpdateToLocation event, it should also implement the didFailWithError event to respond to potential errors.

Available in Mac OS X 10.7 or later.

12.5.20 startUpdatingHeading

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Starts the generation of updates that report the user's current heading.
Notes: This method returns immediately. Calling this method when the receiver is stopped causes it to obtain an initial heading and notify your delegate. After that, the receiver generates update events when the value in the headingFilter property is exceeded.

Before calling this method, you should always check the headingAvailable property to see whether heading information is supported on the current device. If heading information is not supported, calling this method has no effect and does not result in the delivery of events to your delegate.

Calling this method several times in succession does not automatically result in new events being generated. Calling stopUpdatingHeading in between, however, does cause a new initial event to be sent the next time you call this method.

If you start this service and your application is suspended, the system stops the delivery of events until your application starts running again (either in the foreground or background). If your application is terminated, the delivery of new heading events stops altogether and must be restarted by your code when the application is relaunched.

Heading events are delivered to the didUpdateHeading event. If there is an error, the location manager calls the
didFailWithError event instead.

12.5.21 startUpdatingLocation

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: Starts the generation of updates that report the user's current location.
Example:

```
dim c as new CLLocationManagerMBS
```

c.startUpdatingLocation

Notes: This method returns immediately. Calling this method when the receiver is stopped causes it to obtain an initial location fix (which may take several seconds) and notify your delegate. After that, the receiver generates update events primarily when the value in the distanceFilter property is exceeded. Updates may be delivered in other situations though. For example, the receiver may send another notification if the hardware gathers a more accurate location reading.

Calling this method several times in succession does not automatically result in new events being generated. Calling stopUpdatingLocation in between, however, does cause a new initial event to be sent the next time you call this method.

12.5.22 stopMonitoringForRegion(region as CLRegionMBS)

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Stops monitoring the specified region.
Notes: region: The region object currently being monitored. This parameter must not be nil.

If the specified region object is not currently being monitored, this method has no effect.

Available on Mac OS X 10.7 or later.

12.5.23 stopMonitoringSignificantLocationChanges

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Stops the delivery of location events based on significant location changes.
Notes: Use this method to stop the delivery of location events that was started using the startMonitoringSignificantLocationChanges method.
Available on Mac OS X 10.7 or later.

12.5.24 stopUpdatingHeading

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Stops the generation of heading updates.
Notes: Call this method whenever your code no longer needs to receive heading-related events. Disabling event delivery gives the receiver the option of disabling the appropriate hardware (and thereby saving power)

when no clients need location data. You can always restart the generation of heading updates by calling the startUpdatingHeading method again.

12.5.25 stopUpdatingLocation

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: Stops the generation of location updates.
Example:

```
dim c as new CLLocationManagerMBS

c.startUpdatingLocation
// later
c.stopUpdatingLocation
```

Notes: You should call this method whenever your code no longer needs to receive location-related events. Disabling event delivery gives the receiver the option of disabling the appropriate hardware (and thereby saving power) when no clients need location data. You can always restart the generation of location updates by calling the startUpdatingLocation method again.

12.5.26 Properties

12.5.27 desiredAccuracy as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The desired accuracy of the location data.
Example:

```
dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyBest
```

Notes: The receiver does its best to achieve the requested accuracy; however, the actual accuracy is not guaranteed.

You should assign a value to this property that is appropriate for your usage scenario. In other words, if you need only the current location within a few kilometers, you should not specify kCLLocationAccuracyBest for the accuracy. Determining a location with greater accuracy requires more time and more power.

When requesting high accuracy location data, the initial event delivered by the location service may not have the accuracy you requested. The location service delivers the initial event as quickly as possible. It then continues to determine the location with the accuracy you requested and delivers additional events, as necessary, when that data is available.

The default value of this property is kCLLocationAccuracyBest.
(Read and Write property)

12.5.28 distanceFilter as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The minimum distance (measured in meters) a device must move laterally before an update event is generated.
Example:

```
dim c as new CLLocationManagerMBS
c.distanceFilter=CLLocationMBS.kCLDistanceFilterNone
```

Notes: This distance is measured relative to the previously delivered location. Use the value kCLDistanceFilterNone to be notified of all movements.

The default value of this property is kCLDistanceFilterNone.
(Read and Write property)

12.5.29 Handle as Integer

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The internal reference to the CLLocationManager object.
Example:

```
dim c as new CLLocationManagerMBS

MsgBox str(c.Handle) // not zero on success
```

Notes: (Read and Write property)

12.5.30 location as CLLocationMBS

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The most recently retrieved user location.
Example:

```
dim c as new CLLocationMBS(1,2,3,4,5,nil)

MsgBox c.description
```

Notes: The value of this property is nil if no location data has ever been retrieved.

It is a good idea to check the timestamp of the location that is returned. If the receiver is currently gathering location data, but the minimum distance filter is large, the returned location might be relatively old. If it is, you can stop the receiver and start it again to force an update.
(Read only property)

12.5.31 maximumRegionMonitoringDistance as Double

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The largest boundary distance that can be assigned to a region.
Notes: This property defines the largest boundary distance allowed from a region's center point. Attempting to monitor a region with a distance larger than this value causes the location manager to send a kCLErrorRegionMonitoringFailure error to the delegate.

If region monitoring is unavailable or not supported, the value in this property is -1.

Available on Mac OS X 10.7 or later.
(Read only property)

12.5.32 purpose as string

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: An application-provided string that describes the reason for using location services.
Notes: If this property is not "" and the system needs to ask for the user's consent to use location services, it displays the provided string. You can use this string to explain why your application is using location services.

You must set the value of this property prior to starting any location services. Because the string is ulti-

mately displayed to the user, you should always load it from a localized strings file.

Available on Mac OS X 10.7 or later.
(Read and Write property)

12.5.33 Events

12.5.34 didChangeAuthorizationStatus(status as Integer)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: Tells the delegate that the authorization status for the application changed.
Notes: status: The new authorization status for the application.

This method is called whenever the application's ability to use location services changes. Changes can occur because the user allowed or denied the use of location services for your application or for the system as a whole.

12.5.35 didEnterRegion(region as CLRegionMBS)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: Tells the delegate that the user entered the specified region.
Notes: region: An object containing information about the region that was entered.

The region object provided may not be the same one that was registered. As a result, you should never perform pointer-level comparisons to determine equality. Instead, use the region's identifier string to determine if your delegate should respond.

12.5.36 didExitRegion(region as CLRegionMBS)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: Tells the delegate that the user left the specified region.
Notes: manager: The location manager object reporting the event.
region: An object containing information about the region that was exited.

The region object provided may not be the same one that was registered. As a result, you should never perform pointer-level comparisons to determine equality. Instead, use the region's identifier string to determine if your delegate should respond.

12.5.37 didFailWithError(error as NSErrorMBS)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: Tells you that the location manager was unable to retrieve a location value.
Notes: error: The error object containing the reason why the location could not be retrieved.

If the location service is unable to retrieve a location fix right away, it reports a kCLErrorLocationUnknown error and keeps trying. In such a situation, you can simply ignore the error and wait for a new event.

If the user denies your application's use of the location service, this method reports a kCLErrorDenied error. Upon receiving such an error, you should stop the location service.

12.5.38 didFinishDeferredUpdatesWithError(error as NSErrorMBS)

Plugin Version: 13.5, Platform: macOS, Targets: .

Function: Invoked when deferred updates will no longer be delivered.
Notes: Stopping location, disallowing deferred updates, and meeting a specified criterion are all possible reasons for finishing deferred updates.

An error will be returned if deferred updates end before the specified criteria are met (see CLError).
Requires Mac OS X 10.9.

12.5.39 didStartMonitoringForRegion(region as CLRegionMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Tells you that a new region is being monitored.
Notes: region: The region that is being monitored.

12.5.40 didUpdate(newLocation as CLLocationMBS, oldLocation as CLLocationMBS)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: Tells you that a new location value is available.
Notes: newLocation: The new location data.

oldLocation: The location data from the previous update. If this is the first update event delivered by this location manager, this parameter is nil.

By the time this event is called, the new location data is also available directly from the CLLocationManagerMBS object. The newLocation parameter may contain the data that was cached from a previous usage of the location service. You can use the timestamp property of the location object to determine how recent the location data is.

12.5.41 didUpdateHeading(newHeading as CLHeadingMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Tells you that the location manager received updated heading information.
Notes: Implementation of this method is optional but expected if you start heading updates using the startUpdatingHeading method.

The location manager object calls this method after you initially start the heading service. Subsequent events are delivered when the previously reported value changes by more than the value specified in the headingFilter property of the location manager object.

12.5.42 didUpdateLocations(locations() as CLLocationMBS)

Plugin Version: 13.5, Platform: macOS, Targets: .

Function: Invoked when new locations are available.
Notes: Required for delivery of deferred locations.
If implemented, updates will not be delivered to didUpdate.
Requires Mac OS X 10.9.

12.5.43 monitoringDidFailForRegion(region as CLRegionMBS, error as NSErrorMBS)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: Tells the delegate that a region monitoring error occurred.
Notes: region: The region for which the error occurred.
error: An error object containing the error code that indicates why region monitoring failed.

If an error occurs while trying to monitor a given region, the location manager sends this message to its delegate. Region monitoring might fail because the region itself cannot be monitored or because there was

a more general failure in configuring the region monitoring service.

Although implementation of this event is optional, it is recommended that you implement it if you use region monitoring in your application.

12.5.44 Constants

Constants

Constant	Value	Description
kCLErrorDenied	1	One of the error codes reported by the location manager error event. Access to the location service was denied by the user.
kCLErrorLocationUnknown	0	One of the error codes reported by the location manager error event. The location manager was unable to obtain a location value right now.

Authorization Status Constants.

Constant	Value	Description
kCLAuthorizationStatusAuthorized	3	This application is authorized to use location services.
kCLAuthorizationStatusDenied	2	The user explicitly denied the use of location services for this applica location services are currently disabled in Settings.
kCLAuthorizationStatusNotDetermined	0	The user has not yet made a choice regarding whether this application location services.
kCLAuthorizationStatusRestricted	1	This application is not authorized to use location services. The user change this application's status, possibly due to active restrictions parental controls being in place.

Device Orientation Constants

Constant	Value	Description
kCLDeviceOrientationFaceDown	6	The device is held parallel to the ground with the screen facing dow
kCLDeviceOrientationFaceUp	5	The device is held parallel to the ground with the screen facing upw
kCLDeviceOrientationLandscapeLeft	3	The device is in landscape mode, with the device held upright and button on the right side.
kCLDeviceOrientationLandscapeRight	4	The device is in landscape mode, with the device held upright and button on the left side.
kCLDeviceOrientationPortrait	1	The device is in portrait mode, with the device held upright and button at the bottom.
kCLDeviceOrientationPortraitUpsideDown	2	The device is in portrait mode but upside down, with the device he and the home button at the top.
kCLDeviceOrientationUnknown	0	The orientation is currently not known.

Corelocation Error Codes

Constant	Value	Description
kCLErrorGeocodeCanceled	10	The geocode request was canceled.
kCLErrorGeocodeFoundNoResult	8	The geocode request yielded no result.
kCLErrorGeocodeFoundPartialResult	9	The geocode request yielded a partial result.
kCLErrorHeadingFailure	3	The heading could not be determined.
kCLErrorNetwork	2	The network was unavailable or a network error occurred.
kCLErrorRegionMonitoringDenied	4	Access to the region monitoring service was denied by the user.
kCLErrorRegionMonitoringFailure	5	A registered region cannot be monitored.
kCLErrorRegionMonitoringResponseDelayed	7	Core Location will deliver events but they may be delayed.
kCLErrorRegionMonitoringSetupDelayed	6	Core Location could not initialize the region monitoring feature ir

12.6 class CLLocationMBS

12.6.1 class CLLocationMBS

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: A CLLocationMBS object represents the location data generated by a CLLocationManagerMBS object.
Example:

```
dim c as new CLLocationMBS(50,7)

MsgBox c.description

// example output: <+50.00000000, +7.00000000>+/- 0.00m (speed -1.00 mps / course -1.00) @ 2009-08-28 23:59:58 +0200
```

Notes: This object incorporates the geographical coordinates and altitude of the device's location along with values indicating the accuracy of the measurements and when those measurements were made. On some devices, this class also reports information about the speed and heading in which the device is moving.

Typically, you use a CLLocationManagerMBS object to create instances of this class based on the last known location of the user's device. You can create instances yourself, however, if you want to cache custom location data or get the distance between two different coordinate points.

This class is designed to be used as is and should not be subclassed.

Requires Mac OS X 10.6
Blog Entries

- MBS REALbasic plug-in 9.6

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 22.2, page 68: Find Yourself, How to determine the location of devices with MBS under Windows and Mac by Stefanie Juchmes-Simonis
- 18.6, page 71: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.3, pages 80 to 81: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter

12.6.2 Methods

12.6.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns true if this class is available.

12.6.4 Constructor(latitude as Double, longitude as Double)

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: Initializes and returns a location object with the specified latitude and longitude.
Example:

```
dim c as new CLLocationMBS(50,7)

MsgBox c.description

// example output: <+50.00000000, +7.00000000>+/- 0.00m (speed -1.00 mps / course -1.00) @ 2009-08-28 23:59:58 +0200
```

Notes: latitude: The latitude of the coordinate point.
longitude: The longitude of the coordinate point.

Typically, you acquire location objects from the location service, but you can use this method to create new location objects for other uses in your application. When using this method, the other properties of the object are initialized to appropriate values. In particular, the altitude and horizontalAccuracy properties are set to 0, the verticalAccuracy property is set to -1 to indicate that the altitude value is invalid, and the timestamp property is set to the time at which the instance was initialized.

Requires Mac OS X 10.6
See also:

- 12.6.5 Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, course as Double, speed as Double, timestamp as date) 437
- 12.6.6 Constructor(latitude as double, longitude as double, altitude as double, horizontalAccuracy as double, verticalAccuracy as double, course as double, speed as double, timestamp as dateTime) 437
- 12.6.7 Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, timestamp as date) 438
- 12.6.8 Constructor(latitude as double, longitude as double, altitude as double, horizontalAccuracy as double, verticalAccuracy as double, timestamp as dateTime) 439

12.6.5 Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, course as Double, speed as Double, timestamp as date)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Initializes a location object with the specified coordinate and course information.
Notes: latitude and longitude: A coordinate structure containing the latitude and longitude values.
altitude: The altitude value for the location.
horizontalAccuracy: The accuracy of the coordinate value. Specifying a negative number indicates that the coordinate value is invalid.
verticalAccuracy: The accuracy of the altitude value. Specifying a negative number indicates that the altitude value is invalid.
course: The direction of travel for the location.
speed: The current speed associated with this location.
timestamp: The time to associate with the location object. Typically, you would set this to the current time.

Typically, you acquire location objects from the location service, but you can use this method to create new location objects for other uses in your application.

Available on Mac OS X 10.7 or newer.
See also:

- 12.6.4 Constructor(latitude as Double, longitude as Double) 436
- 12.6.6 Constructor(latitude as double, longitude as double, altitude as double, horizontalAccuracy as double, verticalAccuracy as double, course as double, speed as double, timestamp as dateTime) 437
- 12.6.7 Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, timestamp as date) 438
- 12.6.8 Constructor(latitude as double, longitude as double, altitude as double, horizontalAccuracy as double, verticalAccuracy as double, timestamp as dateTime) 439

12.6.6 Constructor(latitude as double, longitude as double, altitude as double, horizontalAccuracy as double, verticalAccuracy as double, course as double, speed as double, timestamp as dateTime)

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: Initializes a location object with the specified coordinate and course information.
See also:

- 12.6.4 Constructor(latitude as Double, longitude as Double) 436
- 12.6.5 Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, course as Double, speed as Double, timestamp as date) 437

12.6.7 Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, timestamp as date)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: Initializes and returns a location object with the specified coordinate information.
Example:

```
dim c as new CLLocationMBS(1,2,3,4,5,nil)

MsgBox c.description
```

Notes: coordinate: A coordinate structure containing the latitude and longitude values.
altitude: The altitude value for the location.
horizontalAccuracy: The accuracy of the coordinate value. Specifying a negative number indicates that the coordinate value is invalid.
verticalAccuracy: The accuracy of the altitude value. Specifying a negative number indicates that the altitude value is invalid.
timestamp: The time to associate with the location object. Typically, you would set this to the current time.

Typically, you acquire location objects from the location service, but you can use this method to create new location objects for other uses in your application.
See also:

12.6.8 Constructor(latitude as double, longitude as double, altitude as double, horizontalAccuracy as double, verticalAccuracy as double, timestamp as dateTime)

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: Initializes and returns a location object with the specified coordinate information.
See also:

- 12.6.4 Constructor(latitude as Double, longitude as Double) 436
- 12.6.5 Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, course as Double, speed as Double, timestamp as date) 437
- 12.6.6 Constructor(latitude as double, longitude as double, altitude as double, horizontalAccuracy as double, verticalAccuracy as double, course as double, speed as double, timestamp as dateTime) 437
- 12.6.7 Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, timestamp as date) 438

12.6.9 copy as CLLocationMBS

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: Creates a copy of the object.
Example:

```
dim c as new CLLocationMBS(5,6)

dim n as CLLocationMBS = c.copy

MsgBox n.description
```

Notes: Internally a new CLLocation object is created with a copy of the data.

12.6.10 distanceFromLocation(location as CLLocationMBS) as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: Returns the distance (in meters) between the two locations.
Example:

```
// Nickenich 50¬∞ 24' 48" N, 7¬∞ 19' 47" E
// Andernach 50¬∞ 26' 23" N, 7¬∞ 24' 6" E

dim c1 as new CLLocationMBS(50.439722, 7.40167) // Andernach
```

```
dim c2 as new CLLocationMBS(50.413333, 7.32972) // Nickenich

MsgBox str(c1.distanceFromLocation(c2))+" meter"
```

Notes: This method measures the distance between the two locations by tracing a line between them that follows the curvature of the Earth. The resulting arc is a smooth curve and does not take into account specific altitude changes between the two locations.

12.6.11 kCLDistanceFilterNone as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: This constant indicates the minimum distance required before an event is generated.
Notes: All movements are reported.

12.6.12 kCLLocationAccuracyBest as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: A constant value you can use to specify the accuracy of a location.
Example:

```
dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyBest
```

Notes: Use the best possible accuracy.

12.6.13 kCLLocationAccuracyBestForNavigation as Double

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: A constant value you can use to specify the accuracy of a location.
Notes: Available on Mac OS X 10.7 or later.

12.6.14 kCLLocationAccuracyHundredMeters as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: A constant value you can use to specify the accuracy of a location.
Example:

```
dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyHundredMeters
```

Notes: Accurate to within one hundred meters.

12.6.15 kCLLocationAccuracyKilometer as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: A constant value you can use to specify the accuracy of a location.
Example:

```
dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyKilometer
```

Notes: Accurate to the nearest kilometer.

12.6.16 kCLLocationAccuracyNearestTenMeters as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: A constant value you can use to specify the accuracy of a location.
Example:

```
dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyNearestTenMeters
```

Notes: Accurate to within ten meters of the desired target.

12.6.17 kCLLocationAccuracyThreeKilometers as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: A constant value you can use to specify the accuracy of a location.
Example:

```
dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyThreeKilometers
```

Notes: Accurate to the nearest three kilometers.

12.6.18 Properties

12.6.19 altitude as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The altitude in meters.
Example:

```
dim c as new CLLocationMBS(1,2,3,4,5,nil)

MsgBox str(c.altitude)
```

Notes: Positive values indicate altitudes above sea level. Negative values indicate altitudes below sea level. (Read only property)

12.6.20 course as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The direction in which the device is travelling.
Example:

```
dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox str(l.course)
end if
```

Notes: Course values are measured in degrees starting at due north and continuing clockwise around the

compass. Thus, north is 0 degrees, east is 90 degrees, south is 180 degrees, and so on. Course values may not be available on all devices. A negative value indicates that the direction is invalid.
(Read only property)

12.6.21 DateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The time at which this location was determined.
Notes: (Read only property)

12.6.22 description as string

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: Returns the location data in a formatted text string.
Example:

```
dim c as new CLLocationMBS(50.439722, 7.40167)

MsgBox C.description
// shows for example:
// <+50.43972200, +7.40167000>+/- 0.00m (speed -1.00 mps / course -1.00) @ 2009-08-29 14:22:39 +0200
```

Notes: A string of the form "«latitude>, <longitude»+/- <accuracy>m (speed <speed>kph / heading <heading>) @ <date-time>", where <latitude>, <longitude>, <accuracy>, <speed>, and <heading>are formatted floating point numbers and <date-time>is a formatted date string that includes date, time, and time zone information.

The returned string is intended for display purposes only.
(Read only property)

12.6.23 Handle as Integer

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The internal reference to the CLLocation object.
Example:

```
dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location
```

```
if l<>Nil then
MsgBox str(l.handle)
end if
```

Notes: (Read and Write property)

12.6.24 horizontalAccuracy as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The radius of uncertainty for the location, measured in meters.
Example:

```
dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox str(l.horizontalAccuracy)
end if
```

Notes: The coordinate's latitude and longitude identify the center of the circle and this value indicates the radius of that circle. A negative value indicates that the coordinate's latitude and longitude are invalid.
(Read only property)

12.6.25 latitude as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The geographical coordinate information.
Example:

```
dim c as new CLLocationMBS(50.413333, 7.32972)

MsgBox str(C.latitude) // shows 50.413333
```

Notes: (Read only property)

12.6.26 longitude as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The geographical coordinate information.
Example:

```
dim c as new CLLocationMBS(50.413333, 7.32972)

MsgBox str(C.longitude) // shows 7.32972
```

Notes: (Read only property)

12.6.27 speed as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The instantaneous speed of the device in meters per second.
Example:

```
dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox str(l.speed)
end if
```

Notes: This value reflects the instantaneous speed of the device in the direction of its current heading. A negative value indicates an invalid speed. Because the actual speed can change many times between the delivery of subsequent location events, you should use this property for informational purposes only.
(Read only property)

12.6.28 timestamp as date

Plugin Version: 9.6, Platform: macOS, Targets: Desktop, Console & Web.

Function: The time at which this location was determined.
Example:

```
dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location
```

```
if l<>Nil then
MsgBox l.timestamp.SQLDateTime
end if
```

Notes: (Read only property)

12.6.29 verticalAccuracy as Double

Plugin Version: 9.6, Platform: macOS, Targets: All.

Function: The accuracy of the altitude value in meters.
Example:

```
dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox str(l.verticalAccuracy)
end if
```

Notes: The value in the altitude property could be plus or minus the value indicated by this property. A negative value indicates that the altitude value is invalid.
(Read only property)

12.7 class CLPlacemarkMBS

12.7.1 class CLPlacemarkMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: A CLPlacemark object stores placemark data for a given latitude and longitude.
Notes: Placemark data includes information such as the country, state, city, and street address associated with the specified coordinate. It can also include points of interest and geographically related data. Placemark objects are typically generated by a CLGeocoder object, although you can also create them explicitly yourself.
Blog Entries

- MBS Xojo Plugins, version 20.2pr3

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 22.2, page 69: Find Yourself, How to determine the location of devices with MBS under Windows and Mac by Stefanie Juchmes-Simonis
- 18.6, page 71: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.3, page 80: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter
- 18.3, page 78: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter

12.7.2 Methods

12.7.3 areasOfInterest as string()

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The relevant areas of interest associated with the placemark. (read-only)
Notes: Examples of an area of interest are the name of a military base or large national park or an attraction such as Eiffel Tower, Disneyland, or Golden Gate Park.
Available in OS X v10.8 and later.

12.7.4 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns true if this class is available.

12.7.5 Constructor(placement as CLPlacemarkMBS)

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Initializes and returns a placemark object from another placemark object.
Notes: You can use this method to transfer information from one placemark object to another placemark object.
Available in OS X v10.8 and later.

12.7.6 copy as CLPlacemarkMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Creates a clone of this object.

12.7.7 Properties

12.7.8 addressDictionary as Dictionary

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: A dictionary containing the Address Book keys and values for the placemark. (read-only)
Notes: The keys in this dictionary are those defined by the Address Book framework and used to access address information for a person. For a list of the strings that can be in this dictionary, see the Address Property constants in ABPerson Reference.

You can format the contents of this dictionary to get a full address string as opposed to building the address yourself.

Available in OS X v10.8 and later.
(Read only property)

12.7.9 administrativeArea as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The state or province associated with the placemark. (read-only)
Notes: If the placemark location is Apple's headquarters, for example, the value for this property would be the string "CA" or "California".
Available in OS X v10.8 and later.
(Read only property)

12.7.10 country as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The name of the country associated with the placemark. (read-only)
Notes: If the placemark location is Apple's headquarters, for example, the value for this property would be the string "United States".
Available in OS X v10.8 and later.
(Read only property)

12.7.11 description as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The description for debugging.
Notes: (Read only property)

12.7.12 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

12.7.13 inlandWater as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The name of the inland water body associated with the placemark. (read-only)
Notes: For coordinates that lie over an inland body of water, this property contains the name of that water body—the name of a lake, stream, river, or other waterway.
Available in OS X v10.8 and later.

(Read only property)

12.7.14 ISOcountryCode as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The abbreviated country name. (read-only)
Notes: This string is the standard abbreviation used to refer to the country. For example, if the placemark location is Apple's headquarters, the value for this property would be the string "US".
Available in OS X v10.8 and later.
(Read only property)

12.7.15 locality as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The city associated with the placemark. (read-only)
Notes: If the placemark location is Apple's headquarters, for example, the value for this property would be the string "Cupertino".
Available in OS X v10.8 and later.
(Read only property)

12.7.16 location as CLLocationMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The location object containing latitude and longitude information. (read-only)
Notes: This object is used to initialize the placemark object.
Available in OS X v10.8 and later.
(Read only property)

12.7.17 name as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The name of the placemark. (read-only)
Notes: Available in OS X v10.8 and later.
(Read only property)

12.7.18 ocean as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The name of the ocean associated with the placemark. (read-only)
Notes: For coordinates that lie over an ocean, this property contains the name of the ocean.
Available in OS X v10.8 and later.
(Read only property)

12.7.19 postalAddress as variant

Plugin Version: 17.4, Platform: macOS, Targets: All.

Function: The address as CNPostalAddressMBS object.
Notes: (Read only property)

12.7.20 postalCode as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The postal code associated with the placemark. (read-only)
Notes: If the placemark location is Apple's headquarters, for example, the value for this property would be the string "95014".
Available in OS X v10.8 and later.
(Read only property)

12.7.21 region as CLRegionMBS

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The geographic region associated with the placemark. (read-only)
Notes: Available in OS X v10.8 and later.
(Read only property)

12.7.22 subAdministrativeArea as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Additional administrative area information for the placemark. (read-only)
Notes: Subadministrative areas typically correspond to counties or other regions that are then organized into a larger administrative area or state. For example, if the placemark location is Apple's headquarters, the value for this property would be the string "Santa Clara", which is the county in California that contains

the city of Cupertino.

Available in OS X v10.8 and later.
(Read only property)

12.7.23 subLocality as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Additional city-level information for the placemark. (read-only)
Notes: This property contains additional information, such as the name of the neighborhood or landmark associated with the placemark. It might also refer to a common name that is associated with the location.
Available in OS X v10.8 and later.
(Read only property)

12.7.24 subThoroughfare as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Additional street-level information for the placemark. (read-only)
Notes: Subthroughfares provide information such as the street number for the location. For example, if the placemark location is Apple's headquarters (1 Infinite Loop), the value for this property would be the string "1".

Available in OS X v10.8 and later.
(Read only property)

12.7.25 thoroughfare as string

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: The street address associated with the placemark. (read-only)
Notes: The street address contains the street name. For example, if the placemark location is Apple's headquarters, the value for this property would be the string "Infinite Loop".

Available in OS X v10.8 and later.
(Read only property)

12.8 class CLRegionMBS

12.8.1 class CLRegionMBS

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The CLRegion class defines a geographical area that can be tracked.
Example:

```
dim c as new CLRegionMBS(50.413333, 7.329722, 3000, "Nickenich")

msgbox c.identifier+" "+str(c.latitude)+"/"+str(c.longitude)+", "+str(c.radius)+"m"
```

Notes: When an instance of this class is registered with a CLLocationManagerMBS object, the location manager generates an appropriate event whenever the user crosses the boundaries of the defined area.

To use this class, create an instance of it and use the startMonitoringForRegion method of a CLLocation-Manager object to begin monitoring it.

Please also check the documentation from Apple for the CLRegion class.
Available on Mac OS X 10.7 or later.
Blog Entries

- MBS Real Studio Plugins, version 11.2pr11
- Lion arrived

12.8.2 Methods

12.8.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: All.

Function: Returns true if this class is available.

12.8.4 Constructor(latitude as Double, longitude as Double, radius as Double, identifier as string)

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Initializes a region object defining a circular area.
Notes: latitude and longitude: The center point of the region.
radius: The distance (measured in meters) from the center point that marks the boundary of the region.

identifier: A unique identifier to associate with the region object. You use this identifier to differentiate regions within your application. This value must not be "".

identifier is a description for the region that could be displayed to the user, and ideally should be chosen by the user.

On success the handle property is not zero.

12.8.5 containsCoordinate(latitude as Double, longitude as Double) as boolean

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Returns a Boolean value indicating whether the region contains the specified coordinate.
Notes: latitude and longitude: The coordinate to test against the region.

Returns true if the coordinate lies within the region's boundaries or false if it does not.

12.8.6 copy as CLRegionMBS

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Creates a copy of the region object.

12.8.7 identifier as string

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The identifier for the region object.
Example:

```
dim c as new CLRegionMBS(50.413333, 7.329722, 3000, "Nickenich")
msgbox c.identifier
```

12.8.8 latitude as Double

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The position of the center of the region.

12.8.9 longitude as Double

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The position of the center of the region.

12.8.10 radius as Double

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The radius (measured in meters) that defines the region's outer boundary.

12.8.11 Properties

12.8.12 Handle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: The internal CLRegion object reference.
Notes: (Read and Write property)

Chapter 13

Files

13.1 class FolderItem

13.1.1 class FolderItem

Platforms: macOS, Linux, Windows, Targets: All.

Function: One of Xojo's base classes.
Notes: Handles access to files.

13.1.2 Methods

13.1.3 BackupIsItemExcludedMBS(byref excludeByPath as boolean) as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: Report whether or not an item is being excluded from backup.
Notes:

excludeByPath: pass a boolean variable to determine whether or not the given item is excluded as an absolute path or whether it is sticky to the item.

Returns true if the item or any of its ancestors are excluded from backup, false otherwise.

Require Mac OS X 10.5.

13.1.4 BackupSetItemExcludedMBS(exclude as boolean, excludeByPath as boolean) as Integer

Plugin Version: 7.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: Add or remove an item from the list of items excluded from backup.
Notes: When backing up, the backup daemon skips items marked by this call. If a folder is marked for exclusion, it and its contents are excluded from backup. When specifying by path, it is OK to pass a URL of an item/folder that does not exist yet.

Returns the error code. -1 is the error code in case the function is not available.
Require Mac OS X 10.5.

13.1.5 QuickLookMBS(MaxWidth as Integer = 500, MaxHeight as Integer = 500, IconMode as Boolean = false, ScaleFactor as Double = 1.0) as picture

Plugin Version: 7.7, Platform: macOS, Targets: All.

Function: Creates a thumbnail for the designated file.
Example:

```
dim f as FolderItem

f=SpecialFolder.Desktop.Child("test.jpg")

// shows the icon in 128x128 scaled by factor 4:
Backdrop=f.QuickLookMBS(128,128,true,4)

// shows the icon in default size:
Backdrop=f.QuickLookMBS(128,128,true,0)

// shows preview of image in 128x128 pixels.
Backdrop=f.QuickLookMBS(128,128,false,0)

// shows preview of image in 512x512 pixels.
Backdrop=f.QuickLookMBS(128,128,false,4)

// shows preview of image in 512x512 pixels.
Backdrop=f.QuickLookMBS(512,512,false,0)

// use Icon function in case no preview is available:
Backdrop=f.iconmbs(512)
```

Notes: Returns nil if Quick Look does not support this file type. In that case you may use folderitem.Icon() with the given size.

MaxWidth and MacHeight specify the maximum desired size.
If ScaleFactor is bigger than zero, it is used. Else the default value is used.
If IconMode is true, QL will produce an icon (ie a thumbnail and all the icon decor, like shadows, curled corner, etc.).

If you look for a control to show quicklook preview like the finder, please check the QLPreviewPanelMBS window and the QLPreviewViewMBS control.

QuickLook does not provide images for items in special folders like temporary folders.
Blog Entries

- MBS Plugins 11.1 Release notes
- MBS Real Studio Plugins, version 11.1pr9
- Getting icons from Files

13.1.6 QuickLookMTMBS(MaxWidth as Integer = 500, MaxHeight as Integer = 500, IconMode as Boolean = false, ScaleFactor as Double = 1.0) as picture

Plugin Version: 13.2, Platform: macOS, Targets: All.

Function: Creates a thumbnail for the designated file.
Example:

```
Dim f As FolderItem

f=SpecialFolder.Desktop.Child("test.png")

// shows preview of image in 512x512 pixels.
Backdrop=f.QuickLookMTMBS(512,512,False,0)
```

Notes: Same as QuickLookMBS, but thread friendly.

QuickLook does not provide images for items in special folders like temporary folders.

The work is performed on a preemptive thread, so this function does not block the application and can yield time to other Xojo threads. Must be called in a Xojo thread to enjoy benefits. If called in main thread will block, but keep other background threads running.
Blog Entries

- Multithreaded plugin functions can increase speed of Xojo application
- Problems with killing Xojo threads with plugin calls.
- MBS Xojo / Real Studio Plugins, version 13.2pr10

13.1.7 Properties

13.1.8 BackupItemExcludedMBS as boolean

Plugin Version: 7.7, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether or not an item is being excluded from backup.
Notes: This is the easy method to just query whether a file is marked as being excluded from backup. You can assign a boolean value to exclude (true) or include (false) the file.

Require Mac OS X 10.5. Returns false on all other operation systems.
(Read and Write computed property)

Chapter 14

Folder Change Watching

14.1 class FSEventsMBS

14.1.1 class FSEventsMBS

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: A class for the Mac OS X 10.5 feature called FSEvents which can be used to monitor a folder hierarchie for changes.
Notes: The text below is from the Apple documentation (With some plugin related modifications). The plugin does currently not support the device related functions, but that can be added later if you need it.

This class provides a mechanism to notify clients about directories they ought to re-scan in order to keep their internal data structures up-to-date with respect to the true state of the file system. (For example, when files or directories are created, modified, or removed.) It sends these notifications "in bulk", possibly notifying the client of changes to several directories in a single callback. By using the API, clients can notice such changes quickly, without needing to resort to recursive polling/scanning of the file system.

Much like kqueues, the FSEvents API allows an application to find near-immediately when the contents of a particular directory has changed. However, unlike kqueues, the FSEvents API allows the application to monitor the whole file system hierarchy rooted at a specified directory (and still get precise per-directory notifications) – to do this with the kqueues API would require the client to monitor each directory individually.

Clients can register interest in a chunk of the filesystem hierarchy and will receive callbacks from their runloop whenever an event occurs that modifies the filesystem therein. The callback will indicate the exact directory in which the event occurred, so the client only has to scan that directory for updated info, not all its children. Clients can supply a "latency" parameter that tells how long to wait after an event occurs before forwarding it; this reduces the volume of events and reduces the chance that the client will see an "intermediate" state, like those that arise when doing a "safe save" of a file, creating a package, or downloading a file via Safari.

The lifecycle of an FSEventStream consists of these stages:

1. new FSEventsMBS(...) ->Creates an FSEventStream.

2. Start() ->Starts receiving events and servicing them from the client's runloop(s) using the callback supplied by the client when the stream was created. If a value was supplied for the sinceWhen parameter then "historical" events will be sent via your callback first, then a HistoryDone event, then "contemporary" events will be sent on an ongoing basis (as though you had supplied kFSEventStreamEventIdSinceNow for sinceWhen).

3. Stop() ->Stops the stream, ensuring the client's callback will not be called again for this stream. After stopping the stream, it can be restarted seamlessly via Start() without missing any events.

Once the event stream has been started, the following calls can be used:

GetLatestEventId() ->Initially, this returns the sinceWhen value supplied when the stream was created; thereafter, it is updated with the highest-numbered event ID mentioned in the current batch of events just before invoking the client's callback. Clients can store this value persistently as long as they also store the UUID for the device (obtained via UUIDForDevice()). Clients can then later supply this event ID as the sinceWhen parameter to Constructor(), as long as its UUID matches what you stored. This works because the FSEvents service stores events in a persistent, per-volume database. In this regard,the stream of event IDs acts like a global, system-wide clock, but bears no relation to any particular timebase.

FlushAsync() ->Requests that the fseventsd daemon send any events it has already buffered (via the latency parameter to one of the constructors). This occurs asynchronously; clients will not have received all the callbacks by the time this call returns to them.

FlushSync() ->Requests that the fseventsd daemon send any events it has already buffered (via the latency parameter to one of the constructors). Then runs the runloop in its private mode till all events that have occurred have been reported (via the clients callback). This occurs synchronously; clients will have received all the callbacks by the time this call returns to them.

GetDeviceBeingWatched() ->Gets the dev_t value supplied when the stream was created with Constructor(), otherwise 0.

PathsBeingWatched() ->Gets the paths supplied when the stream was created with one of the constructors.

Calls that can be made without a stream:

UUIDForDevice() ->Gets a UUID that uniquely identifies the FSEvents database for that volume. If the

database gets discarded then its replacement will have a different UUID so that clients will be able to detect this situation and avoid trying to use event IDs that they stored as the sinceWhen parameter to the FSEventStreamCreate...() functions.

GetCurrentEventId() ->Gets the most recently generated event ID, system-wide (not just for one stream).

GetLastEventIdForDeviceBeforeTime() ->Gets the last event ID for the given device that was returned before the given time. This is conservative in the sense that if you then use the returned event ID as the sinceWhen parameter of Constructor() that you will not miss any events that happened since that time. On the other hand, you might receive some (harmless) extra events.

PurgeEventsForDeviceUpToEventId() ->Purges old events from the persistent per-volume database maintained by the service. You can combine this with GetLastEventIdForDeviceBeforeTime(). Can only be called by the root user.

For Windows, you can use WindowsDirectoryWatcherMBS class.
Blog Entries

- MBS Xojo Plugins, version 19.3pr1
- MBS Xojo Plugins, version 19.2pr7
- MBS Real Studio Plugins, version 12.3pr3
- MBS Releases the MBS Real Studio plug-ins in version 12.0
- MBS Real Studio Plugins, version 11.3pr12
- Notes from today
- MBS Real Studio Plugins, version 11.2pr11
- MonkeyBread Software Releases the MBS Plugins 8.1

14.1.2 Methods

14.1.3 Available as Boolean

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether the FSEvent functions are working.
Example:

```
if FSEventsMBS.Available then
MsgBox "available"
else
MsgBox "not available"
```

end if

Notes: True on Mac OS X 10.5 and false on other versions and operation systems.

14.1.4 Constructor(DeviceToWatch as Integer, path as string, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new FS event stream object for a particular device with the given parameters.
Notes: In order to start receiving callbacks you must also call Start().

deviceToWatch:
A dev_t corresponding to the device which you want to receive notifications from. Use GetDeviceID to get such a device ID.

pathsToWatchRelativeToDevice:
A string, specifying a relative path to a directory on the device identified by the dev parameter. The path should be relative to the root of the device. For example, if a volume "MyData" is mounted at "/Volumes/MyData" and you want to watch "/Volumes/MyData/Pictures/July", specify a path string of "Pictures/July". To watch the root of a volume pass a path of "" (the empty string).

sinceWhen:
The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant kFSEventStreamEventIdSinceNow. Often, clients will supply the highest-numbered FSEventStreamEventId they have received in a callback, which they can obtain via the GetLatestEventId() accessor. Do not pass zero for sinceWhen, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.

latency:
The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its event. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks.

flags:
Flags that modify the behavior of the stream being created.

On success the handle property is not 0.
See also:

- 14.1.5 Constructor(DeviceToWatch as Integer, paths() as string, sinceWhen as UInt64, latency as

14.1.5 Constructor(DeviceToWatch as Integer, paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new FS event stream object with the given parameters.
Notes: In order to start receiving callbacks you must also call Start.

paths: The folders you want to watch. (more exactly the root folders of the folder hierarchies you want to watch)
sinceWhen: The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant kFSEventStreamEventIdSinceNow. Often, clients will supply the highest-numbered FSEventStreamEventId they have received in a callback, which they can obtain via the GetLatestEventId() accessor. Do not pass zero for sinceWhen, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.
latency: The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its callback. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks and greater overall efficiency.
flags: Flags that modify the behavior of the stream being created.
See also:

14.1.6 Constructor(path as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new FS event stream object with the given parameters.
Notes: In order to start receiving callbacks you must also call Start.

path: The folder you want to watch. (more exactly the root folder of the folder hierarchie you want to watch)
sinceWhen: The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant kFSEventStreamEventIdSinceNow. Often, clients will supply the highest-numbered FSEventStreamEventId they have received in a callback, which they can obtain via the GetLatestEventId() accessor. Do not pass zero for sinceWhen, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.
latency: The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its callback. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks and greater overall efficiency.
flags: Flags that modify the behavior of the stream being created.
See also:

14.1.7 Constructor(path as string, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new FS event stream object with the given parameters.
Notes: In order to start receiving callbacks you must also call Start.

path: The folder you want to watch. (more exactly the root folder of the folder hierarchie you want to watch)
sinceWhen: The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant kFSEventStreamEventIdSinceNow. Often, clients will supply the highest-numbered FSEventStreamEventId they have received in a callback, which they can obtain via the GetLatestEventId() accessor. Do not pass zero for sinceWhen, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.
latency: The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its callback. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks and greater overall efficiency.

flags: Flags that modify the behavior of the stream being created.
See also:

14.1.8 Constructor(paths() as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new FS event stream object with the given parameters.
Notes: In order to start receiving callbacks you must also call Start.

paths: The folders you want to watch. (more exactly the root folders of the folder hierarchies you want to watch)
sinceWhen: The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant kFSEventStreamEventIdSinceNow. Often, clients will supply the highest-numbered FSEventStreamEventId they have received in a callback, which they can obtain via the GetLatestEventId() accessor. Do not pass zero for sinceWhen, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.
latency: The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its callback. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks and greater overall efficiency.
flags: Flags that modify the behavior of the stream being created.
See also:

14.1.9 Constructor(paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer)

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new FS event stream object for a particular device with the given parameters.
Notes: In order to start receiving callbacks you must also call Start().

deviceToWatch:
A dev_t corresponding to the device which you want to receive notifications from. Use GetDeviceID to get such a device ID.

pathsToWatchRelativeToDevice:
An array of strings, each specifying a relative path to a directory on the device identified by the dev parameter. The paths should be relative to the root of the device. For example, if a volume "MyData" is mounted at "/Volumes/MyData" and you want to watch "/Volumes/MyData/Pictures/July", specify a path string of "Pictures/July". To watch the root of a volume pass a path of "" (the empty string).

sinceWhen:
The service will supply events that have happened after the given event ID. To ask for events "since now" pass the constant kFSEventStreamEventIdSinceNow. Often, clients will supply the highest-numbered FSEventStreamEventId they have received in a callback, which they can obtain via the GetLatestEventId() accessor. Do not pass zero for sinceWhen, unless you want to receive events for every directory modified since "the beginning of time" – an unlikely scenario.

latency:
The number of seconds the service should wait after hearing about an event from the kernel before passing it along to the client via its event. Specifying a larger value may result in more effective temporal coalescing, resulting in fewer callbacks.

flags:
Flags that modify the behavior of the stream being created.

On success the handle property is not 0.
See also:

- 14.1.4 Constructor(DeviceToWatch as Integer, path as string, sinceWhen as UInt64, latency as Double, flags as Integer) 464
- 14.1.5 Constructor(DeviceToWatch as Integer, paths() as string, sinceWhen as UInt64, latency as Double, flags as Integer) 465
- 14.1.6 Constructor(path as folderitem, sinceWhen as UInt64, latency as Double, flags as Integer) 465
- 14.1.7 Constructor(path as string, sinceWhen as UInt64, latency as Double, flags as Integer) 466

14.1.10 Description as string

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a string containing the description of the stream.
Notes: For debugging only.

14.1.11 DeviceBeingWatched as Integer

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Fetches the dev_t supplied when the stream was created using a Device ID.
Notes: Returns 0 if there was an error.

14.1.12 ExclusionPaths as String()

Plugin Version: 16.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Queries exclusion paths.

14.1.13 FlushAsync as UInt64

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Flushes all events.
Notes: Asks the FS Events service to flush out any events that have occurred but have not yet been delivered, due to the latency parameter that was supplied when the stream was created. This flushing occurs asynchronously – do not expect the events to have already been delivered by the time this call returns. FlushAsync() can only be called after the stream has been started, via Start().

Returns The largest event id of any event ever queued for this stream, otherwise zero if no events have been queued for this stream.

14.1.14 FlushSync

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Flushes all events.
Notes: Asks the FS Events service to flush out any events that have occurred but have not yet been delivered, due to the latency parameter that was supplied when the stream was created. This flushing occurs synchronously – by the time this call returns, your callback will have been invoked for every event that had already occurred at the time you made this call. FlushSync() can only be called after the stream has been started, via Start().

14.1.15 GetAbsoluteTime(theDate as date) as Double

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates an absolute time value based on the system time zone and the values in the date object.
Example:

```
dim d as new date

MsgBox str(FSEventsMBS.GetAbsoluteTime(d))
```

Notes: Returns 0 if the date parameter is nil or invalid.
See also:

- 14.1.16 GetAbsoluteTime(theDate as DateTime) as double 470

14.1.16 GetAbsoluteTime(theDate as DateTime) as double

Plugin Version: 20.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates an absolute time value based on the system time zone and the values in the date object.
Notes: Returns 0 if the date parameter is nil or invalid.
See also:

- 14.1.15 GetAbsoluteTime(theDate as date) as Double 470

14.1.17 GetCurrentEventId as UInt64

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Fetches the most recently generated event ID, system-wide (not just for one stream).
Notes: By thetime it is returned to your application even newer events may have already been generated.

14.1.18 GetDeviceID(volume as folderitem) as Integer

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the device ID for the volume the folderitem points to.
Example:

```
dim v as FolderItem

v=volume(0)

MsgBox str(FSEventsMBS.GetDeviceID(v))
```

Notes: Returns 0 on any error.

14.1.19 GetLastEventIdForDeviceBeforeTime(DeviceID as Integer, theTime as Double) as UInt64

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Gets the last event ID for the given device that was returned before the given time.
Example:

```
dim d as new date

MsgBox str(FSEventsMBS.GetLastEventIdForDeviceBeforeTime(1,d.TotalSeconds))
```

Notes: This is conservative in the sense that if you then use the returned event ID as the sinceWhen parameter of the constructor that you will not miss any events that happened since that time. On the other hand, you might receive some (harmless) extra events. Beware: there are things that can cause this to fail to be accurate. For example, someone might change the system's clock (either backwards or forwards). Or an external drive might be used on different systems without perfectly synchronized clocks.

14.1.20 GetLatestEventId as UInt64

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Fetches the sinceWhen property of the stream.
Notes: Upon receiving an event (and just before invoking the client's callback) this attribute is updated to the highest-numbered event ID mentioned in the event.

14.1.21 kFSEventStreamEventIdSinceNow as UInt64

Plugin Version: 16.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: A special value to pass in if you mean the event ID for now.
Notes: Returns &hFFFFFFFFFFFFFFFF.

14.1.22 PathsBeingWatched as String()

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns an array with the paths being watched.
Notes: Works only on the RB Versions which support arry creation in plugins.

14.1.23 PurgeEventsForDeviceUpToEventId(DeviceID as Integer, EventID as UInt64) as boolean

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Purges old events from the persistent per-volume database maintained by the service.
Notes: Can only be called by the root user.

14.1.24 SetExclusionPaths(paths() as String) as boolean

Plugin Version: 16.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the exclusion paths.
Notes: Sets directories to be filtered from the EventStream.
A maximum of 8 directories maybe specified.

Requires OS X 10.9 or newer.
Returns true on success or false on failure.

14.1.25 Show

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Prints a description of the supplied stream to stderr.
Notes: For debugging only.

14.1.26 Start as boolean

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Attempts to register with the FS Events service to receive events per the parameters in the stream.
Notes: Once started, the stream can be stopped via Stop().

Returns true if it succeeds, otherwise False if it fails. It ought to always succeed, but in the event it does not then your code should fall back to performing recursive scans of the directories of interest as appropriate.

14.1.27 Stop

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: Unregisters with the FS Events service.
Notes: The client callback will not be called for this stream while it is stopped. Stop() can only be called if the stream has been started, via Start(). Once stopped, the stream can be restarted via Start(), at which point it will resume receiving events from where it left off ("sinceWhen").

14.1.28 UUIDForDevice(DeviceID as Integer) as memoryblock

Plugin Version: 8.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Gets the UUID associated with a device, or nil if not possible (for example, on read-only device).
Notes: A (non-nil) UUID uniquely identifies a given stream of FSEvents. If this (non-nil) UUID is different than one that you stored from a previous run then the event stream is different (for example, because FSEvents were purged, because the disk was erased, or because the event ID counter wrapped around back to zero). A nil return value indicates that "historical" events are not available, i.e., you should not supply a "sinceWhen" value to the constructor other than kFSEventStreamEventIdSinceNow.

14.1.29 Properties

14.1.30 Handle as Integer

Plugin Version: 8.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal stream handle used.
Notes: (Read only property)

14.1.31 Running as Boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether this object has been started.
Notes: This is set to true when you call Start and set to false when you call Stop.
(Read only property)

14.1.32 Events

14.1.33 Callback(index as Integer, count as Integer, path as string, flags as Integer, eventID as UInt64)

Plugin Version: 8.1, Platform: macOS, Targets: .

Function: The callback received when something changed.
Notes: The plugin receives count events. This event is called count times with index going from 0 to count-1.
Path is the unix file path for the folder. A path might be "/" if either of these flags is set for the event: kFSEventStreamEventFlagUserDropped, kFSEventStreamEventFlagKernelDropped.
Flags: Flags to specify why the event was called. If no flags are set, then there was some change in the directory at the specific path supplied in this event.
eventID: The event ID for this change. Each event ID comes from the most recent event being reported in the corresponding directory named in the path parameter. Event IDs all come from a single global source. They are guaranteed to always be increasing, usually in leaps and bounds, even across system reboots and moving drives from one machine to another. Just before invoking your callback your stream is updated so that calling the accessor GetLatestEventId() will return the largest of the values passed in the eventIds parameter; if you were to stop processing events from this stream after this callback and resume processing them later from a newly-created FSEventStream, this is the value you would pass for the sinceWhen parameter to constructor.

14.1.34 Constants

Creation Flags

Constant	Value	Description
kFSEventStreamCreateFlagFileEvents	16	Request file-level notifications. Your stream will receive events abo files in the hierarchy you're watching instead of only receiving d notifications. Use this flag with care as it will generate significantl than without it. Available in Mac OS X 10.7 or newer.
kFSEventStreamCreateFlagIgnoreSelf	8	Don't send events that were triggered by the current process. Thi reducing the volume of events that are sent. It is only useful if might modify the file system hierarchy beneath the path(s) bein Note: this has no effect on historical events, i.e., those delivere HistoryDone sentinel event. Available in Mac OS X 10.7 or newer.
kFSEventStreamCreateFlagMarkSelf	32	Tag events that were triggered by the current process with the flag. This is only useful if your process might modify the file syst beneath the path(s) being monitored and you wish to know whic triggered by your process. Note: this has no effect on historica those delivered before the HistoryDone sentinel event.
kFSEventStreamCreateFlagNoDefer	2	Affects the meaning of the latency parameter. If you specify this than latency seconds have elapsed since the last event, your app w event immediately. The delivery of the event resets the latency t further events will be delivered after latency seconds have elapsed useful for apps that are interactive and want to react immediate but avoid getting swamped by notifications when changes are occu succession. If you do not specify this flag, then when an event a period of no events, the latency timer is started. Any even during the next latency seconds will be delivered as one group (i first event). The delivery of the group of events resets the laten any further events will be delivered after latency seconds. This behavior and is more appropriate for background, daemon or bat apps.
kFSEventStreamCreateFlagNone	0	
kFSEventStreamCreateFlagUseCFTypes	1	The plugin uses this one internally.
kFSEventStreamCreateFlagUseExtendedData	64	Requires kFSEventStreamCreateFlagUseCFTypes and instructs t to invoke your callback function with CF types but, instead a CFArrayMBS of CFStringMBSs, a CFArrayMBS of CFDic is passed. Each dictionary will contain the event path and p "extended data" about the event. See the kFSEventStreamEv Data*Key definitions for the set of keys that may be set in the d For macOS 10.13 or newer.
kFSEventStreamCreateFlagWatchRoot	4	Request notifications of changes along the path to the path(s) ing. For example, with this flag, if you watch "/foo/bar" and it "/foo/bar.old", you would receive a RootChanged event. The sa the directory "/foo" were renamed. The event you receive is a the path for the event is the original path you specified, the entStreamEventFlagRootChanged is set and event ID is zero. events are useful to indicate that you should rescan a particular cause it changed completely (as opposed to the things inside of If you want to track the current location of a directory, it is bes directory before creating the stream so that you have a file descrip can issue an F_GETPATH fcntl() to find the current path.

Event flags.

Constant	Value	Description
kFSEventStreamEventFlagEventIdsWrapped	8	If kFSEventStreamEventFlagEventIdsWrapped is set, it means the ID counter wrapped around. As a result, previously-issued event longer valid arguments for the sinceWhen parameter of the constr
kFSEventStreamEventFlagHistoryDone	16	Denotes a sentinel event sent to mark the end of the "historical" as a result of specifying a sinceWhen value in the constructor call this event stream. (It will not be sent if kFSEventStreamEvent was passed for sinceWhen.) After invoking the client's callback "historical" events that occurred before now, the client's callbac voked with an event where the kFSEventStreamEventFlagHistory set. The client should ignore the path supplied in this callback.
kFSEventStreamEventFlagKernelDropped	4	The kFSEventStreamEventFlagUserDropped or kFSEventStreaml ernelDropped flags may be set in addition to the kFSEventStrear MustScanSubDirs flag to indicate that a problem occurred in b events (the particular flag set indicates where the problem occurr the client must do a full scan of any directories (and their subdirec sively) being monitored by this stream. If you asked to monitor m with this stream then you will be notified about all of them. You only check for the kFSEventStreamEventFlagMustScanSubDirs fla (if present) only provide information to help you diagnose the pro
kFSEventStreamEventFlagMount	64	Denotes a special event sent when a volume is mounted. The event is the path to the newly-mounted volume. You will receive notifications for every volume mount event inside the kernel (inc DiskArbitration). Beware that a newly-mounted volume could con trarily large directory hierarchy. Avoid pitfalls like triggering a re of a non-local filesystem, which you can detect by checking for th the MNT_LOCAL flag in the f_flags returned by statfs(). Also the MNT_DONTBROWSE flag that is set for volumes which sh displayed by user interface elements.
kFSEventStreamEventFlagMustScanSubDirs	1	Your application must rescan not just the directory given in the e its children, recursively. This can happen if there was a problem wh were coalesced hierarchically. For example, an event in /Users/js and an event in /Users/jsmith/Pictures might be coalesced into a this flag set and path=/Users/jsmith. If this flag is set you may get an idea of whether the bottleneck happened in the kernel (less your client (more likely) by checking for the presence of the inform kFSEventStreamEventFlagUserDropped or kFSEventStreamEvent Dropped.
kFSEventStreamEventFlagNone	0	
kFSEventStreamEventFlagRootChanged	32	Denotes a special event sent when there is a change to one of th along the path to one of the directories you asked to watch. Whe set, the event ID is zero and the path corresponds to one of the pat to watch (specifically, the one that changed). The path may no because it or one of its parents was deleted or renamed. Events with will only be sent if you passed the flag kFSEventStreamCreateFla to the constructor when you created the stream.
kFSEventStreamEventFlagUnmount	128	Denotes a special event sent when a volume is unmounted. The event is the path to the directory from which the volume was You will receive one of these notifications for every volume un inside the kernel. This is not a substitute for the notifications the DiskArbitration framework; you only get notified after the u occurred. Beware that unmounting a volume could uncover an arb directory hierarchy, although Mac OS X never does that.
kFSEventStreamEventFlagUserDropped	2	The kFSEventStreamEventFlagUserDropped or kFSEventStreaml ernelDropped flags may be set in addition to the kFSEventStrear MustScanSubDirs flag to indicate that a problem occurred in b events (the particular flag set indicates where the problem occurr the client must do a full scan of any directories (and their subdirec sively) being monitored by this stream. If you asked to monitor m

File Event Flags

Constant	Value	Description
kFSEventStreamEventFlagItemChangeOwner	&h00004000	File changed owner.
kFSEventStreamEventFlagItemCloned	&h00400000	The file system object at the specific path supplied in th was cloned. (This flag is only ever set if you specified the FileEvents fl stream.)
kFSEventStreamEventFlagItemCreated	&h00000100	File created.
kFSEventStreamEventFlagItemFinderInfoMod	&h00002000	File meta data in Finder info have changed.
kFSEventStreamEventFlagItemInodeMetaMod	&h00000400	File meta data in inode have changed.
kFSEventStreamEventFlagItemIsDir	&h00020000	File is a folder.
kFSEventStreamEventFlagItemIsFile	&h00010000	File is a regular file.
kFSEventStreamEventFlagItemIsHardlink	&h00100000	Indicates the object at the specified path supplied in this (This flag is only ever set if you specified the FileEvents fl stream.)
kFSEventStreamEventFlagItemIsLastHardlink	&h00200000	Indicates the object at the specific path supplied in this ev link. (This flag is only ever set if you specified the FileEvents fl stream.)
kFSEventStreamEventFlagItemIsSymlink	&h00040000	File is a symlink.
kFSEventStreamEventFlagItemModified	&h00001000	File modified.
kFSEventStreamEventFlagItemRemoved	&h00000200	File deleted.
kFSEventStreamEventFlagItemRenamed	&h00000800	File renamed.
kFSEventStreamEventFlagItemXattrMod	&h00008000	Extended attributes changed.
kFSEventStreamEventFlagOwnEvent	&h00080000	Indicates the event was triggered by the current process. (This flag is only ever set if you specified the MarkSelf fl stream.)

Chapter 15

GameKit

15.1 class GameKitMBS

15.1.1 class GameKitMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The central plugin class for GameKit.
Notes: Events from various objects end here, so you can implement them in a central subclass of GameKitMBS.
For most events, we carry a "tag as Variant" parameter, so you can pass a window, some object or whatever value you need.

Also we defined that matchdata is a dictionary. This way you can store various values inside including arrays (e.g. array of variant). As data is serialized over the network, you can't pass Xojo objects.

The plugin makes sure that all events run on the main thread, so please make sure you don't block main thread.
Please create only one instance of your GameKitMBS subclass.

GameKit classes are available in OS X v10.8 and later.
Please review Apple's documentation for more details and a guide.
Blog Entries

- GameKit for Real Studio

Xojo Developer Magazine

- 12.4, page 30: Writing OS X Apps for Game Center, Getting started by authenticating the local player with the Game Center Sandbox testing facility by Tom Baumgartner

15.1.2 Methods

15.1.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.1.4 GKErrorDomain as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The Game Kit framework error domain.
Notes: For NSErrorMBS.

15.1.5 showBannerWithTitle(title as string, message as string, duration as Double, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Displays a banner to the player for a specified period of time.
Notes: title: The title of the banner.
message: A secondary message to be displayed.
duration: The amount of time that the banner should be displayed to the player.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.Notification-BannerCompleted event.
See also:

- 15.1.6 showBannerWithTitle(title as string, message as string, tag as Variant) 480

15.1.6 showBannerWithTitle(title as string, message as string, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Displays a banner to the player.
Notes: title: The title of the banner.
message: A secondary message to be displayed.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.Notification-

BannerCompleted event.
See also:

- 15.1.5 showBannerWithTitle(title as string, message as string, duration as Double, tag as Variant) 480

15.1.7 Events

15.1.8 acceptInviteCompleted(match as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The event to be called after the match is successfully created.
Notes: match: A newly initialized match object that contains a list of players for the match. If an error occurred, this value is nil.
error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

Called by GKTurnBasedMatchMBS.acceptInvite.
Available on Mac OS X 10.8.2 and newer.

15.1.9 achievementViewControllerDidFinish(viewController as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when the user dismisses the achievements screen. (required)
Notes: viewController: The achievement view controller whose interface was dismissed by the player. (GKAchievementViewControllerMBS)

Your should dismiss the view controller. If your game paused any gameplay or other activities, it can restart those services in this method.

15.1.10 addPlayersToMatchCompleted(MatchMaker as GKMatchmakerMBS, match as GKMatchMBS, matchRequest as GKMatchRequestMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKMatchmakerMBS.addPlayersToMatch when matchmaking completes.
Notes: error: If matchmaking was successful, this parameter contains nil. Otherwise, this parameter holds an error object that describes the error that occurred.

15.1.11 authenticateCompleted(localPlayer as GKLocalPlayerMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKLocalPlayerMBS.authenticate when the player has authenticated or when an error occurs.
Notes: error: This parameter is nil if the player successfully authenticated. Otherwise, it contains an error object that describes the error that occurred.

15.1.12 authenticateHandler(LocalPlayer as GKLocalPlayerMBS, viewController as NSViewControllerMBS, error as NSErrorMBS, tag as Variant, viewControllerHandle as Integer)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The event called when game center needs authentication.
Notes: viewController: This parameter is nil if the authentication process is complete. Otherwise, it contains a view controller that your game should display to the player.
error: This parameter contains an error object that describes any error that occurred.

Your game should authenticate the player as early as possible after launching, ideally as soon as you can present a user interface to the player. For example, your game may be launched because the player accepted an invitation to join a match or to take a turn in a turn-based match, so you want your game to authenticate the player and process the match invitation as quickly as possible. After you set a handler, authentication begins automatically and is repeated when your game moves to the background and then back to the foreground.

During the authentication process, Game Kit calls your handler one or more times to handle specific authentication events. Your handler must handle three kinds of events:

- If the device does not have an authenticated player, Game Kit passes a view controller to your authenticate handler. When presented, this view controller displays the authentication user interface. Your game should pause other activities that require user interaction (such as your game loop), present this view controller and then return. When the player finishes interacting with it, the view controller is dismissed automatically.
- If the authentication process succeeded, theGKLocalPlayer singleton object's authenticated property is set to true and the object's other properties are set to match those of the connected player.
- If the authentication process failed, the GKLocalPlayer singleton object's authenticated property is set to false and the object's other properties are cleared.

Each time the authentication handler is called, the data stored in the local player singleton object may have changed. A new player may have logged into the device or the player may have simply logged out from Game

Center. Because of both of these possibilities, your authentication handler must be prepared to update any other objects that assume that a particular player is logged in. For more information, see "Authenticating the Local Player in a Multitasking Application" in Game Center Programming Guide.

Available on Mac OS X 10.8.2 and newer.

15.1.13 challengesViewControllerDidFinish(viewController as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The challengesViewController did finish.
Notes: Called by GKChallengesViewControllerMBS if needed.
Available on Mac OS X 10.8.2 and newer.

15.1.14 chooseBestHostPlayerCompleted(match as GKMatchMBS, playerID as string, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when GKMatchMBS.chooseBestHostPlayer completes.
Notes: playerID: The player identifier for the player with the best estimated network performance, or nil if a player could not currently be determined.

Available on Mac OS X 10.8.2 and newer.

15.1.15 declineInviteCompleted(match as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The event to be called after the match is successfully created.
Notes: error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

Called by GKTurnBasedMatchMBS.declineInvite.
Available on Mac OS X 10.8.2 and newer.

15.1.16 didRequestMatchWithOtherPlayers(players() as GKPlayerMBS)

Plugin Version: 15.0, Platform: macOS, Targets: .

Function: Initiates a match from Game Center with the requested players. (required)
Notes: player: The GKPlayer object containing the current player,Äôs information.
playersToInvite: An array of GKPlayer objects containing the player identifiers to invite to the match.

When this method is called, you should create a new match using the player identifiers provided and present a GKTurnBasedMatchmakerViewController.

Available in OS X v10.10 and later.

15.1.17 endMatchInTurnWithMatchDataCompleted(match as GKTurnBasedMatchMBS, matchData as Dictionary, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKTurnBasedMatchMBS.endMatchInTurnWithMatchData after the match is successfully ended.
Notes: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

15.1.18 endTurnWithNextParticipant(match as GKTurnBasedMatchMBS, nextParticipant as GKTurnBasedParticipantMBS, matchData as Dictionary, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKTurnBasedMatchMBS.endTurnWithNextParticipant after the data is uploaded to Game Center.
Notes: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

15.1.19 endTurnWithNextParticipantsCompleted(match as GKTurnBasedMatchMBS, nextParticipants() as GKTurnBasedParticipantMBS, timeout as Double, matchData as Dictionary, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The event to be called after the data is uploaded to the server.
Notes: Called by GKTurnBasedMatchMBS.participantQuitInTurnWithOutcome.

error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

Available on Mac OS X 10.8.2 and newer.

15.1.20 findMatchForRequestCompleted(MatchMaker as GKMatchmakerMBS, request as GKMatchRequestMBS, match as GKMatchMBS, TurnBasedMatch as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when the match has been created.
Notes: This is either called by GKMatchmakerMBS.findMatchForRequest or GKTurnBasedMatchMBS.findMatchForRequest.

match: If matchmaking was successful, this parameter contains the created match. Otherwise, this parameter is nil.
error: If matchmaking was successful, this parameter contains nil. Otherwise, this parameter holds an error object that describes the error that occurred.

15.1.21 findPlayersForHostedMatchRequestCompleted(MatchMaker as GKMatchmakerMBS, request as GKMatchRequestMBS, playerIDs() as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKMatchmakerMBS.findPlayersForHostedMatchRequest when the match has been created.
Notes: players: If matchmaking was successful, this parameter contains an array of players to connect into the match. Otherwise, this parameter is nil.
error: If matchmaking was successful, this parameter contains nil. Otherwise, this parameter holds an error object that describes the error that occurred.

15.1.22 friendRequestComposeViewControllerDidFinish(viewController as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: The compose view has finished.
Notes: viewController: The GKFriendRequestComposeViewControllerMBS object.

15.1.23 gameCenterViewControllerDidFinish(gameCenterViewController as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when gameCenterViewController did finish.
Notes: Available on Mac OS X 10.8.2 and newer.

15.1.24 handleInviteFromGameCenter(playersToInvite() as string)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Sent when the local player receives an invitation to join a new turn-based match.
Notes: playersToInvite: An array of player identifiers for the players to initially invite to the game.

When you receive this message, your game should create a new GKMatchRequestMBS object and assign the playersToInvite parameter to the match request's playersToInvite property. Then, your game can either call the GKTurnBasedMatchMBS class method findMatchForRequest to find a match programmatically or it can use the request to instantiate a new GKTurnBasedMatchmakerViewControllerMBS object to show a user interface to the player.

15.1.25 handleMatchEnded(match as GKTurnBasedMatchMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Sent when a match the local player is participating in has ended.
Notes: match: The match that just ended.

When you receive this message, it should display the match's final results to the player and allow the player the option of saving or removing the match data from Game Center.

15.1.26 handleTurnEventForMatch(match as GKTurnBasedMatchMBS, didBecomeActive as boolean)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Sent when it is the local player's turn to act in a turn-based match.
Notes: match: A match object containing the current state of the match.

When you receive this message, the player has accepted a push notification for a match already in progress. Your game should end whatever task it was performing and switch to the match information provided by the match object. For more information on handling player actions in a turn-based match, see GKTurnBasedMatch Class Reference.

didBecomeActive: New parameter valid on Mac OS X 10.8.2 and newer.

15.1.27 Invited(MatchMaker as GKMatchmakerMBS, acceptedInvite as GKInviteMBS, playersToInvite() as string)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKMatchmakerMBS when an invitation is received from another player.
Notes: acceptedInvite: The invitation accepted by the player.
playersToInvite: A list of player identifiers for additional players to invite into the game.

An game responds to an invitation by allocating and initializing a GKMatchmakerViewControllerMBS object, passing the invitation object and the list of player identifiers as parameters. For more information, see Game Kit Programming Guide.

If your game receives an invitation while your game is running, it should clean up any existing gameplay (including disconnecting from any current matches) and then process the invitation.

15.1.28 inviteeResponseHandler(MatchRequest as GKMatchRequestMBS, PlayerID as string, response as Integer, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The event called when an response from an invited player is returned to your game.
Notes: playerID: The identifier for the player.
response: The nature of the response. See GKInviteeResponse* constants.

Available on Mac OS X 10.8.2 and newer.

15.1.29 leaderboardViewControllerDidFinish(viewController as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: The leaderboard view has finished.
Notes: viewController: The GKLeaderboardViewControllerMBS object.

15.1.30 loadAchievementDescriptionsCompleted(achievements() as GKAchievementDescriptionMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKAchievementDescriptionMBS.loadAchievementDescriptions when the download is completed.
Notes: descriptions: An array of description objects for the achievements in your game. If an error occurred, this value may be non-empty. In this case, the array holds whatever descriptions were downloaded by Game Kit before the error occurred.
error: If an error occurred, this error object describes the error. If the operation completed successfully, this value is nil.

15.1.31 loadAchievementsCompleted(achievements() as GKAchievementMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKAchievementMBS.loadAchievements when the download is completed.
Notes: achievements: An array of achievement objects that represents all progress reported to Game Center for the local player. If an error occurred, this parameter may be non-empty, in which case the array holds whatever achievement information Game Kit was able to fetch.
error: If an error occurred, this object describes the error. If the operation completed successfully, this value is nil.

15.1.32 loadCategoriesCompleted(categories() as string, titles() as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKLeaderboardMBS.loadCategories when the categories have been retrieved from the server.
Notes: categories: An array of strings that provides the categories to your game. If an error occurred, this

value may be non-empty. In this case, the array holds whatever data Game Kit was able to download before the error occurred.
titles: An array of strings that provides localized titles for each category. If an error occurred, this value may be non-empty. In this case, the array holds whatever data Game Kit was able to download before the error occurred.
error: If an error occurred, this error object describes the error. If the operation completed successfully, the value is nil.

15.1.33 loadDefaultLeaderboardCategoryIDCompleted(LocalPlayer as GKLocalPlayerMBS, categoryID as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The loadDefaultLeaderboardCategoryID method completed.
Notes: categoryID: The category ID string for the local player's default leaderboard.
error: If an error occurred, this parameter holds an error object that explains the error. Otherwise, the value of this parameter is nil.

Available on Mac OS X 10.8.2 and newer.

15.1.34 loadFriendPlayersCompleted(localPlayer as GKLocalPlayerMBS, friendPlayers() as GKPlayerMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 15.0, Platform: macOS, Targets: .

Function: The event called by GKLocalPlayerMBS.loadFriendPlayers.
Notes: friendPlayers: An array of GKPlayer objects containing the player identifiers for the players that are friends of the local player. If an error occurred, this value can be non-nil. In that case, the array contains the data that Game Kit was able to download before the error occurred.
error: If an error occurred, this parameter holds an error object that explains the error. Otherwise, the value of this parameter is nil.

15.1.35 loadFriendsCompleted(localPlayer as GKLocalPlayerMBS, friends() as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKLocalPlayerMBS.loadFriends when the request completes.
Notes: friends: An array of player identifiers for the players that are friends of the local player. If an error occurred, this value can be non-empty. In that case, the array contains the data that Game Kit was able to download before the error occurred.

error: If an error occurred, this parameter holds an error object that explains the error. Otherwise, the value of this parameter is nil.

15.1.36 loadImageCompleted(description as GKAchievementDescriptionMBS, image as NSImageMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKAchievementDescriptionMBS.loadImage when the download is completed.
Notes: image: The downloaded image. If an error occurred, this value is nil.
error: If an error occurred, this error object describes the error. If the operation completed successfully, this value is nil.

15.1.37 loadLeaderboardsCompleted(Leaderboards() as GKLeaderboardMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Leaderboards have been loaded.
Notes: Available on Mac OS X 10.8.2 and newer.

15.1.38 loadMatchDataCompleted(match as GKTurnBasedMatchMBS, matchData as Dictionary, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKTurnBasedMatchMBS.loadMatchData after the match data has been retrieved from the server.
Notes: matchData: The data stored on Game Center that reflects the current state of the match. If an error occurred, this value is nil.
error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

15.1.39 loadMatchesCompleted(matches() as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKTurnBasedMatchMBS.loadMatches after the matches are retrieved from the server.
Notes: matches: An array of match objects that hold the requested matches. If an error occurred, this value may be non-empty. In this case, the array holds whatever match data could be retrieved from Game

Center before the error occurred.
error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

15.1.40 loadMatchWithIDCompleted(TurnBasedMatch as GKTurnBasedMatchMBS, matchID as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The event to be called after the match is retrieved from the server.
Notes: Called when GKTurnBasedMatchMBS.loadMatchWithID finishes.

matchID: The identifier for the turn-based match.
match: If the operation completed successfully, this parameter holds the match. If an error occurred, the value is nil.
error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

Available on Mac OS X 10.8.2 and newer.

15.1.41 loadPhotoForSizeCompleted(player as GKPlayerMBS, size as Integer, photo as NSImageMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKPlayerMBS.loadPhotoForSize when the player data is retrieved from Game Center.
Notes: photo: An image for the player. If an error occurred, this may still be non-nil. In this case, the image reflects an image cached by Game Kit on the device.
error: If an error occurred, this error object describes the error. If the operation completed successfully, this is nil.

15.1.42 loadPlayersForIdentifiersCompleted(identifiers() as string, players() as GKPlayerMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKPlayerMBS.loadPlayersForIdentifiers when the player data is retrieved from Game Center.
Notes: players: An array of GKPlayer objects, one per identifier. If an error occurred, this may be non-empty. In that case, the array holds whatever data Game Kit was able to retrieve for the requested players.
error: If an error occurred, this error object describes the error. If the operation completed successfully, this

is nil.

15.1.43 loadReceivedChallengesCompleted(challenges() as GKChallengeMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when loadReceivedChallenges finished.
Notes: challenges: An array of challenge objects that represents all challenges made to the local player. If an error occurred, this parameter may be non-nil, in which case the array holds whatever challenge information Game Kit was able to fetch.
error: If an error occurred, this object describes the error. If the operation completed successfully, this value is nil.

Available on Mac OS X 10.8.2 and newer.

15.1.44 loadScoresCompleted(Leaderboard as GKLeaderboardMBS, scores() as GKScoreMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKLeaderboardMBS.loadScores after the scores are retrieved from the server.
Notes: scores: An array of score objects that hold the requested scores. If an error occurred, this value may be non-nil. In this case, the array holds whatever score data could be retrieved from Game Center before the error occurred.
error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

15.1.45 localPlayerDidCompleteChallenge(challenge as GKChallengeMBS)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when the local player has completed one of their challenges, triggered by a push notification from the server.
Notes: Received only while the game is running.
Available on Mac OS X 10.8.2 and newer.

15.1.46 localPlayerDidReceiveChallenge(challenge as GKChallengeMBS)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when the local player has received a challenge, triggered by a push notification from the server.
Notes: Received only while the game is running.
Available on Mac OS X 10.8.2 and newer.

15.1.47 localPlayerDidSelectChallenge(challenge as GKChallengeMBS)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when the user clicks a challenge notification banner or the "Play Now" button for a challenge inside Game Center, causing the game to launch.
Notes: Also called when the user clicks a challenge banner inside the game.
Available on Mac OS X 10.8.2 and newer.

15.1.48 matchConnectionWithPlayerFailed(match as GKMatchMBS, playerID as string, error as NSErrorMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when the match fails to connect to a player.
Notes: match: The match that received the error.
player: The identifier for the player whose connection failed.
error: The error that occurred.

This method is called if the match was unable to send a transmission to another player in the match.

15.1.49 matchDidChangeState(match as GKMatchMBS, playerID as string, state as Integer)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when a player connects to or disconnects from the match.
Notes: match: The match that the player is connected to.
player: The identifier for the player whose state changed.
state: The state the player moved to. (see constants in GKMatchMBS)

Your game implements this method to be notified when players connect to or disconnect from the match.one

15.1.50 matchDidFailWithError(match as GKMatchMBS, error as NSErrorMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when the match cannot connect to any other players.
Notes: match: The match that received the error.
error: The error that occurred.

This method is called if the match cannot connect to any other players associated with the match. It usually means a serious networking error has occurred.

15.1.51 matchDidReceiveData(match as GKMatchMBS, data as Dictionary, playerID as string)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when data is received from a player. (required)
Notes: match: The match that received the data.
data: The data sent by the player.
player: The string identifier for the player that sent the data.

Important: Data received from other players should be treated as untrusted data. Be sure to validate the data you receive from the match and write your code carefully to avoid security vulnerabilities. See the Secure Coding Guide for more information.

15.1.52 matchEnded(player as GKPlayerMBS, match as GKTurnBasedMatchMBS)

Plugin Version: 15.0, Platform: macOS, Targets: .

Function: Called when the match has ended. (required)
Notes: player: The GKPlayer object containing the current player,Äôs information.
match: The GKTurnBasedMatch object containing the current game data.

Available in OS X v10.10 and later.

15.1.53 matchForInviteCompleted(Matchmaker as GKMatchmakerMBS, invite as GKInviteMBS, match as GKMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called by matchForInvite on completion.
Notes: Match provides the new match object on success.

Possible reasons for error:
1. Communications failure.
2. Invite cancelled.
Available on Mac OS X 10.8.2 and newer.

15.1.54 matchmakerViewControllerDidFailWithError(viewController as Variant, error as NSErrorMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when the view controller encounters an unrecoverable error. (required)
Notes: viewController: The view controller that received the error. (GKMatchmakerViewControllerMBS)
error: An error object that describes the error.

15.1.55 matchmakerViewControllerDidFindMatch(viewController as Variant, match as GKMatchMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when a peer-to-peer match is found.
Notes: viewController: The view controller that performed the matchmaking. (GKMatchmakerViewControllerMBS)
match: A completed match.

This method is called when the view controller's hosted property is false. Although optional in the protocol, if your game attaches a delegate to the view controller for a peer-to-peer match, the view controller expects your game to provide an implementation of this method.

15.1.56 matchmakerViewControllerDidFindPlayers(viewController as Variant, playerIDs() as string)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when a hosted match is found.
Notes: viewController: The view controller that performed the matchmaking. (GKMatchmakerViewControllerMBS)
players: An array of identifier strings for the matched players.

This method is called when the view controller's hosted property is true. Although optional in the protocol, if your game attaches a delegate to the view controller for a hosted match, the view controller expects your game to provide an implementation of this method.

The view controller returns the list of players to your game by calling this method. Your game is responsible for connecting these players to your own server and then using that server to relay messages between the players.

15.1.57 matchmakerViewControllerDidReceiveAcceptFromHostedPlayer(viewController as Variant, playerID as string)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when a player in a hosted match accepts the invitation.
Notes: viewController: The view controller that accepted the invitation. (GKMatchmakerViewControllerMBS)
playerID: The identifier of the accepting player.

After a player accepts an invitation, that player's device should connect to your server. Once the connection is established, your game should call the view controller's setHostedPlayer method to update the player's connection status.

15.1.58 matchmakerViewControllerWasCancelled(viewController as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when the user cancels the matchmaking request (required)
Notes: viewController: The view controller that received the cancellation. (GKMatchmakerViewControllerMBS)

15.1.59 matchShouldReinvitePlayer(match as GKMatchMBS, playerID as string) as boolean

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when a player in a two-player match was disconnected.
Notes: match: The match that lost the player.
playerID: The identifier for the player whose connection failed.

Your game should return true if it wants Game Kit to attempt to reconnect the player, false if it wants to terminate the match.

Occasionally, players may get disconnected from a match. If your game implements this method in the match delegate and the match only contains two players, Game Kit calls this method after a player gets disconnected. If your delegate allows Game Kit to reconnect to the other player, it reconnects the other player. Your matchDidChangeState event is called when the other player is reconnected.

15.1.60 NotificationBannerCompleted(title as string, message as string, duration as Double, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GameKitMBS.showBannerWithTitle after the banner is reported.
Notes: Duration is only passed if it was sent with the newer method on Mac OS X 10.8.2 and newer.

15.1.61 participantQuitInTurnWithOutcomeCompleted(match as GKTurnBasedMatchMBS, matchOutcome as Integer, nextParticipant as GKTurnBasedParticipantMBS, nextParticipants() as GKTurnBasedParticipantMBS, timeout as Double, matchData as Dictionary, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The event to be called after the data is uploaded to the server.
Notes: Called by GKTurnBasedMatchMBS.participantQuitInTurnWithOutcome.

error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

Available on Mac OS X 10.8.2 and newer.

15.1.62 participantQuitOutOfTurnWithOutcomeCompleted(match as GKTurnBasedMatchMBS, matchOutcome as Integer, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKTurnBasedMatchMBS.participantQuitOutOfTurnWithOutcome called after the data is uploaded to the server.
Notes: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

15.1.63 PlayerAuthenticationDidChange(player as GKPlayerMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Player's authentication changed.

15.1.64 playerChanged(player as GKPlayerMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: The player changed.

15.1.65 playerStateUpdate(playerID as string, state as Integer, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when the state of any participant in the chat changes (including the local player).
Notes: player: The player identifier for the player whose status changed.
state: The new state of the player.
You need to call enablePlayerStateUpdate to receive events.

15.1.66 queryActivityCompleted(MatchMaker as GKMatchmakerMBS, activity as Integer, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKMatchmakerMBS.queryActivity when query is done.
Notes: activity: The amount of activity in the player group.
error: If the search completed successfully, this parameter is nil; otherwise, this parameter holds an error object that describes the error that occurred.

15.1.67 queryPlayerGroupActivityCompleted(MatchMaker as GKMatchmakerMBS, playerGroup as Integer, activity as Integer, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKMatchmakerMBS.queryPlayerGroupActivity when the search completes.
Notes: activity: The amount of activity in the player group.
error: If the search completed successfully, this parameter is nil; otherwise, this parameter holds an error object that describes the error that occurred.

15.1.68 receivedTurnEventForMatch(player as GKPlayerMBS, match as GKTurnBasedMatchMBS, didBecomeActive as boolean)

Plugin Version: 15.0, Platform: macOS, Targets: .

Function: Activates the player,Äôs turn. (required)
Notes: This method is called when the it becomes the player,Äôs turn. It is also called when any of the following events happen:

- The current turn has a time-out associated with it and the turn is about to expire.
- Player accepts an invite from another player.
- Turn was passed to another player. In this case, didBecomeActive is false.
- Match data is saved by another player.
- Player receives a reminder.

Available in OS X v10.10 and later.

15.1.69 recipientResponseHandler(MatchRequest as GKMatchRequestMBS, Player as GKPlayerMBS, response as Integer, tag as Variant)

Plugin Version: 15.0, Platform: macOS, Targets: .

Function: This event is called whenever you programmatically invite specific players to join a match.
Notes: It is called once for each player invited to the match. Typically, your game uses the responses to update the custom user interface. For example, you want the player to be able to perform any of the following tasks:

- Start the match.
- Invite an additional set of specific players.
- Use matchmaking to fill the remaining match slots.

Available in OS X v10.10 and later.

15.1.70 rematchCompleted(TurnMatch as GKTurnBasedMatchMBS, match as GKMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when GKMatchMBS.rematch completes.
Notes: match: The new match. If an error occurred, this parameter's value is nil.
error: If an error occurred, this parameter holds an error object that describes the problem. If the match was successfully recreated, this parameter's value is nil.

Available on Mac OS X 10.8.2 and newer.

15.1.71 remotePlayerDidCompleteChallenge(challenge as GKChallengeMBS)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when a non-local player has completed a challenge issued by the local player.
Notes: Triggered by a push notification from the server. Received when a challenge notification banner is clicked, or while the game is running.
Available on Mac OS X 10.8.2 and newer.

15.1.72 removeCompleted(match as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKTurnBasedMatchMBS.remove on completion.
Notes: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.
Tag is the parameter you passed to remove method.

15.1.73 reportAchievementCompleted(score as GKAchievementMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKAchievementMBS.reportAchievement after the operation completes.
Notes: error: If the operation was successful, this value is nil; otherwise, this parameter holds an object that describes the problem that occurred.

15.1.74 reportAchievementsCompleted(achievements() as GKAchievementMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when GKAchievementMBS.reportAchievements completes.
Notes: Available on Mac OS X 10.8.2 and newer.

15.1.75 reportScoreCompleted(score as GKScoreMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKScoreMBS.reportScore after the score is reported.
Notes: error: If an error occurred, this parameter holds an error object that describes the problem. If the score was successfully reported, this parameter's value is nil.

15.1.76 reportScoresCompleted(Scores() as GKScoreMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Reporting scores completed.
Notes: scores: An array of score objects to report to Game Center.
error: If an error occurred, this parameter holds an error object that describes the problem. If the score was successfully reported, this parameter's value is nil.

Available on Mac OS X 10.8.2 and newer.

15.1.77 resetAchievementsCompleted(error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKAchievementMBS.resetAchievements when the reset action is completed.
Notes: error: If the operation was successful, this value is nil; otherwise, this parameter holds an object that describes the problem that occurred.

15.1.78 saveCurrentTurnWithMatchDataCompleted(match as GKTurnBasedMatchMBS, matchData as Dictionary, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: The event to be called after the data is uploaded to Game Center.
Notes: error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.
matchData: The game-specific state for the match.

Available on Mac OS X 10.8.2 and newer.

15.1.79 selectChallengeablePlayerIDsCompleted(Achievement as GKAchievementMBS, playerIDs() as string, challengeablePlayerIDs() as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called by GKAchievementMBS.selectChallengeablePlayerIDs on completion
Notes: Available on Mac OS X 10.8.2 and newer.

15.1.80 setDefaultLeaderboardCategoryIDCompleted(LocalPlayer as GKLocalPlayerMBS, categoryID as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called by GKLocalPlayerMBS.setDefaultLeaderboardCategoryID when completed.
Notes: Available on Mac OS X 10.8.2 and newer.

15.1.81 setDefaultLeaderboardCompleted(categoryID as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called by GKLeaderboardMBS.setDefaultLeaderboard after the scores are retrieved from the server.
Notes: error: If an error occurred, this error object describes the error. If the operation was completed successfully, the value is nil.

15.1.82 shouldShowBannerForLocallyCompletedChallenge(challenge as GKChallengeMBS) as boolean

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Whether to show banner for locally completed challenge.
Notes: If the method returns true, a challenge banner (like an achievement or welcome banner – not a notification center banner) is displayed. If false, then no banner is displayed. Default behavior for non-implementing apps is true.
Available on Mac OS X 10.8.2 and newer.

15.1.83 shouldShowBannerForLocallyReceivedChallenge(challenge as GKChallengeMBS) as boolean

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Whether to show banner for locally received challenge.
Notes: If the method returns true, a challenge banner (like an achievement or welcome banner – not a notification center banner) is displayed when a challenge is received in-game for the local player. If false, then no banner is displayed, and localPlayerDidSelectChallenge will not be called for that challenge. Default behavior for non-implementing apps is true.

Available on Mac OS X 10.8.2 and newer.

15.1.84 shouldShowBannerForRemotelyCompletedChallenge(challenge as GKChallengeMBS) as boolean

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Whether to show banner for remotely completed challenge.
Notes: If the method returns true, a challenge banner (like an achievement or welcome banner – not a notification center banner) is displayed. If false, then no banner is displayed. Default behavior for non-implementing apps is true.
Available on Mac OS X 10.8.2 and newer.

15.1.85 startBrowsingForNearbyPlayersCompleted(Matchmaker as GKMatchmakerMBS, playerID as string, reachable as boolean, tag as Variant)

Plugin Version: 13.0, Platform: macOS, Targets: .

Function: Called when startBrowsingForNearbyPlayers method found a player.
Notes: Available on Mac OS X 10.8.2 and newer.

15.1.86 turnBasedMatchmakerViewControllerDidFailWithError(viewController as Variant, error as NSErrorMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when an error occurs. (required)
Notes: viewController: The view controller that received an error. (GKTurnBasedMatchmakerViewControllerMBS)
error: An error object that describes the error.

Your game should dismiss the view controller.

15.1.87 turnBasedMatchmakerViewControllerDidFindMatch(viewController as Variant, match as GKTurnBasedMatchMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when the player selected a match to view. (required)
Notes: viewController: The view controller that found a match. (GKTurnBasedMatchmakerViewControllerMBS)
match: The match that the player selected.

Your game should dismiss the view controller and use the match object to show the current state of the match to the player.

15.1.88 turnBasedMatchmakerViewControllerPlayerQuitForMatch(viewController as Variant, match as GKTurnBasedMatchMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when a player chooses to quit the match. (required)
Notes: viewController: The view controller that the player interacted with. (GKTurnBasedMatchmakerViewControllerMBS)
match: The match the player has chosen to quit.

When this method is called, the player is the current participant in the match, but that player has chosen to resign the match instead of taking a turn. Your game should dismiss the view controller, set an outcome for the player, and then call the match's participantQuitInTurnWithOutcome method.

15.1.89 turnBasedMatchmakerViewControllerWasCancelled(viewController as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when the player cancels matchmaking. (required)
Notes: viewController: The view controller that the player canceled. (GKTurnBasedMatchmakerViewControllerMBS)

Your game should dismiss the view controller.

15.1.90 Constants

GameKit Error Constants

Constant	Value	Description
GKErrorAuthenticationInProgress	7	The local player is currently authenticating.
GKErrorCancelled	2	The requested operation was canceled.
GKErrorChallengeInvalid	19	The challenge was invalid. Available on Mac OS X 10.8.2 and newer.
GKErrorCommunicationsFailure	3	An error occurred when communicating with Game Center.
GKErrorGameUnrecognized	15	nGame Center does not recognize the application that made the reques sure the bundle identifier is set properly for the application.one
GKErrorInvalidCredentials	5	The operation failed because the player's user name or password or b incorrect.
GKErrorInvalidParameter	17	One or more of the parameters was incorrect. For example, this error code may be returned if your application atte post a score and provides a category string that does not match a categ configured for your leaderboards on iTunes Connect.
GKErrorInvalidPlayer	8	A player object or identifier is invalid.
GKErrorMatchRequestInvalid	13	The match request's properties are impossible to fulfill. For example, th mum number of players cannot be larger than the maximum number of
GKErrorNotAuthenticated	6	The local player has not been authenticated.
GKErrorNotSupported	16	The device does not support Game Center.
GKErrorOffline	25	The user went offline. In Mac OS X 10.8.2 and newer this constant has value 25. In older ver has value 19.
GKErrorParentalControlsBlocked	10	The feature has been blocked by the user.
GKErrorScoreNotSet	9	A score value was not set before attempting to post the score.
GKErrorTurnBasedInvalidParticipant	22	One of the participant objects you provided was invalid. Available on Mac OS X 10.8.2 and newer.
GKErrorTurnBasedInvalidState	24	The requested operation could not be completed because the session invalid state. Available on Mac OS X 10.8.2 and newer.
GKErrorTurnBasedInvalidTurn	23	The requested operation could not be completed because the specified pant does not have the required turn state. Available on Mac OS X 10.8.2 and newer.
GKErrorTurnBasedMatchDataTooLarge	20	Your game submitted data that exceeded the maximum size that Game permits for a turn-based game. Available on Mac OS X 10.8.2 and newer.
GKErrorTurnBasedTooManySessions	21	The requested operation could not be completed because it would exc maximum number of sessions. Available on Mac OS X 10.8.2 and newer.
GKErrorUnderage	14	The feature is disabled because the local player is underage.
GKErrorUnexpectedConnection	18	An unexpected player has connected to a match.
GKErrorUnknown	1	An unexpected error occurred.
GKErrorUserDenied	4	The operation was denied by the user.

Response Constants

Constant	Value	Description
GKInviteeResponseAccepted	0	The player accepted the invitation. Available on Mac OS X 10.8.2 and newer.
GKInviteeResponseDeclined	1	The player rejected the invitation. Available on Mac OS X 10.8.2 and newer.
GKInviteeResponseFailed	2	The invitation was unable to be delivered. Available on Mac OS X 10.8.2 and newer.
GKInviteeResponseIncompatible	3	The invitee is not running a compatible version of your game. Available on Mac OS X 10.8.2 and newer.
GKInviteeResponseNoAnswer	5	The invitation timed out without an answer. Available on Mac OS X 10.8.2 and newer.
GKInviteeResponseUnableToConnect	4	The invitee could not be contacted. Available on Mac OS X 10.8.2 and newer.

Invite Responses

Constant	Value	Description
GKInviteRecipientResponseAccepted	0	The player accepted the invitation. Available in OS X v10.10 and later.
GKInviteRecipientResponseDeclined	1	The player rejected the invitation. Available in OS X v10.10 and later.
GKInviteRecipientResponseFailed	2	The invitation was unable to be delivered. Available in OS X v10.10 and later.
GKInviteRecipientResponseIncompatible	3	The invitee is not running a compatible version of your game. Available in OS X v10.10 and later.
GKInviteRecipientResponseNoAnswer	5	The invitation timed out without an answer. Available in OS X v10.10 and later.
GKInviteRecipientResponseUnableToConnect	4	The invitee could not be contacted. Available in OS X v10.10 and later.

15.2 class GKAchievementChallengeMBS

15.2.1 class GKAchievementChallengeMBS

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: A GKAchievementChallenge is a challenge to a player to complete a specific achievement.
Notes: Subclass of the GKChallengeMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

15.2.2 Methods

15.2.3 achievement as GKAchievementMBS

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The achievement the player must complete.
Notes: (read-only)

15.2.4 Constructor

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The private constructor.

15.3 class GKAchievementDescriptionMBS

15.3.1 class GKAchievementDescriptionMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: An GKAchievementDescription object holds text and images used to display an achievement to the player.
Notes: During development, you create achievement descriptions by editing them in iTunes Connect. At runtime, your game retrieve these descriptions from Game Center. Usually, your game only needs to download achievement descriptions when it wants to present a custom achievement user interface to the player.

see also
http://developer.apple.com/library/ios/#documentation/GameKit/Reference/GKAchievementDescription_Ref/Reference/Reference.html
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

15.3.2 Methods

15.3.3 achievedDescription as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A localized description of the completed achievement. (read-only)

15.3.4 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.3.5 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The private constructor.

15.3.6 groupIdentifier as string

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The group identifier for the achievement, if one exists.
Notes: Available on Mac OS X 10.8.2 and newer.

15.3.7 identifier as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A unique string used to identify the achievement. (read-only)
Notes: The GKAchievementDescription property holds the identifier string you created for the achievement on iTunes Connect.

15.3.8 image as NSImageMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: An image to display for the completed achievement. (read-only)
Notes: The value of this property is undefined until after the image is loaded. See loadImage.

15.3.9 incompleteAchievementImage as NSImageMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A common image for incomplete achievements.

15.3.10 isHidden as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that states whether this achievement should be visible to players. (read-only)
Notes: If the value of this property is false, this achievement is always visible to the user. If true, the achievement is not displayed in any of the standard achievement user interface screens. It remains hidden until the first time your game reports progress towards completing this achievement.

15.3.11 isReplayable as boolean

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Whether or not the achievement will be reported by the game when the user earns it again.
Notes: This allows the achievement to be used for challenges when the recipient has previously earned it. Available on Mac OS X 10.8.2 and newer.

15.3.12 loadAchievementDescriptions(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Downloads the achievement descriptions from Game Center.
Notes: When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadAchievementDescriptionsCompleted event.

15.3.13 loadImage(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Loads the image property for a completed achievement.
Notes: Your game should call loadImage for each achievement the user has completed. Your game should display the placeholder image until the image is successfully downloaded. After the event is called, the description's image property holds the same image object that is returned to the event.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadImageCompleted event.

15.3.14 maximumPoints as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The number of points earned by completing this achievement. (read-only)

15.3.15 placeholderCompletedAchievementImage as NSImageMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A common image for completed achievements.
Notes: When an achievement is completed, your game can display this image until the custom image for an achievement finishes loading.

15.3.16 title as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A localized title for the achievement. (read-only)

15.3.17 unachievedDescription as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A localized description of the achievement, to be used when the achievement has not been completed. (read-only)

15.3.18 Properties

15.3.19 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.4 class GKAchievementMBS

15.4.1 class GKAchievementMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Your game uses a GKAchievement object to communicate with Game Center about a local player's progress towards completing an achievement.
Notes: see also
http://developer.apple.com/library/ios/#documentation/GameKit/Reference/GKAchievement_Ref/Reference/Reference.html

15.4.2 Methods

15.4.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.4.4 Constructor(identifier as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initializes a new achievement object.
Notes: identifier: A string that identifies the achievement you want to update.

Your game initializes a new achievement object only when it has not previously reported progress for that achievement. If your game has previously reported progress on an achievement, you should retrieve the achievement object by calling the loadAchievementsWithCompletionHandler class method and update the progress on that object instead.

15.4.5 isCompleted as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that states whether the player has completed the achievement. (read-only)
Notes: The value of this property is true if the percentComplete property is equal to 100.0; otherwise, it is false.

15.4.6 isHidden as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that states whether this achievement is normally kept secret from the player. (read-only)
Notes: On a newly initialized achievement object, the property's value is invalid. If the achievement object was returned to your game by the loadAchievementsWithCompletionHandler class method, the value of this property matches the value you set in iTunes Connect for that achievement. The value in this property is identical to the value found in the hidden property for an GKAchievementDescriptionMBS object that shares the same achievement identifier.

15.4.7 issueChallengeToPlayers(playerIDs() as string, message as string)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Use this method to issue GKScoreChallenges and GKAchievementChallenges to an array of playerIDs.
Notes: Players may not issue challenges to themselves nor to non-friends. Please see the GameKit reference documentation for further details on these methods.
Available on Mac OS X 10.8.2 and newer.

15.4.8 lastReportedDate as date

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The last time that the achievement was successfully reported to Game Center. (read-only)
Notes: On a newly initialized achievement object, this property holds the current date.

15.4.9 loadAchievements(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Retrieves previously submitted achievement progress from Game Center.
Notes: When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadAchievementsCompleted event.

15.4.10 reportAchievement(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Reports the player's progress to Game Center.
Notes: When the player makes progress towards completing an achievement, your game should communicate the player's progress to Game Center by calling this method. An achievement object is implicitly tied to the local player that was authenticated when the object was created; your game should only report progress when the same local player is still authenticated on the device.

Note: To avoid using network bandwidth unnecessarily, only report an achievement when the user has actually advanced the progress they have made towards completing it.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.reportAchievementCompleted.

When the progress is successfully reported, the achievement is made visible if it was previously hidden. The percentComplete and lastReportedDate property values stored on Game Center are updated if the new percentComplete value is greater than the value previously stored on Game Center. if the value of the percentComplete property was equal to 100.0, then the achievement is marked as completed and a banner may be shown to the player.

If the error is a network error and your game is running on iOS 4.3 or earlier, your game should periodically attempt to report the progress until the achievement is successfully reported. On iOS 5.0 and later and on OS X, the background reporting task automatically handles network errors on your game's behalf.

15.4.11 reportAchievements(achievements() as GKAchievementMBS, tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Report an array of achievements to the server.
Notes: Percent complete is required. Points, completed state are set based on percentComplete. isHidden is set to false anytime this method is invoqued. Date is optional. Error will be nil on success.

Possible reasons for error:
1. Local player not authenticated.
2. Communications failure.
3. Reported Achievement does not exist.

Later calls GameKitMBS.reportAchievementsCompleted event.
Available on Mac OS X 10.8.2 and newer.

15.4.12 resetAchievements(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Resets all achievement progress for the local player.
Notes: Calling this class method deletes all progress towards achievements previously reported for the local player. Hidden achievements that were previously visible are now hidden again.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.resetAchievementsCompleted event.

15.4.13 selectChallengeablePlayerIDs(playerIDs() as string, tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Given a list of playerIDs, return a subset of that list containing only playerIDs that are eligible to receive a challenge for the achievement.
Notes: Available on Mac OS X 10.8.2 and newer.
Calls later GameKitMBS.selectChallengeablePlayerIDsCompleted event when completed.

15.4.14 Properties

15.4.15 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.4.16 identifier as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A string used to uniquely identify the specific achievement the object refers to.
Notes: The identifier property must match the identifier string for an achievement you created for your game on iTunes Connect.
(Read and Write computed property)

15.4.17 percentComplete as Double

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A percentage value that states how far the player has progressed on this achievement.
Notes: The default value for a newly initialized achievement object is 0.0. The range of legal values is between 0.0 and 100.0, inclusive.
(Read and Write computed property)

15.4.18 showsCompletionBanner as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that states whether a banner is displayed when the achievement is completed.
Notes: When an achievement is completed and the value of this property is true, a notification banner is displayed to the player to inform them of the completed achievement. If the value of this property is false, there is no visual indication that the achievement is completed. Your game should set this property to false only when it wants to provide its own visual indicator that the achievement was earned. The default value is false.
(Read and Write computed property)

15.5 class GKAchievementViewControllerMBS

15.5.1 class GKAchievementViewControllerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: An GKAchievementViewController object provides a standard user interface to display achievement progress for the local player.
Notes: see also
http://developer.apple.com/library/ios/#documentation/GameKit/Reference/GKAchievementViewController_Ref/Reference/Reference.html
Subclass of the NSViewControllerMBS class.

15.5.2 Methods

15.5.3 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.6 class GKChallengeMBS

15.6.1 class GKChallengeMBS

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: A GKChallenge object represents a challenge issued by a player to another player.
Notes: Important: Your game must authenticate a local player before you can use any Game Center classes. If there is no authenticated player, your game receives a GKErrorNotAuthenticated error. For more information on authentication see Game Center Programming Guide.

Players use the Game Center app to issue and view challenges. However, your game can also customize its challenge behaviors in a number of ways:

- You can load the list of challenges issued to the local player by calling the loadReceivedChallenges shared method. For example, you might do this to display the challenges in your game's user interface.
- Your app can issue challenges using a GKScoreMBS or GKAchievementMBS object. Your game should only issue challenges when the local player initiates the action in your user interface.
- Your game can be notified when new challenge events are received. See GameKitMBS events.

You never subclass the GKChallengeMBS class directly. However, subclasses of GKChallengeMBS represent specific kinds of challenges. Two challenge types exist:

A GKScoreChallengeMBS is a challenge to beat a score the local player earned in a leaderboard.
A GKAchievementChallengeMBS is a challenge to complete an achievement that the local player has already completed.

Available on Mac OS X 10.8.2 and newer.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

15.6.2 Methods

15.6.3 Available as boolean

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Whether this class is available.
Notes: Returns true on Mac OS X 10.8.2 and newer.

15.6.4 completionDate as date

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The date the challenge was completed. (read-only).
Notes: If the challenge is not complete, this value is nil.
Available on Mac OS X 10.8.2 and newer.

15.6.5 Constructor

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The private constructor.
Notes: Available on Mac OS X 10.8.2 and newer.
This constructor is private to make sure you don't create an object from this class by error. Please use designated functions to create objects.

15.6.6 decline

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Declines a challenge.
Notes: If your game implements a custom user interface to display challenges, it should include controls that allow a player to decline a challenge. If the player uses your user interface to decline a challenge, call this method.

Available on Mac OS X 10.8.2 and newer.

15.6.7 issueDate as date

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The date the challenge was issued. (read-only).
Notes: Available on Mac OS X 10.8.2 and newer.

15.6.8 issuingPlayerID as string

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The player identifier for the player who issued the challenge. (read-only).
Notes: Available on Mac OS X 10.8.2 and newer.

15.6.9 loadReceivedChallenges(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Loads the list of outstanding challenges.
Notes: Available on Mac OS X 10.8.2 and newer.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKit.loadReceivedChallengesCompleted event.

15.6.10 message as string

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: A text message that describes the challenge. (read-only).
Notes: Available on Mac OS X 10.8.2 and newer.

15.6.11 receivingPlayerID as string

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The player identifier for the player who received the challenge. (read-only).
Notes: Available on Mac OS X 10.8.2 and newer.

15.6.12 state as Integer

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The current state of the challenge. (read-only).
Notes: See GKChallengeState* constants.
Available on Mac OS X 10.8.2 and newer.

15.6.13 Properties

15.6.14 Handle as Integer

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: Available on Mac OS X 10.8.2 and newer.
(Read and Write property)

15.6.15 Constants

State Constants

Constant	Value	Description
GKChallengeStateCompleted	2	The receiving player successfully completed the challenge. Available on Mac OS X 10.8.2 and newer.
GKChallengeStateDeclined	3	The receiving player declined the challenge. Available on Mac OS X 10.8.2 and newer.
GKChallengeStateInvalid	0	An error occurred. The state of this challenge is not valid. Available on Mac OS X 10.8.2 and newer.
GKChallengeStatePending	1	The challenge has been issued, but is not yet completed nor declined. Available on Mac OS X 10.8.2 and newer.

15.7 class GKChallengesViewControllerMBS

15.7.1 class GKChallengesViewControllerMBS

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: View controller that provides the standard user interface for challenges.
Notes: Present modally from the top view controller.
Calls GameKit.challengesViewControllerDidFinish if needed.
Available on Mac OS X 10.8.2 and newer.
Subclass of the NSViewControllerMBS class.

15.7.2 Methods

15.7.3 Constructor

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.8 class GKDialogControllerMBS

15.8.1 class GKDialogControllerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The GKDialogController class provides the ability to present Game Center view controller classes on OS X.
Notes: To present a view controller, instantiate a new GKDialogControllerMBS object or use the singleton object provided by the sharedDialogController class method. Set the parentWindow property of the dialog controller to the window that should display the view controller's contents. Then, call the dialog controller's presentViewController* methods, passing in the view controller object to be presented. Later, when the view controller's contents should be hidden, call the dialog controller's dismiss method.

see also
https://developer.apple.com/library/prerelease/mac/#documentation/GameKit/Reference/GKDialogController_Ref/Reference/Reference.html
Subclass of the NSResponderMBS class.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 13.4pr1

Xojo Developer Magazine

- 12.5, page 33: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner
- 12.5, page 29: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner
- 12.4, page 31: Writing OS X Apps for Game Center, Getting started by authenticating the local player with the Game Center Sandbox testing facility by Tom Baumgartner

15.8.2 Methods

15.8.3 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.8.4 dismiss

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Dismisses the currently displayed view controller.

15.8.5 parentWindow as NSWindowMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The window that view controllers presented by the dialog controller are displayed in.
Notes: Your app must set this property before presenting a view controller. The window must be at least 800 x 600.

15.8.6 presentViewController(GKViewController as NSViewControllerMBS) as boolean

Plugin Version: 13.4, Platform: macOS, Targets: Desktop only.

Function: Presents a view controller in the dialog controller's window.
Notes: viewController: A Game Center view controller.

Returns true if the view controller was presented, false if an error occurred.
The contents of the window are covered by the view controller's contents until the view controller is dismissed.

15.8.7 setParentWindow(parentWindow as NSWindowMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Sets the parent window.
See also:

- 15.8.8 setParentWindow(parentWindow as Window) 525

15.8.8 setParentWindow(parentWindow as Window)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Sets the parent window to the given Xojo Window.
Notes: Should work fine in Cocoa, but may fail in Carbon.
See also:

- 15.8.7 setParentWindow(parentWindow as NSWindowMBS) 525

15.8.9 sharedDialogController as GKDialogControllerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Retrieves the shared instance of the dialog controller.
Notes: Game Kit provides the shared dialog controller as a convenience. Your game can either use the shared dialog controller provided by this method, or it can instantiate its own GKDialogController object and configure it. You might create multiple GKDialogController objects when each should be presented in its own window.

15.9 class GKFriendRequestComposeViewControllerMBS

15.9.1 class GKFriendRequestComposeViewControllerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Your game uses the GKFriendRequestComposeViewController class to present a screen that allows the local player to send friend requests to other players.
Notes: see also
https://developer.apple.com/library/prerelease/mac/#documentation/GameKit/Reference/GKFriendRequestComposeViewController_Ref/Reference/Reference.html
Subclass of the NSViewControllerMBS class.

15.9.2 Methods

15.9.3 addRecipientsWithEmailAddresses(playerIDs() as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Add recipients to the request.
Notes: If you don't specify at least one recipient before presenting the view, the recipients field will be made firstResponder, to encourage the user to add some.
If you add more than maxNumberOfRecipients recipients, these methods will throw an exception.

15.9.4 addRecipientsWithPlayerIDs(playerIDs() as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Add recipients to the request.
Notes: If you don't specify at least one recipient before presenting the view, the recipients field will be made firstResponder, to encourage the user to add some.
If you add more than maxNumberOfRecipients recipients, these methods will throw an exception.

15.9.5 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.9.6 maxNumberOfRecipients as UInt64

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Get the maximum number of recipients permitted.

15.9.7 setMessage(message as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specify the message sent to the invitee. A default message will be used if you don't specify one.

15.10 class GKGameCenterViewControllerMBS

15.10.1 class GKGameCenterViewControllerMBS

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The GKGameCenterViewControllerMBS class aggregates many common Game Center features into a single user interface.
Notes: It replaces GKAchievementViewControllerMBS and GKLeaderboardViewControllerMBS as the preferred way to show Game Center content in your game.

Important: Your application must authenticate a local player before you can use any Game Center classes. If there is no authenticated player, your application receives a GKErrorNotAuthenticated error. For more information on authentication, see Game Center Programming Guide.

To display the Game Center screen, initialize a new GKGameCenterViewController object and set its delegate. Optionally, you can choose to configure the view controller further to specify which content is initially displayed. Then present the view controller. Your delegate is called when the user dismisses the screen.

Your game should pause other activities before presenting the Game Center user interface.

Available on Mac OS X 10.8.2 and newer.
Subclass of the NSViewControllerMBS class.

15.10.2 Methods

15.10.3 Constructor

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The constructor.
Notes: Available on Mac OS X 10.8.2 and newer.

15.10.4 Properties

15.10.5 leaderboardCategory as string

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The named leaderboard that is displayed by the view controller.
Notes: The category property must either be empty or it must match a category identifier you defined

when you created your leaderboards on iTunes Connect. If empty, the view displays scores for the aggregate leaderboard. Default is empty.

When the leaderboard is presented, the value of this property determines which leaderboard content is displayed to the player. As the player changes which leaderboard content they view, the leaderboardCategory property is automatically updated. For example, to preserve the player's selections, you can read the leaderboardCategory property after the screen is dismissed, and set that value the next time you initialize the view controller.

Available on Mac OS X 10.8.2 and newer.
(Read and Write computed property)

15.10.6 leaderboardTimeScope as Integer

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: A time filter used to restrict which scores are displayed to the player.
Notes: This property determines which tab view of the scores screen is displayed to the player. The default value is GKLeaderboardTimeScopeAllTime, which shows the best score each player has earned. For more information on time scopes, see GKLeaderboardMBS Class.

When the leaderboard is presented, the value of this property determines the initial tab that is displayed to the player. As the player changes which tab they view, the leaderboardTimeScope property is automatically updated. For example, to preserve the player's selections, you can read the leaderboardTimeScope property after the screen is dismissed, and set that value the next time you initialize the view controller.

Available on Mac OS X 10.8.2 and newer.
(Read and Write computed property)

15.10.7 viewState as Integer

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The content displayed by the Game Center controller.
Notes: See State* constants for possible values. When you first present the Game Center view controller, the content displayed by the view controller is determined by this property. If the player navigates to different content, the view state is automatically updated. For example, to preserve the player's selections, you can read the viewState property after the screen is dismissed, and set that value the next time you initialize the view controller.

Available on Mac OS X 10.8.2 and newer.
(Read and Write computed property)

15.10.8 Constants

State Values

Constant	Value	Description
StateAchievements	1	Indicates that the view controller presents achievements content. Available on Mac OS X 10.8.2 and newer.
StateChallenges	2	Indicates that the view controller presents challenges content. Available on Mac OS X 10.8.2 and newer.
StateDefault	-1	Indicates that the view controller should present the default screen. Available on Mac OS X 10.8.2 and newer.
StateLeaderboards	0	Indicates that the view controller presents leaderboard content. The leaderboardCategory and leaderboardTimeScope properties affect the appearance of this view state. Available on Mac OS X 10.8.2 and newer.

15.11 class GKInviteMBS

15.11.1 class GKInviteMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Your game receives invitations from other players through the GKInvite class.
Notes: Your game never directly creates GKInvite objects. Instead, invitations are created by Game Kit and delivered to your game. To receive invitations from Game Center, your game sets an invitation handler.

The properties of the invitation object describe the match the local player is being invited to join.
Xojo Developer Magazine

- 12.5, page 31: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner
- 12.5, page 29: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner

15.11.2 Methods

15.11.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.11.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.11.5 inviter as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The identifier for the player who invited the local user to join a match. (read-only)

15.11.6 isHosted as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that states whether the game is hosted. (read-only)
Notes: If the value of the hosted property is true, this is a hosted match. If the value is false, this is a peer-to-peer match. The default is false.

15.11.7 playerAttributes as UInt32

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Player attributes from inviter's match request.
Notes: Available on Mac OS X 10.8.2 and newer.

15.11.8 playerGroup as Integer

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Player group from inviter's match request.
Notes: Available on Mac OS X 10.8.2 and newer.

15.11.9 Properties

15.11.10 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.12 class GKLeaderboardMBS

15.12.1 class GKLeaderboardMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A GKLeaderboard object represents a programmatic query to retrieve scores from Game Center.
Notes: Your game uses GKLeaderboard objects when it wants to analyze scoring information or when it wants to create its own custom leaderboard screens.

see also
https://developer.apple.com/library/prerelease/mac/#documentation/GameKit/Reference/GKLeaderboard_Ref/Reference/Reference.html

15.12.2 Methods

15.12.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.12.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initializes a default leaderboard request.
Notes: A leaderboard object initialized with this method uses the playerScope, timeScope, and range properties to search Game Center for scores.
See also:

- 15.12.5 Constructor(playerIDs() as string) 534

15.12.5 Constructor(playerIDs() as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initializes a leaderboard request to retrieve the scores of a specific group of players.
Notes: playerIDs: An array of strings that holds the player identifier strings of the players to retrieve.

A leaderboard object initialized with this method ignores the playerScope and range properties. Instead, it retrieves scores for the specific list of players whose IDs are included in the playerIDs parameter.
See also:

- 15.12.4 Constructor 534

15.12.6 groupIdentifier as string

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Set when leaderboards have been designated a game group; set when loadLeaderboards has been called for leaderboards that support game groups.
Notes: Available on Mac OS X 10.8.2 and newer.

15.12.7 isLoading as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that indicates whether the leaderboard object is retrieving scores. (read-only)
Notes: The value of the loading property is true if the leaderboard object has any pending requests for scores.

15.12.8 loadCategories(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Loads the list of leaderboard categories along with their corresponding localized titles.
Notes: You use this class method to retrieve the category identifiers and titles you configured for your leaderboards on iTunes Connect. To create a leaderboard query that targets a particular category, set the category property to one of the strings returned by this method.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadCategoriesCompleted event.

15.12.9 loadLeaderboards(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Loads the leaderboards.
Notes: Calls GameKitMBS.loadLeaderboardsCompleted later when completed.
Available on Mac OS X 10.8.2 and newer.

15.12.10 loadScores(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Retrieves a set of scores from Game Center.
Notes: When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadScoresCompleted event.

You can call this method multiple times; each call represents a different query against the scores stored on Game Center. If you post multiple load operations using the same leaderboard object, any properties that are updated by loading scores reflect the last query that completed. The order that achievement queries are processed is arbitrary.

15.12.11 localPlayerScore as GKScoreMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The score earned by the local player. (read-only)
Notes: This property is invalid until a call to loadScores is completed. Afterward, it contains a score object representing the local player's score on the leaderboard.

15.12.12 maxRange as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The size of the leaderboard. (read-only)
Notes: This property is invalid until a call to loadScores is completed. Afterward, it contains the total number of entries available to return to your game given the filters you applied to the query.

15.12.13 scores as GKScoreMBS()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The list of scores returned by the search. (read-only)
Notes: This property is invalid until a call to loadScores is complete. Afterward, it contains the same score objects that were returned to the completion handler.

15.12.14 setDefaultLeaderboard(categoryID as string, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Sets the default leaderboard for the local player.
Notes: categoryID: The named leaderboard that should be the new default leaderboard for the local player.

The default leaderboard is used whenever your game uses a GKScore object to report a score to Game Center without explicitly setting the score object's category property. The default leaderboard is normally set in iTunes Connect when you configure your game. However, your game can use this class method to override the default leaderboard that appears for the local player.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.setDefault-LeaderboardCompleted event.

If an error occurs and was a network error, your game should periodically resend the request until it completes.

15.12.15 title as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The localized title for the leaderboard. (read-only)
Notes: This property is invalid until a call to loadScores is complete. Afterward, it contains the localized title that matches the category property of the leaderboard object.

15.12.16 Properties

15.12.17 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.12.18 category as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The named leaderboard to retrieve information from.
Notes: If non-empty, Game Center only returns scores with a matching category value. If empty, this property is ignored. Default is empty.
(Read and Write computed property)

15.12.19 playerScope as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A filter used to restrict the search to a subset of the players on Game Center.
Notes: The playerScope property is ignored if the leaderboard request was initialized using the Constructor method. Otherwise, the playerScope property determines which players are included in the request for high scores. The default is GKLeaderboardPlayerScopeGlobal. See Leaderboard Player Scope constants for more information.
(Read and Write computed property)

15.12.20 range as NSRangeMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The numerical score rankings to return from the search.
Notes: The range property is ignored if the leaderboard request was initialized using the Constructor method. Otherwise, the range property is used to filter which scores are returned to your game. For example, if you specified a range of [1,10] , after the search is complete, your game receives the top ten scores. The default range is [1,25] .

The minimum index is 1. The maximum length is 100.
(Read and Write computed property)

15.12.21 timeScope as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A filter used to restrict the search to scores that were posted within a specific period of time.
Notes: This property determines how far back in time the search looks for scores. The default value is GKLeaderboardTimeScopeAllTime. See Leaderboard Time Scope for more information.
(Read and Write computed property)

15.12.22 Constants

Leaderboard Player Scope

Constant	Value	Description
GKLeaderboardPlayerScopeFriendsOnly	1	Only friends of the local player should be considered when generating of scores.
GKLeaderboardPlayerScopeGlobal	0	All players on Game Center should be considered when generating th scores.

Leaderboard Time Scope

Constant	Value	Description
GKLeaderboardTimeScopeAllTime	2	Each player's best score is returned.
GKLeaderboardTimeScopeToday	0	Each player is restricted to scores recorded in the past 24 hours.
GKLeaderboardTimeScopeWeek	1	Each player is restricted to scores recorded in the past week.

15.13 class GKLeaderboardViewControllerMBS

15.13.1 class GKLeaderboardViewControllerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The GKLeaderboardViewController class provides a standard user interface that displays high scores to the player.
Notes: see also
https://developer.apple.com/library/prerelease/mac/#documentation/GameKit/Reference/GKLeaderboard-ViewController_Ref/Reference/Reference.html
Subclass of the NSViewControllerMBS class.

15.13.2 Methods

15.13.3 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.13.4 Properties

15.13.5 category as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The category.
Notes: (Read and Write computed property)

15.13.6 timeScope as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The time scope.
Notes: (Read and Write computed property)

15.14 class GKLocalPlayerMBS

15.14.1 class GKLocalPlayerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The GKLocalPlayer class is a special subclass of GKPlayer that represents the authenticated player running your game on the local device.
Notes: At any given time, only one player may be authenticated on the device; this player must log out before another player can log in.

Your game must authenticate the local player before using any Game Center features. Authenticating the player ensures that the player has created an account and is connected to Game Center. To authenticate the local player, retrieve the shared instance of the local player by calling the localPlayer class method, and then call the authenticateWithCompletionHandler: method.

You can see whether the local player is authenticated by reading the local player's authenticated property. If authenticated is true, then the local player's other properties are valid, and you can call other Game Center methods.

Call the loadFriendsWithCompletionHandler: method to retrieve the player identifiers for the local player's friends.
Subclass of the GKPlayerMBS class.
Xojo Developer Magazine

- 12.6, page 27: Writing OS X Apps for Game Center, Part 3: Turn-Based Games by Tom Baumgartner
- 12.4, pages 30 to 31: Writing OS X Apps for Game Center, Getting started by authenticating the local player with the Game Center Sandbox testing facility by Tom Baumgartner

15.14.2 Methods

15.14.3 authenticate(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use SetAuthenticateHandler instead. **Function:** Prompts the player to confirm their identity.
Notes: When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.authenticateCompleted event.

Your game should authenticate the player as early as possible after launching, ideally as soon as you can present a user interface to the player. For example, your game may be launched because the player accepted an invitation to join a match or to take a turn in a turn-based match, so you want your game to authenticate

the player and process the match invitation as quickly as possible.

If there is not an authenticated player on the device when your game calls this method, Game Kit displays a user interface that allows the player to sign in with their credentials (or to create a new account if he or she has never used Game Center). Your game should pause other activities that require user interaction (such as a real time game loop) before attempting to authenticate the local player.

Each time the completion handler is called, the data stored in the the GKLocalPlayer singleton object may have changed. A new player may have logged into the device or the player may have simply logged out from Game Center. Because of both of these possibilities, your completion handler must be prepared update any state of the game that assumes that a particular player is logged in if it discovers that the local player has changed. For more information, see "Authenticating the Local Player in a Multitasking Application" in Game Kit Programming Guide.

Deprecated in Mac OS X 10.9.

15.14.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Creates new object pointing to the shared instance of the local player.

15.14.5 friends as string()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A list of player identifiers for the local player's friends. (read-only)
Notes: This property is invalid until a call to loadFriends succeeds.

15.14.6 GKPlayerAuthenticationDidChangeNotificationName as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The notificartion name fo the notification to inform about an authentication change.
Notes: Posted after the authenticated property of the shared local player object changes.

15.14.7 loadDefaultLeaderboardCategoryID(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Loads the category identifier for the local player's default leaderboard.
Notes: Calls later GameKitMBS.loadDefaultLeaderboardCategoryIDCompleted event.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadDefaultLeaderboardCategoryIDCompleted event.

Available on Mac OS X 10.8.2 and newer.

15.14.8 loadFriendPlayers(tag as Variant = nil)

Plugin Version: 15.0, Platform: macOS, Targets: Desktop only.

Function: Retrieves a list of player identifiers for the local player,Äôs friends.
Notes: When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your completion handler. The completion handler is always called on the main thread.

Available in OS X v10.10 and later.
Calls later loadFriendPlayersCompleted event in GameKitMBS class.

15.14.9 loadFriends(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Retrieves a list of player identifiers for the local player's friends.
Notes: When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadFriendsCompleted.

Once this call is completed, the friends property is set to the same list of players returned in the completion event.

15.14.10 localPlayer as GKLocalPlayerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Retrieves the shared instance of the local player.
Notes: You never directly create a local player object. Instead, you retrieve the singleton object by calling this method.

15.14.11 SetAuthenticateHandler(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Sets the handler called to process an authentication-related event with GameKitMBS.authenticateHandler.
Notes: Calls later GameKitMBS.authenticateHandler.
Available on Mac OS X 10.8.2 and newer.

15.14.12 setDefaultLeaderboardCategoryID(categoryID as string, tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Sets the category identifier for the local player's default leaderboard.
Notes: categoryID: The category ID string for one of your game's leaderboards.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.setDefaultLeaderboardCategoryIDCompleted event.

The default leaderboard is configured in iTunes Connect as part of configuring your game's leaderboards. All players normally start with this leaderboard as the default leaderboard. Calling this method changes the default leaderboard only for the local player.

Available on Mac OS X 10.8.2 and newer.

15.14.13 Properties

15.14.14 isAuthenticated as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that indicates whether a local player is currently signed in to Game Center. (read-only)
Notes: Before using other Game Center features, your game must authenticate the local player. Your game can read this property elsewhere in your game to confirm that the local player is authenticated.

Important Even after the local player has successfully authenticated their credentials, the value of this property can change. For example, if your game is switched into the background, the player could launch the Game Center game and sign out of Game Center. To be notified when the value of this property changes, your game should register to receive the GKPlayerAuthenticationDidChangeNotificationName notification

(or use GameKitMBS.PlayerAuthenticationDidChange event).
(Read only property)

15.14.15 isUnderage as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that declares whether the local player is underage. (read-only)
Notes: Some Game Center features are disabled if the local player is underage. Your game can test this property if it wants to disable some of its own features based on the player's age.
(Read only property)

15.15 class GKMatchmakerMBS

15.15.1 class GKMatchmakerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The GKMatchmaker class is used to programmatically create matches to other players and to receive match invitations sent by other players.
Notes: see also
https://developer.apple.com/library/mac/#documentation/GameKit/Reference/GKMatchmaker_Ref/Reference/Reference.html
Xojo Developer Magazine

- 12.5, pages 31 to 32: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner
- 12.5, page 29: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner

15.15.2 Methods

15.15.3 addPlayersToMatch(match as GKMatchMBS, matchRequest as GKMatchRequestMBS, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds players to an existing match.
Notes: match: A previously created match.
matchRequest: The parameters for the new match request.

This method updates an existing match object by adding additional players.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.addPlayersToMatchCompleted event.

15.15.4 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.15.5 cancel

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Cancels a pending matchmaking request.
Notes: The completion event receives a callback with a GKErrorCancelled error.

15.15.6 cancelInviteToPlayer(playerID as string)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Cancel a pending invitation to a player.
Notes: Available on Mac OS X 10.8.2 and newer.

15.15.7 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.15.8 Destructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The destructor.

15.15.9 findMatchForRequest(request as GKMatchRequestMBS, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initiates a request to find players for a peer-to-peer match.
Notes: When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.findMatchForRequestCompleted event.

The match request's playersToInvite property is ignored; to invite a specific set of players to the match, you must display the standard user interface.

15.15.10 findPlayersForHostedMatchRequest(request as GKMatchRequestMBS, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initiates a request to find players for a hosted match.
Notes: request: The configuration for the desired match.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.findPlayersForHostedMatchRequestCompleted event. When the event is called, your game should connect those players to your own server.

The match request's playersToInvite property is ignored; to invite a specific set of players to the match, you must display the standard user interface.

15.15.11 finishMatchmakingForMatch(match as GKMatchMBS)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Call this when finished with all programmatic P2P invites/matchmaking, for compatability with connected players using GKMatchmakerViewController.
Notes: Available on Mac OS X 10.8.2 and newer.

15.15.12 matchForInvite(invite as GKInviteMBS, tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Get a match for an accepted invite.
Notes: Calls later GameKitMBS.matchForInviteCompleted eventg.

Possible reasons for error:
1. Communications failure.
2. Invite cancelled.

Available on Mac OS X 10.8.2 and newer.

15.15.13 maxPlayersAllowedForMatchOfType(type as Integer) as Integer

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: To determine the maximum allowed players for each type of match supported.
Notes: Available on Mac OS X 10.8.2 and newer.

15.15.14 queryActivity(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initiates a search for activity in all player groups.
Notes: A query allows your game to see how many players have recently searched for a match, across all player groups.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.queryActivityCompleted.

15.15.15 queryPlayerGroupActivity(playerGroup as Integer, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Queries Game Center for the activity in a player group.
Notes: playerGroup: A number that uniquely identifies a subset of players of your game.

A query allows your game to see how many players have recently searched for a match. As a result, you can present a user interface that shows the relative activity in each player group. For example, if one group sees less activity than others, you might display a warning so that players are aware that finding a match may take longer.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.queryPlayerGroupActivityCompleted event.

15.15.16 sharedMatchmaker as GKMatchmakerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns the singleton matchmaker instance.
Notes: Games do not create a GKMatchmaker object. Instead, they retrieve the shared singleton by calling this method.

15.15.17 startBrowsingForNearbyPlayers(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Start browsing for nearby players that can be invited to a match.
Notes: The GameKitMBS.startBrowsingForNearbyPlayersCompleted event will be called for each player found with a compatible game. It may be called more than once for the same player if that player ever becomes unreachable (e.g. moves out of range). You should call stopBrowsingForNearbyPlayers when finished browsing.

Available on Mac OS X 10.8.2 and newer.

15.15.18 stopBrowsingForNearbyPlayers

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Stop browsing for nearby players.
Notes: Available on Mac OS X 10.8.2 and newer.

15.15.19 Properties

15.15.20 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.15.21 Constants

Match Types

Constant	Value	Description
GKMatchTypeHosted	1	Hosted Match Available on Mac OS X 10.8.2 and newer.
GKMatchTypePeerToPeer	0	Peer to Peer Match. Available on Mac OS X 10.8.2 and newer.
GKMatchTypeTurnBased	2	Turn based match. Available on Mac OS X 10.8.2 and newer.

15.16 class GKMatchmakerViewControllerMBS

15.16.1 class GKMatchmakerViewControllerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The GKMatchmakerViewController class is used to present a standard user interface to the player.
Notes: This interface allows them to invite friends to a match or to allow Game Center to fill the remaining players needed for a match.

see also:
https://developer.apple.com/library/mac/#documentation/GameKit/Reference/GKMatchmakerViewController_Ref/Reference/Reference.html
Subclass of the NSViewControllerMBS class.
Xojo Developer Magazine

- 12.5, page 33: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner
- 12.5, page 29: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner

15.16.2 Methods

15.16.3 addPlayersToMatch(match as GKMatchMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds a player to the match.
Notes: match: An existing match that you want to add players to.

Your game calls this method prior to presenting the view controller to the player. Calling this method instructs the view controller to add new players to the provided match rather than creating a new match.

When called, this method sets the delegate on the match to nil and updates the view controller's user interface to display the players already connected to the match.

Important Only one device connected to the match should call this method.

15.16.4 Constructor

Plugin Version: 14.2, Platform: macOS, Targets: Desktop only.

Function: The private constructor.
See also:

- 15.16.5 Constructor(invite as GKInviteMBS) 552
- 15.16.6 Constructor(request as GKMatchRequestMBS) 552

15.16.5 Constructor(invite as GKInviteMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initializes a matchmaker view controller to respond to an invitation received from another player.
Notes: invite: The invitation received from the other player.

The user is allowed to join the match that the user was invited to, but is not allowed to invite others to the match.
See also:

- 15.16.4 Constructor 551
- 15.16.6 Constructor(request as GKMatchRequestMBS) 552

15.16.6 Constructor(request as GKMatchRequestMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initializes a matchmaker view controller to create a new match.
Notes: request: A request containing the characteristics for the desired match.
Your game uses this Constructor when it wants the local user to create a new match.
See also:

- 15.16.4 Constructor 551
- 15.16.5 Constructor(invite as GKInviteMBS) 552

15.16.7 matchRequest as GKMatchRequestMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The configuration for the desired match. (read-only)

15.16.8 setHostedPlayer(playerID as string, connected as boolean)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Updates a player's status on the view to show that the player has connected or disconnected from your server.
Notes: playerID: The identifier string for a player that connected to the external server.
connected: Optional, a Boolean value that states whether the player is connected to the hosted match.

When setting up a hosted match, each device should instantiate a matchmaker view controller and display it to the player. Then, when a new player connects to your server, your server should notify all participating devices already connected to your server. Each participating device should then call this method to update that player's status in the matchmaking interface. Similarly, if a player disconnects from the server, your server should inform each device so that the devices can update their user interface.

15.16.9 Properties

15.16.10 DefaultInvitationMessage as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The default invitation message used to initialize an invitation.
Notes: Your game sets this property to change the default invitation text displayed when the local player creates a new invitation. The local player may edit the text before sending the invitation.
(Read and Write computed property)

15.16.11 Hosted as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that indicates whether the match is hosted or peer-to-peer.
Notes: The value of the hosted property determines which events of GameKitMBS are called when the match is complete. If true, this is a hosted match, and the delegate's matchmakerViewControllerDidFind-Players method is to provide the list of players to your game. If false, this is a peer-to-peer match, and matchmakerViewControllerDidCreateMatch is called with a GKMatch object. The default value is false.

Hosted matches require you to provide a server that hosts the participants in the match.
(Read and Write computed property)

15.17 class GKMatchMBS

15.17.1 class GKMatchMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A GKMatch object provides a peer-to-peer connection between a group of players that are connected through Game Center.
Notes: Matches provide both data and voice services. Your application never directly allocates GKMatch objects. Instead, your application uses the GKMatchmaker class to programmatically find a match with other interested players or a GKMatchmakerViewController object to display a user interface to the player.

After your application receives a match object, you must set a delegate and then wait until the other participants are connected to the match. You can read the expectedPlayerCount property to determine how many players have not connected to the match.

Your application transmits data to other players by calling either the sendDataToAllPlayers method or the sendDataToPlayer method. To transmit and receive voice data, call voiceChatWithName to create one or more voice channels.

When you are finished with the match, call the match's disconnect method.
Xojo Developer Magazine

- 12.5, page 34: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner
- 12.5, pages 31 to 32: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner

15.17.2 Methods

15.17.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.17.4 chooseBestHostPlayer(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Determines the best player in the game to act as the server for a client-server match.
Notes: Calling this method causes Game Kit to attempt to estimate which player has the best overall

network connection using a variety of metrics such as bandwidth, latency and network reliability. Typically, you call this method when your game implements a client-server model on top of the match's peer-to-peer connection. See "Designing Your Network Game" in Game Center Programming Guide.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your GKMatchMBS.chooseBestHostPlayerCompleted event.

15.17.5 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.17.6 disconnect

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Disconnects the local player from the match.
Notes: Your application should call disconnect before releasing the match object. Calling disconnect notifies other players that you have left the match.

15.17.7 expectedPlayerCount as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The remaining number of players who have not yet connected to the match. (read-only)
Notes: The value of this property is decremented whenever a player connects to the match. When its value reaches zero, all expected players are connected, and your game can begin the match.

15.17.8 playerIDs as string()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The player identifiers for the players in the match. (read-only)
Notes: The playerIDs property initially includes the player identifiers for any players already connected to the match; the array may initially be empty. As each player connects to the match, that player's player identifier is added to the array.

15.17.9 rematch(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Create a new match with the list of players from an existing match.
Notes: Calling this method uses auto-matching to recreate a previous match. A new match with the same set of players is created and returned. If your game attempts to recreate matches using this method, each instance of your game on each device should call this method.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GKGameKitMBS.rematchCompleted event.

15.17.10 sendDataToAllPlayers(data as Dictionary, mode as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Transmits data to all players connected to the match.
Notes: data: The game data to send.
mode: The mechanism used to send the data.
error: If the data could not be queued, on return, this parameter holds an NSError object describing the error.

Return true if the data was successfully queued for transmission; false if the match was unable to queue the data.
The match queues the data and transmits it when the network becomes available.

15.17.11 sendDataToPlayers(players() as string, data as Dictionary, mode as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Transmits data to a list of connected players.
Notes: data: The game data to be sent.
players: An array containing the identifier strings for the list of players who should receive the data.
mode: The mechanism used to send the data.
error: If the data could not be queued, on return, this parameter holds an NSError object describing the error.

Returns true if the data was successfully queued for transmission; false if the match was unable to queue the data.
The match queues the data and transmits it when the network becomes available.

15.17.12 voiceChatWithName(name as string) as GKVoiceChatMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Joins a voice channel.
Notes: Returns an voice chat object for the voice channel, or nil if an error occurred.

Calling this method joins a voice channel, creating it if necessary. Your application should retain the voice chat object returned by this method. All participants who join a channel with the same name are connected to each other.

A single match can have multiple voice chat channels, and any player in the match can join multiple channels simultaneously. For example, a team-based game might create a channel for each team, and a single channel that includes all of the players.

Voice chat objects are dependent on the network connection provided by the match. When the player disconnects from the match, all voice channels associated with that match stop working. Typically, you should release any voice channels you joined before calling calling disconnect on the match.

Parental controls may prevent a player from joining a voice chat. If the player is not permitted to join the voice channel, a nil object is returned to your application.

15.17.13 Properties

15.17.14 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.17.15 Constants

Constants

Constant	Value	Description
GKMatchSendDataReliable	0	One of the mechanism constants used to transmit data to other players. The data is sent continuously until it is successfully received by the intended recipients or the connection times out. Reliable transmissions are delivered in the order they were sent. Use this when you need to guarantee delivery.
GKMatchSendDataUnreliable	1	One of the mechanism constants used to transmit data to other players. The data is sent once and is not sent again if a transmission error occurs. Data transmitted unreliably may be received out of order by recipients. Use this for small packets of data that must arrive quickly to be useful to the recipient.

Match State Constants

Constant	Value	Description
GKPlayerStateConnected	1	Connected to the match.
GKPlayerStateDisconnected	2	Disconnected from the match.
GKPlayerStateUnknown	0	Initial player state.

15.18 class GKMatchRequestMBS

15.18.1 class GKMatchRequestMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A GKMatchRequest object is used to specify the parameters for a new match.
Notes: A GKMatchRequest object is passed to the GKMatchmaker object to programmatically search for other players, or to a GKMatchmakerViewController (GKMatchmakerPanel on OS X) object when your game wants to present the default user interface to the player.
Xojo Developer Magazine

- 12.6, pages 28 to 29: Writing OS X Apps for Game Center, Part 3: Turn-Based Games by Tom Baumgartner
- 12.5, pages 32 to 33: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner
- 12.5, page 29: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner

15.18.2 Methods

15.18.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.18.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.18.5 playersToInvite as string()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A list of players to invite to the match.
Notes: If empty (the default), no players are invited. If non-empty, Game Kit populates the match with the provided list of players.

15.18.6 recipients as GKPlayerMBS()

Plugin Version: 15.0, Platform: macOS, Targets: Desktop only.

Function: A list of player identifiers for players to invite to the match.
Notes: The property holds an array of GKPlayer objects, each of which contains an identifier for a player on Game Center. If the value of the property is non-nil, when you use the request to create a match, Game Center invites those players to the match. No automatching is done and the GKMatchRequestmaxPlayers and minPlayers properties are ignored. If nil (the default), no players are invited. The exact behavior for matchmaking depends on the kind of match being created and the class used to create the match. For more information, see Game Center Programming Guide.

Available in OS X v10.10 and later.

15.18.7 SetInviteeResponseHandler(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Sets the invitee response handler for this match request.
Notes: An invitee response handler is called whenever you programmatically invite specific players to join a match. It is called once for each player invited to the match. Typically, your game uses the responses to update the custom user interface. For example, you want the player to be able to perform any of the following tasks:

- Start the match.
- Invite an additional set of specific players.
- Use matchmaking to fill the remaining match slots.

Available on Mac OS X 10.8.2 and newer.

15.18.8 setPlayersToInvite(playerIDs() as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Sets the list of players to invite to the match.
Notes: If empty (the default), no players are invited. If non-empty, Game Kit populates the match with the provided list of players.

15.18.9 SetRecipientResponseHandler(tag as Variant = nil)

Plugin Version: 15.0, Platform: macOS, Targets: Desktop only.

Function: Sets the event to be called when a response from an invited player is returned to your game.
Notes: Once event is installed, the plugin can call GameKitMBS.recipientResponseHandler event for this match request.

15.18.10 setRecipients(players() as GKPlayerMBS)

Plugin Version: 15.0, Platform: macOS, Targets: Desktop only.

Function: Sets the list of player identifiers for players to invite to the match.
Notes: The property holds an array of GKPlayer objects, each of which contains an identifier for a player on Game Center. If the value of the property is non-nil, when you use the request to create a match, Game Center invites those players to the match. No automatching is done and the GKMatchRequestmaxPlayers and minPlayers properties are ignored. If nil (the default), no players are invited. The exact behavior for matchmaking depends on the kind of match being created and the class used to create the match. For more information, see Game Center Programming Guide.

Available in OS X v10.10 and later.

15.18.11 Properties

15.18.12 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.18.13 defaultNumberOfPlayers as Integer

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The default number of players for the match.
Notes: If this property is not set, then the default number of players is equal to the value stored in the maxPlayers property. The default number of players determines the number of invitees shown in the standard matchmaking user interface. The player can choose to override this to add or remove slots.

Available on Mac OS X 10.8.2 and newer.
(Read and Write computed property)

15.18.14 inviteMessage as string

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Message sent to invited players, may be modified if using Game Center UI.
Notes: Available on Mac OS X 10.8.2 and newer.
(Read and Write computed property)

15.18.15 maxPlayers as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The maximum number of players to join the match.
Notes: The maximum number of players must be equal or greater than the minimum number of players. The maximum number of players may be no more than 4 for a peer-to-peer match and no more than 16 for a hosted match.
(Read and Write computed property)

15.18.16 minPlayers as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The minimum number of players to join the match.
Notes: The minimum number of players must be at least 2.
(Read and Write computed property)

15.18.17 playerAttributes as UInt32

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A mask that specifies the role that the local player would like to play in the game.
Notes: If this value is 0 (the default), this property is ignored. If the value is nonzero, then automatching uses the value as a mask that restricts the role the player can play in the group. Automatching with player attributes follows two rules:

A new player can only be added to the match if the bitwise AND of that player's mask and the mask of any player already in the match equals &h00000000.
Players are added to the match until the bitwise OR of the masks of all the players in the match equals &hFFFFFFFF.

(Read and Write computed property)

15.18.18 playerGroup as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A number identifying a subset of players allowed to join the match.
Notes: If your game sets the playerGroup property, only players whose requests share the same playerGroup value are automatched by Game Center. You can use any values you want for player groups. For example, you could define different playerGroup values to implement any of the following filters:

- A game could restrict players based on skill level.
- A game that provides multiple games could use it to filter players into the specific game they want to play.
- A game with multiple victory conditions (for example, Capture-The-Flag, Survival) could match players to others interested in the same rules.
- A game that provides bonus content through in-app purchase could match players who own the same content with each other.

(Read and Write computed property)

15.19 class GKPlayerMBS

15.19.1 class GKPlayerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: GKPlayer objects provide information about a player connected to Game Center.
Notes: see also
https://developer.apple.com/library/mac/#documentation/GameKit/Reference/GKPlayer_Ref/Reference/Reference.html
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

15.19.2 Methods

15.19.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.19.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The private constructor.

15.19.5 GKPlayerDidChangeNotificationName as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The name of the notification posted when a player object's data changes.
Notes: Used internally for GameKitMBS.playerChanged event.

15.19.6 loadPhotoForSize(size as Integer, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Loads a photo depicting this player from Game Center.
Notes: size: A constant that determines the size of the photo to load.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadPhotoForSizeCompleted.

Important The size of the image returned to your game is dependent on both the constant you provided in the initial request and the user interface idiom of the device your game is running on.

15.19.7 loadPlayersForIdentifiers(identifiers() as string, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Loads information from Game Center about a list of players.
Notes: identifiers: An array of strings, each a unique identifier for a Game Center player.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadPlayersForIdentifiersCompleted event.

15.19.8 Properties

15.19.9 alias as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A string chosen by the player to identify themselves to other players. (read-only)
Notes: Your game uses the alias property when it wants to display a user-visible string for a particular player.
(Read only property)

15.19.10 displayName as String

Plugin Version: 15.0, Platform: macOS, Targets: Desktop only.

Function: A string to display for the player.
Notes: The display name for a player depends on whether the player is a friend of the local player authenticated on the device. If the player is a friend of the local player, then the display name is the actual name of the player. If the player is not a friend, then the display name is the player,Äôs alias.
Available in Mac OS X 10.8 and newer.
(Read only property)

15.19.11 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.19.12 isFriend as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that indicates whether the local player has identified this player as a friend. (read-only)
Notes: The Game Center application allows players to declare other players as friends.
(Read only property)

15.19.13 playerID as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A string assigned by Game Center to uniquely identify a player. (read-only)
Notes: The player identifier should not be displayed to the user. Your game should use this string whenever it needs to persistently store information for a specific player.

Do not make assumptions about the contents of the player identifier string. Its format and length are subject to change.
(Read only property)

15.19.14 Constants

Constants

Constant	Value	Description
GKPhotoSizeNormal	1	One of the size constants of a photo loaded by Game Center. Load a normal sized photo.
GKPhotoSizeSmall	0	One of the size constants of a photo loaded by Game Center. Load a small photo.

15.20 class GKScoreChallengeMBS

15.20.1 class GKScoreChallengeMBS

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: A GKScoreChallenge object represents a challenge based on a score in a leaderboard.
Notes: To complete the challenge, the player must score an equal or better score than the score used to create the challenge. When a player beats a score challenge, a new score challenge is automatically issued to the player that issued the challenge unless there is already a pending score challenge that requires a better score.

Available on Mac OS X 10.8.2 and newer.
Subclass of the GKChallengeMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

15.20.2 Methods

15.20.3 Constructor

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The private constructor.
Notes: Available on Mac OS X 10.8.2 and newer.
This constructor is private to make sure you don't create an object from this class by error. Please use designated functions to create objects.

15.20.4 score as GKScoreMBS

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The score to beat. (read-only)
Notes: Available on Mac OS X 10.8.2 and newer.

15.21 class GKScoreMBS

15.21.1 class GKScoreMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A GKScore class holds information for a score that was earned by the player.
Notes: Your game creates GKScore objects to post scores to a leaderboard on Game Center. When your game retrieves score information from a leaderboard those scores are returned as GKScore objects.

see also
https://developer.apple.com/library/mac/#documentation/GameKit/Reference/GKScore_Ref/Reference/Reference.html

15.21.2 Methods

15.21.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.21.4 Constructor(category as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initializes a score object.
Notes: Category: A category identifier for a specific leaderboard you've configured on iTunes Connect. Must not be "".

Your game explicitly allocates and initializes a score object when it needs to report a new score to Game Center.

15.21.5 date as date

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The date and time when the score was earned. (read-only)
Notes: When you initialize the new score object, the date property is automatically set to the current date

and time.

15.21.6 formattedValue as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns the player's score as a localized string. (read-only)
Notes: This property is invalid on a newly initialized score object. On a score returned from Game Kit, it contains a formatted string based on the player's score. You control the formatting of this string by configuring your leaderboards on iTunes Connect.

Never convert the value property into a string; always configure your leaderboard and call this method to receive the formatted string.

15.21.7 issueChallengeToPlayers(playerIDs() as string, message as string)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Use this method to issue GKScoreChallenges and GKAchievementChallenges to an array of playerIDs.
Notes: Players may not issue challenges to themselves nor to non-friends. Please see the GameKit reference documentation for further details on these methods.
Available on Mac OS X 10.8.2 and newer.

15.21.8 playerID as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The player identifier for the player that earned the score. (read-only)
Notes: When you initialize a new score object, the playerID property is set to the identifier for the local player. If you read the property on a score object retrieved from Game Center, playerID identifies the player who recorded that score.

15.21.9 rank as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The position of the score in the results of a leaderboard search. (read-only)
Notes: The value of this property is undefined on a newly initialized GKScore object. It is only valid on score objects received from Game Center. The rank property represents the position of the score in the

returned results, with 1 being the best score, 2 being the second best, and so on.

15.21.10 reportScore(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Reports a score to Game Center.
Notes: The value property must be set before calling this method.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.reportScoreCompleted.

If the score object successfully reports progress to Game Center, your game may release it. Otherwise, your game should inspect the error. If the error is a network error and your game is running on iOS 4.3 or earlier, your game should periodically attempt to report the progress until the score is successfully reported. On iOS 5.0 and later and on OS X, the background reporting task automatically handles network errors on your game's behalf.

15.21.11 reportScores(scores() as GKScoreMBS, tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Reports a list of scores to Game Center.
Notes: scores: An array of score objects to report to Game Center.

Calls later GameKitMBS.reportScoresCompleted on completion.

Use this class method whenever you need to submit multiple scores at the same time. Calling this method reports each of the scores, exactly as if you called the reportScore method on each score object in the array. However, the entire operation can typically be processed more efficiently using this method, and the completion handler is only called once.
Available on Mac OS X 10.8.2 and newer.

15.21.12 Properties

15.21.13 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.

Notes: (Read and Write property)

15.21.14 category as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The leaderboard that this score belongs to.
Notes: The category string must match an identifier you created when you defined your leaderboards on iTunes Connect.
(Read and Write computed property)

15.21.15 context as UInt64

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: An integer value used by your game.
Notes: The context property allows your game to associate an arbitrary 64-bit unsigned integer value with the score data reported to Game Center. You decide how this integer value is interpreted by your game. For example, your game might use the context property to store flags that provide game-specific details about a player's score, or it might use the context as a key to some other data stored on the device or on your own server. In either case, your game typically uses this information when it displays a custom leaderboard to the player.
(Read and Write computed property)

15.21.16 shouldSetDefaultLeaderboard as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that indicates whether this score should also update the default leaderboard.
Notes: If the value of this property is true, when the score is reported to Game Center, Game Center also updates the default leaderboard to match the value stored in the category property of the score object. This matches the behavior of the GKLeaderboardMBS class's setDefaultLeaderboard class method. If the value of this property is true, the default leaderboard is not changed by reporting the score. The default value of this property is false.
(Read and Write computed property)

15.21.17 value as Int64

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The score earned by the player.

Notes: You can use any algorithm you want to to calculate scores in your game. The value provided by a score object must match the formatting string configured for your leaderboard on iTunes Connect. Your game must set the value property before reporting a score, otherwise an error is returned.
(Read and Write computed property)

15.22 class GKTurnBasedMatchmakerViewControllerMBS

15.22.1 class GKTurnBasedMatchmakerViewControllerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The GKTurnBasedMatchmakerViewController class displays a user interface that allows players to manage the turn-based matches that they are participating in.
Notes: see also https://developer.apple.com/library/mac/#documentation/GameKit/Reference/GKTurnBasedMatchmakerViewController_Ref/Reference/Reference.html

See also GameKitMBS.turnBasedMatchmakerViewController* events.
Subclass of the NSViewControllerMBS class.

15.22.2 Methods

15.22.3 Constructor

Plugin Version: 14.2, Platform: macOS, Targets: Desktop only.

Function: The private constructor.
See also:

- 15.22.4 Constructor(request as GKMatchRequestMBS) 573

15.22.4 Constructor(request as GKMatchRequestMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initializes a new matchmaker view controller.
Notes: request: A match request with parameters for the match.
See also:

- 15.22.3 Constructor 573

15.22.5 Properties

15.22.6 showExistingMatches as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that determines whether the view controller shows existing matches.
Notes: If the value of this property is true, the view controller shows matches that are already in progress.

If the value of this property is false, the view controller only offers the ability to create new matches. The default value is true.
(Read and Write computed property)

15.23 class GKTurnBasedMatchMBS

15.23.1 class GKTurnBasedMatchMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The GKTurnBasedMatch class allows your game to implement turn-based matches between sets of players on Game Center.
Notes: A turn-based match uses a store-and-forward approach to share data between the participants. When a player participating in the match performs actions to advance the state of the match, your game uploads data to Game Center that defines the new state of the match and tells Game Center which player act next in the match. Later, when the next player launches your game, it downloads the match data from Game Center and continues the match. Players continue to take turns acting (based on whatever internal logic your game implements) until the match ends. A key advantage of turn-based matches is that a player may participate in multiple matches simultaneously.

see also
https://developer.apple.com/library/mac/#documentation/GameKit/Reference/GKTurnBasedMatch_Ref/Reference/Reference.html
Xojo Developer Magazine

- 12.6, pages 33 to 35: Writing OS X Apps for Game Center, Part 3: Turn-Based Games by Tom Baumgartner
- 12.6, page 29: Writing OS X Apps for Game Center, Part 3: Turn-Based Games by Tom Baumgartner
- 12.6, page 25: Writing OS X Apps for Game Center, Part 3: Turn-Based Games by Tom Baumgartner
- 12.5, page 32: Writing OS X Apps for Game Center, Part 2: Requesting a Match by Tom Baumgartner

15.23.2 Methods

15.23.3 acceptInvite(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Programmatically accept an invitation to a turn-based match.
Notes: When this method is called, it creates a background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your GameKitMBS.acceptInviteCompleted event.

Available on Mac OS X 10.8.2 and newer.

15.23.4 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.23.5 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

15.23.6 creationDate as date

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The date that the match was created. (read-only)

15.23.7 currentParticipant as GKTurnBasedParticipantMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The participant whose turn it is to act next. (read-only)
Notes: After a match starts and until it ends, the current player is the one who needs to take action to drive the match to completion. Other players are not allowed to change the state of the match.

15.23.8 declineInvite(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Programmatically decline an invitation to a turn-based match.
Notes: When this method is called, it creates a background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your GameKitMBS.declineInviteCompleted event.

Available on Mac OS X 10.8.2 and newer.

15.23.9 endMatchInTurnWithMatchData(matchData as Dictionary, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Ends the match.
Notes: matchData: The end state for the match.

Calling this method ends the match for all players. This method may only be called by the current participant. Before your game calls this method, the matchOutcome property on each participant object stored in the participants property must have been set to a value other than GKTurnBasedMatchOutcomeNone.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your GameKitMBS.endMatchInTurnWithMatchDataCompleted event.

15.23.10 endTurnWithNextParticipant(nextParticipant as GKTurnBasedParticipantMBS, matchData as Dictionary, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Updates the data stored on Game Center for the current match.
Notes: nextParticipant: The next player in the match who needs to take an action. It must be one of the object's stored in the match's participants property.
matchData: The game-specific state for the match.
completionHandler

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls the GameKitMBS.endTurnWithNextParticipant event.

15.23.11 endTurnWithNextParticipants(nextParticipants() as GKTurnBasedParticipantMBS, timeout as Double, matchData as Dictionary, tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Updates the data stored on Game Center for the current match.
Notes: nextParticipants: An array of participant objects reflecting the order in which the players should act next. Each object in the array must be one of the objects stored in the match's participants property.
timeout: The length of time the next player has to complete their turn.
matchData: The game-specific state for the match.

If the next player to act does not take their turn in the specified interval, the next player in the array receives a notification to act. This process continues until a player takes a turn or the last player in the list is notified.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your GameKitMBS.endTurnWithNextParticipantsCompleted event.

Available on Mac OS X 10.8.2 and newer.

15.23.12 findMatchForRequest(request as GKMatchRequestMBS, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Programmatically searches for a new match to join.
Notes: request: A match request that specifies the properties that the new match must fulfill.

When this method is called, it creates a background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your GameKitMBS.findMatchForRequest2Completed event.

This method may either create a new match or it may place the player into an existing match that does not yet have its full complement of players and needs a new player to advance the match further. Regardless of how the player is placed in the match, the local player is always the current participant in the returned match. Your game should immediately display the match in its user interface and allow the player to take a turn.

15.23.13 loadMatchData(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Loads the game-specific data associated with a match.
Notes: When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadMatchDataCompleted event.

15.23.14 loadMatches(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Loads the set of turn-based matches involving the local player and creates a match object for each match.
Notes: When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.loadMatchesCompleted event.

15.23.15 loadMatchWithID(matchID as string, tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Loads a specific match.
Notes: matchID: The identifier for the turn-based match.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your GameKitMBS.loadMatchWithIDCompleted event.

Available on Mac OS X 10.8.2 and newer.

15.23.16 matchData as Dictionary

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Game-specific data that reflects the details of the match. (read-only)
Notes: Although Game Center knows who is participating in the match and who is expected to act next, it does not know anything about your game's internal logic. Your game provides the match data and all the programming logic required to interpret it. This data should include the current state of the game and provide any necessary details about what actions the current player is expected to take. It can also be helpful for your game to record information about recent moves made by other players. The game can then replay those moves visually for the player to show exactly how the match reached the state it is in now.

Your game never directly updates the match state associated with this property. Instead, when the data is updated to reflect the actions of the current player, your game serializes the updated state into dictionary and calls one of the match's instance methods that transmit the updated state to Game Center.

The value of this property is nil until after your game calls the loadMatchDataWithCompletionHandler: method and the load task is complete. After this task completes, the matchData property holds the data that the last player to act transmitted to Game Center.

15.23.17 matchDataMaximumSize as Integer

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Returns the limit the Game Center servers place on the size of the match data. (read-only)
Notes: Game Kit returns an error if your game sends updated data larger than this value.
Available on Mac OS X 10.8.2 and newer.

15.23.18 matchID as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A string that uniquely identifies the match. (read-only)
Notes: This string is not intended to be displayed to players. Your game should use this string whenever it needs to refer to a specific match. For example, if you want your game to store additional information on a device, it might store it in a database using the match ID as a key.

15.23.19 message as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A message displayed to all players in the match.
Notes: The message property is displayed by the standard user interface; this allows your game to use the message to inform players of the current state of the match.

Important This property can be changed only by an instance of your game associated with the current player. If an instance of your game associated with another player in the match attempts to write to this property, an exception is thrown.

15.23.20 participantQuitInTurnWithOutcome(matchOutcome as Integer, nextParticipant as GKTurnBasedParticipantMBS, matchData as Dictionary, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Resigns the current player from the match without ending the match.
Notes: matchOutcome: The end outcome of the current player in the match.
nextParticipant: The next player in the match who needs to take an action. It must be one of the object's stored in the match's participants property.

matchData: A dictionary the game-specific state for the match.

Your game calls this method on an instance of your game that is processing the current player's turn, but that player has left the match. For example, the player may have willingly resigned from the match or that player may have been eliminated by the other players (based on your game's internal logic).

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.participantQuitInTurnWithOutcome event.
See also:

- 15.23.21 participantQuitInTurnWithOutcome(matchOutcome as Integer, nextParticipants() as GKTurnBasedParticipantMBS, timeout as Double, matchData as Dictionary, tag as Variant = nil) 581

15.23.21 participantQuitInTurnWithOutcome(matchOutcome as Integer, nextParticipants() as GKTurnBasedParticipantMBS, timeout as Double, matchData as Dictionary, tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Resigns the current player from the match without ending the match.
Notes: matchOutcome: The end outcome of the current player in the match.
nextParticipants: An array of participant objects reflecting the order in which the players should act next. Each object in the array must be one of the objects stored in the match's participants property.
timeout: The length of time the next player has to complete their turn.
matchData: The game-specific state for the match.

Your game calls this method on an instance of your game that is processing the current player's turn, but that player has left the match. For example, the player may have willingly resigned from the match or that player may have been eliminated by the other players (based on your game's internal logic).

If the next player to act does not take their turn in the specified interval, the next player in the array receives a notification to act. This process continues until a player takes a turn or the last player in the list is notified.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your GameKitMBS.participantQuitInTurnWithOutcomeCompleted event.

Available on Mac OS X 10.8.2 and newer.
See also:

- 15.23.20 participantQuitInTurnWithOutcome(matchOutcome as Integer, nextParticipant as GKTurnBasedParticipantMBS, matchData as Dictionary, tag as Variant = nil) 580

15.23.22 participantQuitOutOfTurnWithOutcome(matchOutcome as Integer, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Resigns the player from the match when that player is not the current player. This action does not end the match.
Notes: matchOutcome: The end outcome of the current player in the match.

If the local player decided they wanted to resign from the match but is not the current participant in the match, your game calls this method.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.participantQuitOutOfTurnWithOutcomeCompleted event.

15.23.23 participants as GKTurnBasedParticipantMBS()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Information about the players participating in the match. (read-only)
Notes: The elements of this array are GKTurnBasedParticipantMBS objects representing each participant in the match. Your game uses these objects to retrieve more information about the participants in the match. Your game also uses one of the objects in this array as a parameter whenever it calls a method that sets a different participant to act in the match.

The size of the array and the order in which the participants appear in the array are set when the match is first created, and never changes. When a match is first created, some participants may not hold actual players yet. Game Center searches for a player to fill that spot in the match only after your game sets that participant as the current player.

15.23.24 rematch(tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Create a new match with the list of players from an existing match.
Notes: Calling this method uses auto-matching to recreate a previous match. A new match with the same set of players is created and returned. If your game attempts to recreate matches using this method, each instance of your game on each device should call this method.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GKGameKitMBS.rematch-

Completed event.

15.23.25 remove(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Programmatically removes a match from Game Center.
Notes: Even after a player's participation in a match ends, the data associated with the match continues to be stored on Game Center. Storing the data on Game Center allows the player to continue to watch the match's progress, or even see the final state of the match when it ends. However, players may also want to delete matches that they have finished playing. If you choose not to use the standard matchmaker user interface, your game should offer the ability to delete a finished match from Game Center. When a player chooses to delete a match from Game Center, call this method. It is a programming error to call this method on a match that has the local player as an active participant.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls GameKitMBS.removeCompleted event passing the tag. Keep in mind that the completion handler may be called on a thread other than the one originally used to invoke the method. This means that the code in your block needs to be thread-safe.

When the task completes, the match is no longer visible to the local player whose device made the call. Other players involved in the match still see the match.

15.23.26 saveCurrentTurnWithMatchData(matchData as Dictionary, tag as Variant = nil)

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Update the match data without advancing the game to another player.
Notes: Available on Mac OS X 10.8.2 and newer.

matchData: The game-specific state for the match.

This method updates the match data stored on Game Center. Call this method when the current player takes an action that advances the state of the match but does not end the player's turn. For example, if your game has a fog-of-war mechanic, you might call this method when the player revealed new information on the map.

When this method is called, it creates a new background task to handle the request. The method then returns control to your game. Later, when the task is complete, Game Kit calls your GameKitMBS.saveCurrentTurnWithMatchDataCompleted event.

15.23.27 status as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The current state of the match. (read-only)

15.23.28 TimeoutDefault as Double

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Indicates that the player has one week to take a turn.
Example:

MsgBox str(GKTurnBasedMatchMBS.TimeoutDefault)

Notes: One of the common values for turn timeouts.
Available on Mac OS X 10.8.2 and newer.
Currently this function returns 604800 seconds (7 weeks), but this may change in the future.

15.23.29 TimeoutNone as Double

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: Indicates that the player's turn never times out.
Example:

MsgBox str(GKTurnBasedMatchMBS.TimeoutNone)

Notes: One of the common values for turn timeouts.
Available on Mac OS X 10.8.2 and newer.
Currently this function returns 0 seconds, but this may change in the future.

15.23.30 Properties

15.23.31 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.23.32 Constants

Constants

Constant	Value	Description
GKTurnBasedMatchStatusEnded	2	One of the states a match can enter. The match has been completed.
GKTurnBasedMatchStatusMatching	3	One of the states a match can enter. The match is currently being played.
GKTurnBasedMatchStatusOpen	1	One of the states a match can enter. Game Center is still searching for other players to join the match.
GKTurnBasedMatchStatusUnknown	0	One of the states a match can enter. The match is in an unexpected state.
GKTurnBasedParticipantStatusActive	4	One of the states the participant is in during the match. The participant has joined the match and is an active player in it.
GKTurnBasedParticipantStatusDeclined	2	One of the states the participant is in during the match. The participant declined the invitation to join the match. When ticipant declines an invitation to join a match, the match is auto terminated.
GKTurnBasedParticipantStatusDone	5	One of the states the participant is in during the match. The participant has exited the match. Your game sets the match property to state why the participant left the match.
GKTurnBasedParticipantStatusInvited	1	One of the states the participant is in during the match. The participant was invited to the match, but has not responded to tation.
GKTurnBasedParticipantStatusMatching	3	One of the states the participant is in during the match. The participant is an unfilled position in the match that Game Center to fill when needed. When your game sets this participant as the participant in the match, Game Center fills the position and updates t and playerID properties.
GKTurnBasedParticipantStatusUnknown	0	One of the states the participant is in during the match. The participant is in an unexpected state.

15.24 class GKTurnBasedParticipantMBS

15.24.1 class GKTurnBasedParticipantMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A GKTurnBasedParticipant object stores information for a participant in a turn-based match.
Notes: Your game never creates objects of this class directly; instead it retrieves an array of GKTurnBasedParticipant objects from an GKTurnBasedMatch object.

Most information stored by a GKTurnBasedParticipant object is read-only, and is provided by Game Kit to assist you in implementing your game logic. However, the matchOutcome property is quite important; before your game may end a match, it must set the matchOutcome property in every GKTurnBasedParticipant object associated with the match.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.3pr5

Xojo Developer Magazine

- 12.6, pages 33 to 35: Writing OS X Apps for Game Center, Part 3: Turn-Based Games by Tom Baumgartner
- 12.6, page 29: Writing OS X Apps for Game Center, Part 3: Turn-Based Games by Tom Baumgartner

15.24.2 Methods

15.24.3 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The private constructor.

15.24.4 Properties

15.24.5 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.24.6 lastTurnDate as date

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The date and time that this participant last took a turn in the game. (read-only)
Notes: The value of this property is invalid until the participant first takes a turn in the match.
(Read only property)

15.24.7 lastTurnDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: Desktop only.

Function: The date and time that this participant last took a turn in the game. (read-only)
Notes: The value of this property is invalid until the participant first takes a turn in the match.
(Read only property)

15.24.8 matchOutcome as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The end-state of this participant in the match.
Notes: Initially, this property holds GKTurnBasedMatchOutcomeNone. Before your game can end a match, it must set the match outcome to some other value that reflects the outcome of this participant when he or she left the match. Your game must use any of the values provided in the "GKTurnBasedMatchOutcome" enumerated type. Optionally, it may also use an OR operation to include a custom match outcome for your specific game. Game Center does not use the custom value; it exists to allow your game to provide additional information at the end of the match. The custom value must fit in the range provided by the GKTurnBasedMatchOutcomeCustomRange constant.
(Read and Write property)

15.24.9 player as GKPlayerMBS

Plugin Version: 15.0, Platform: macOS, Targets: Desktop only.

Function: The GKPlayer object that identifies this participant. (read-only)
Notes: The value of this property may be nil if this slot in the match has not yet been filled by an actual player.
Available in OS X v10.10 and later.
(Read only property)

15.24.10 playerID as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The player identifier for this participant. (read-only)
Notes: The value of this property may be nil if this slot in the match has not been filled by an actual player.
(Read only property)

15.24.11 status as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The current status of the participant. (read-only)
Notes: This property is updated by Game Kit to reflect the status of the participant.
(Read only property)

15.24.12 timeoutDate as date

Plugin Version: 13.0, Platform: macOS, Targets: Desktop only.

Function: The date and time that the participant's turn times out. (read-only)
Notes: If a timeout was set when the turn state was advanced, this property holds when the player's turn expires. Otherwise, this property is nil.
Available on Mac OS X 10.8.2 and newer.
(Read only property)

15.24.13 timeoutDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: Desktop only.

Function: The date and time that the participant's turn times out. (read-only)
Notes: If a timeout was set when the turn state was advanced, this property holds when the player's turn expires. Otherwise, this property is nil.
Available on Mac OS X 10.8.2 and newer.
(Read only property)

15.24.14 Constants

Constants

Constant	Value	Description
GKTurnBasedMatchOutcomeCustomRange	&h00FF0000	One of the states the participant was in when they left the A mask used to allow your game to provide its own custo custom value must fit inside the mask.
GKTurnBasedMatchOutcomeFirst	6	One of the states the participant was in when they left the The participant finished first.
GKTurnBasedMatchOutcomeFourth	9	One of the states the participant was in when they left the The participant finished fourth.
GKTurnBasedMatchOutcomeLost	3	One of the states the participant was in when they left the The participant lost the match.
GKTurnBasedMatchOutcomeNone	0	One of the states the participant was in when they left the The participant's outcome has not been set yet (typically l is still in progress).
GKTurnBasedMatchOutcomeQuit	1	One of the states the participant was in when they left the The participant forfeited the match.
GKTurnBasedMatchOutcomeSecond	7	One of the states the participant was in when they left the The participant finished second.
GKTurnBasedMatchOutcomeThird	8	One of the states the participant was in when they left the The participant finished third.
GKTurnBasedMatchOutcomeTied	4	One of the states the participant was in when they left the The participant tied the match.
GKTurnBasedMatchOutcomeTimeExpired	5	One of the states the participant was in when they left the The participant was ejected from the match because he or s timely fashion.
GKTurnBasedMatchOutcomeWon	2	One of the states the participant was in when they left the The participant won the match.
GKTurnBasedParticipantStatusActive	4	One of the states the participant is in during the match. The participant has joined the match and is an active playe
GKTurnBasedParticipantStatusDeclined	2	One of the states the participant is in during the match. The participant declined the invitation to join the match ticipant declines an invitation to join a match, the matc terminated.
GKTurnBasedParticipantStatusDone	5	One of the states the participant is in during the match. The participant has exited the match. Your game sets t property to state why the participant left the match.
GKTurnBasedParticipantStatusInvited	1	One of the states the participant is in during the match. The participant was invited to the match, but has not resp tation.
GKTurnBasedParticipantStatusMatching	3	One of the states the participant is in during the match. The participant is an unfilled position in the match that Gam to fill when needed. When your game sets this participa participant in the match, Game Center fills the position and and playerID properties.
GKTurnBasedParticipantStatusUnknown	0	One of the states the participant is in during the match. The participant is in an unexpected state.

15.25 class GKVoiceChatMBS

15.25.1 class GKVoiceChatMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A GKVoiceChat object provides a voice channel that allows a set of players in a match to speak with each other.
Notes: see also:
https://developer.apple.com/library/mac/#documentation/GameKit/Reference/GKVoiceChat_Ref/Reference/Reference.html

Available in OS X v10.8 and later.

15.25.2 Methods

15.25.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: True if the class is available.
Notes: Should always be true on Mac OS X 10.8 and newer.

15.25.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor for a new voice chat.

15.25.5 enablePlayerStateUpdate(tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Enables player state update event in GameKitMBS class.
Notes: You enable GameKit.playerStateUpdate event to be called when the state of any participant in the chat changes (including the local player). The event receives the following parameters:

player: The player identifier for the player whose status changed.
state: The new state of the player.

15.25.6 isVoIPAllowed as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns whether voice chat is allowed to be used on the device.
Notes: True if voice chat is available to the game.

Some countries or phone carriers may restrict the availability of voice over IP services. Before retrieving a GKVoiceChat object, your game should first check to see whether voice over IP is permitted on the device.

15.25.7 name as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The name of the voice chat (read-only).

15.25.8 playerIDs as string()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: An array of player identifiers for the players connected to the channel. (read-only)

15.25.9 setMute(mute as boolean, playerID as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Mutes a participant in the chat.
Notes: isMuted: Determines whether the player is to be muted or not.
player: The player identifier string for a player in the match.

While a player is muted, the local player does not hear voice data transmitted by that player.

15.25.10 start

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Starts communication with other participants in the voice chat.
Notes: When start is called, the voice chat connects to the channel and notifies other connected players that the local player joined the chat. When the voice chat object is connected, it plays voice data from other

participants in the channel. It sends voice data to other participants when its active property is true.

A device only connects to the channel when the device has a microphone and is connected via wi-fi. However, your game may configure and start a voice chat channel when the device is not currently capable of using voice chat. If conditions change to allow voice chat—for example, the device connects to a wi-fi network—the GKVoiceChat object automatically connects to the channel.

15.25.11 stop

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Ends communication with other participants in the voice chat.
Notes: When stop is called, the voice chat object disconnects from the other players. You should call stop on a channel before releasing it.

15.25.12 Properties

15.25.13 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

15.25.14 active as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A Boolean value that states whether the channel is sampling the microphone.
Notes: When active is true, the voice chat samples the microphone and transmits the voice data to other players connected to the channel. Default value is false.

Only one GKVoiceChat object is allowed to sample the microphone at any given time. When your game sets the active property to true on a voice chat object, the previous voice chat object that owned the microphone (if there was one) sets its active property to false.

Available in OS X v10.8 and later.
(Read and Write computed property)

15.25.15 volume as Double

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The volume level for the voice channel.
Notes: All voice data received from other participants is mixed and then scaled by the volume property. The volume property has a range between 0.0 and 1.0, inclusive. A volume level of 0.0 means the entire channel is muted; a value of 1.0 plays voice samples at full volume. The default value is 1.0.
(Read and Write computed property)

15.25.16 Constants

Constants

Constant	Value	Description
GKVoiceChatPlayerConnected	0	One of the states returned to your game about other players in a voice chat. A new player connected to the chat.
GKVoiceChatPlayerConnecting	4	One of the states returned to your game about other players in a voice chat. A new player is connecting to the chat.
GKVoiceChatPlayerDisconnected	1	One of the states returned to your game about other players in a voice chat. A player left the chat.
GKVoiceChatPlayerSilent	3	One of the states returned to your game about other players in a voice chat. A player stopped speaking.
GKVoiceChatPlayerSpeaking	2	One of the states returned to your game about other players in a voice chat. A player began speaking.

Chapter 16

JavaScript

16.1 class JSClassMBS

16.1.1 class JSClassMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The class for a class in javascript.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

16.1.2 Methods

16.1.3 Constructor

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The private constructor.

16.1.4 NewObject as JSObjectMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript object for current class.

16.1.5 Properties

16.1.6 context as JSContextMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The context for this class.
Notes: (Read only property)

16.1.7 Handle as Integer

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The handle for the class object.
Notes: (Read and Write property)

16.1.8 Tag as Variant

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The tag value.
Notes: You can store anything here and as long as the JSClass object exists, this value is kept referenced.
(Read and Write property)

16.2 class JSContextMBS

16.2.1 class JSContextMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The class for a javascript execution context.
Example:

```
dim c as new JSContextMBS
dim e as JSValueMBS
dim v as JSValueMBS = c.EvaluateScript("1+2", "", nil, e)

if e <>nil then
// show error
MsgBox e.StringValue
else
// show result
MsgBox str(v.doubleValue)
end if
```

Notes: See also JavaScriptEngineMBS class for cross platform projects.

Updated for version 23.1 to work on Windows and Linux if you have a JavaScriptCore library to load.
Blog Entries

- New in MBS Xojo Plugins in version 23.1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 23.1
- MBS Xojo Plugins, version 23.1pr1

16.2.2 Methods

16.2.3 CheckScriptSyntax(script as string, sourceURL as String, startingLineNumber as Integer = 1, byref JSException as JSValueMBS) as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Checks for syntax errors in a string of JavaScript.
Example:

```
dim c as new JSContextMBS
dim e as JSValueMBS
if c.CheckScriptSyntax("1+", "", e) then
MsgBox "OK"
```

```
else
// show error

MsgBox e.StringValue
end if
```

Notes: Script: A string containing the script to check for syntax errors.
sourceURL: A string containing a URL for the script's source file. This is only used when reporting exceptions. Pass "" if you do not care to include source file information in exceptions.
startingLineNumber: An integer value specifying the script's starting line number in the file located at sourceURL. This is only used when reporting exceptions. The value is one-based, so the first line is line 1 and invalid values are clamped to 1.
exception: A JSValue in which to store a syntax error exception, if any.

Returns true if the script is syntactically correct, otherwise false.

16.2.4 Constructor

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The constructor.
Notes: Creates a global JavaScript execution context.

16.2.5 EvaluateScript(script as string, sourceURL as String, thisObject as JSValueMBS, startingLineNumber as Integer = 1, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Evaluates a string of JavaScript.
Example:

```
dim c as new JSContextMBS
dim e as JSValueMBS
dim v as JSValueMBS = c.EvaluateScript("1+", "", nil, e)

if e <>nil then
// show error
MsgBox e.StringValue
else
// show result
MsgBox str(v.doubleValue)
```

```
end if
```

Notes: script: A string containing the script to evaluate.
thisObject: The object to use as "this," or nil to use the global object as "this."
sourceURL: A string containing a URL for the script's source file. This is used by debuggers and when reporting exceptions. Pass "" if you do not care to include source file information.
startingLineNumber: An integer value specifying the script's starting line number in the file located at sourceURL. This is only used when reporting exceptions. The value is one-based, so the first line is line 1 and invalid values are clamped to 1.
exception: A JSValueMBS in which to store an exception, if any.

Returns the JSValue that results from evaluating script, or nil if an exception is thrown.

16.2.6 GarbageCollect

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Performs a JavaScript garbage collection.
Notes: JavaScript values that are on the machine stack, in a register, protected by JSValueProtect, set as the global object of an execution context, or reachable from any such value will not be collected.

During JavaScript execution, you are not required to call this function; the JavaScript engine will garbage collect as needed. JavaScript values created within a context group are automatically destroyed when the last reference to the context group is released.

16.2.7 LoadLibrary(File as folderItem) as boolean

Plugin Version: 23.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Loads the library.
Notes: Does nothing on macOS or iOS since we use the library provided by Apple with the operation system.

You can load JavaScriptCore.dll on Windows here.
Make sure all dependencies are honored and you may use Dependency Walker application to look for dependencies.

You can load libjavascriptcoregtk.so on Linux here.
e.g. "/usr/lib/aarch64-linux-gnu/libjavascriptcoregtk-4.1.so" for Linux 64-bit on ARM

Returns true on success.

See also:

16.2.8 LoadLibrary(Path as String) as boolean

Plugin Version: 23.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Loads the library.
Example:

```
#If TargetLinux Then

// you may need to check what version you have
If JSContextMBS.LoadLibraryPath("libjavascriptcoregtk-4.1.so") Then
MessageBox "Okay"
Else
MessageBox "Failed to load: "+JSContextMBS.LibraryError
End If

#ElseIf TargetWindows

// you may find somewhere a JavaScriptCore.dll for use here

// we just load the DLLs from iTunes into our folder with exe file:
// ASL.dll
// CoreFoundation.dll
// icudt62.dll
// JavaScriptCore.dll
// libdispatch.dll
// libicuin.dll
// libicuuc.dll
// objc.dll
// WTF.dll


If JSContextMBS.LoadLibraryPath("JavaScriptCore.dll") Then
MessageBox "Okay"
Else
MessageBox "Failed to load: "+JSContextMBS.LibraryError
End If

#endif
```

Notes: You can load JavaScriptCore.dll on Windows here.
Make sure all dependencies are honored and you may use Dependency Walker application to look for dependencies.

You can load libjavascriptcoregtk.so on Linux here.
e.g. "/usr/lib/aarch64-linux-gnu/libjavascriptcoregtk-4.1.so" for Linux 64-bit on ARM

Returns true on success.
See also:

- 16.2.7 LoadLibrary(File as folderItem) as boolean 599

16.2.9 NewArray(arguments() as JSValueMBS, byref JSException as JSValueMBS) as JSObjectMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript Array object.
Example:

```
dim c as new JSContextMBS

dim e as JSValueMBS
dim v as JSObjectMBS = c.NewArray(nil, e)
v.SetPropertyAtIndex(0, c.valueWithString("Hello"), e)
v.SetPropertyAtIndex(1, c.valueWithString("World"), e)
MsgBox v.JSONString
```

Notes: arguments: A JSValue array of data to populate the Array with.
JSException: A JSValueMBS in which to store an exception, if any.
Returns a JSObject that is an Array.
The behavior of this function does not exactly match the behavior of the built-in Array constructor. Specifically, if one argument is supplied, this function returns an array with one element.
Requires Mac OS X 10.6 or newer.

16.2.10 NewDate(arguments() as JSValueMBS, byref JSException as JSValueMBS) as JSObjectMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript Date object, as if by invoking the built-in Date constructor.
Example:

```
dim c as new JSContextMBS

dim year as JSValueMBS = c.valueWithDouble(2015)
```

```
dim month as JSValueMBS = c.valueWithDouble(5)
dim day as JSValueMBS = c.valueWithDouble(12)

dim e as JSValueMBS // exception
dim d as JSValueMBS = c.NewDate(array(year, month, day), e)

MsgBox d.JSONString
```

Notes: arguments: A JSValue array of arguments to pass to the Date Constructor.
JSException: A JSValueMBS in which to store an exception, if any.
Returns a JSObject that is a Date.
Requires Mac OS X 10.6 or newer.

16.2.11 NewError(arguments() as JSValueMBS, byref JSException as JSValueMBS) as JSObjectMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript Error object, as if by invoking the built-in Error constructor.
Example:

```
dim c as new JSContextMBS

dim parameters() as JSValueMBS
Parameters.Append c.valueWithString("Hello")

dim ex as JSValueMBS
dim e as JSValueMBS = c.NewError(Parameters, ex)
MsgBox e.StringValue
```

Notes: arguments: A JSValue array of arguments to pass to the Error Constructor.
JSException: A JSValueMBS in which to store an exception, if any.

Returns a JSObject that is a Error.
Requires Mac OS X 10.6 or newer.

16.2.12 NewFunction(name as string) as JSObjectMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Convenience method for creating a JavaScript function which raises FunctionCalled event on

invokation.
Notes: name: A string containing the function's name. This will be used when converting the function to string. Pass NULL to create an anonymous function.
Returns a JSObject that is a function. The object's prototype will be the default function prototype.
See also:

- 16.2.13 NewFunction(name as string, parameterNames() as string, Body as String, SourceURL as string = "", startingLineNumber as Integer = 0, byref JSException as JSValueMBS) as JSValueMBS 603

16.2.13 NewFunction(name as string, parameterNames() as string, Body as String, SourceURL as string = "", startingLineNumber as Integer = 0, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a function with a given script as its body.
Example:

```
dim c as new JSContextMBS

// create a function
dim parameterNames() as string = array("value")
dim body as string = "return value*value;"
dim name as string = "test"

dim e as JSValueMBS
dim v as JSValueMBS = c.NewFunction(name, parameterNames, body, e )

MsgBox v.StringValue

// put it in global memory
c.globalObject.SetProperty "test", v, e

// and call it
dim r as JSValueMBS = c.EvaluateScript("test(5)", "", nil, e)
MsgBox r.StringValue
```

Notes: name: A string containing the function's name. This will be used when converting the function to string. Pass "" to create an anonymous function.
parameterNames: A string array containing the names of the function's parameters.
body: A string containing the script to use as the function's body.
sourceURL: A string containing a URL for the script's source file. This is only used when reporting exceptions. Pass "" if you do not care to include source file information in exceptions.
startingLineNumber: An integer value specifying the script's starting line number in the file located at sourceURL. This is only used when reporting exceptions. The value is one-based, so the first line is line 1

and invalid values are clamped to 1.
exception: A JSValueMBS in which to store a syntax error exception, if any. Pass nil if you do not care to store a syntax error exception.
A JSObject that is a function, or nil if either body or parameterNames contains a syntax error. The object's prototype will be the default function prototype.
Use this method when you want to execute a script repeatedly, to avoid the cost of re-parsing the script before each execution.
See also:

- 16.2.12 NewFunction(name as string) as JSObjectMBS 602

16.2.14 NewObject as JSObjectMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a new object.

16.2.15 NewRegExp(arguments() as JSValueMBS, byref JSException as JSValueMBS) as JSObjectMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript RegExp object, as if by invoking the built-in RegExp constructor.
Notes: arguments: A JSValue array of arguments to pass to the RegExp Constructor.
JSException: A JSValueMBS in which to store an exception, if any.
Returns a JSObject that is a RegExp.
Requires Mac OS X 10.6 or newer.

16.2.16 valueWithBool(value as boolean) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript value of the boolean type.
Example:

```
dim c as new JSContextMBS
dim v as JSValueMBS = c.valueWithBool(true)
MsgBox v.JSONString
```

16.2.17 valueWithDouble(value as Double) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript value of the number type.
Example:

```
dim c as new JSContextMBS

dim v as JSValueMBS = c.valueWithDouble(5.6)
MsgBox v.StringValue
```

16.2.18 valueWithJSON(JSON as string) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript value from a JSON formatted string.
Example:

```
dim c as new JSContextMBS

dim v as JSValueMBS = c.valueWithJSON(" [ 1,2,3 ] ")
dim o as JSObjectMBS = JSObjectMBS(v) // arrays are objects

dim e as JSValueMBS
dim p as JSValueMBS = o.GetProperty("length", e)

MsgBox p.StringValue // shows 3
```

Notes: Returns a JSValue containing the parsed value, or nil if the input is invalid.
Available on Mac OS X 10.7 and newer

16.2.19 valueWithNull as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript value of the null type.
Example:

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithNull

if j.Type = JSValueMBS.kJSTypeNull then
```

```
MsgBox "null"
end if
```

16.2.20 valueWithString(value as string) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript value of the string type.
Example:

```
dim c as new JSContextMBS

dim v as JSValueMBS = c.valueWithString("Hello")
MsgBox v.StringValue
```

16.2.21 valueWithUndefined as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript value of the undefined type.
Example:

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithUndefined

if j.Type = JSValueMBS.kJSTypeUndefined then
MsgBox "undefined"
end if
```

16.2.22 Properties

16.2.23 Available as Boolean

Plugin Version: 23.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Checks whether the JavaScriptCore library is loaded.
Notes: Checks whether the JavaScriptCore library is loaded.
Always loaded on macOS since we use the one coming with macOS.

For Windows you can load JavaScriptCore.dll and for Linux you can load the libjavascriptcoregtk.so file with

LoadLibrary function.

Returns always true on macOS and iOS.
(Read only property)

16.2.24 globalObject as JSObjectMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Gets the global object of a JavaScript execution context.
Example:

```
dim c as new JSContextMBS

dim v as JSObjectMBS = c.globalObject
dim e as JSValueMBS

v.SetProperty "Hello", c.valueWithString("World"), e
v.SetProperty "Value", c.valueWithDouble(5), e

MsgBox c.globalObject.JSONString
```

Notes: (Read only property)

16.2.25 Handle as Integer

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

16.2.26 LibraryError as String

Plugin Version: 23.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The error message from loading the library.
Notes: (Read only property)

16.2.27 Name as String

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The name.
Example:

```
dim c as new JSContextMBS

c.Name = "Hello"
MsgBox c.Name
```

Notes: Requires Mac OS X 10.10 and newer.
(Read and Write property)

16.2.28 Tag as Variant

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The tag value.
Notes: You can store anything here and as long as the JSContext object exists, this value is kept referenced.
(Read and Write property)

16.2.29 Events

16.2.30 FunctionCalled(functionObject as JSObjectMBS, thisObject as JSObjectMBS, arguments() as JSValueMBS, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: .

Function: The event called when your custom function is called.
Notes: Please return a value and in case of error set exception.

16.3 class JSObjectMBS

16.3.1 class JSObjectMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The class for a Javascript Object.
Notes: Subclass of the JSValueMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

16.3.2 Methods

16.3.3 CallAsConstructor(arguments() as JSValueMBS, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Calls an object as a constructor.
Notes: self: The JSObject to call as a constructor.
arguments: A JSValueMBS array of arguments to pass to the constructor.
JSException A pointer to a JSValueMBS in which to store an exception, if any.
Returns the JSObject that results from calling object as a constructor, or nil if an exception is thrown or object is not a constructor.

16.3.4 CallAsFunction(thisObject as JSValueMBS, arguments() as JSValueMBS, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Calls an object as a function.
Notes: self: The JSObject to call as a function.
thisObject: The object to use as "this," or nil to use the global object as "this."
arguments: A JSValueMBS array of arguments to pass to the function.
JSException: A JSValueMBS in which to store an exception, if any.

Returns the JSValue that results from calling object as a function, or nil if an exception is thrown or object is not a function.

16.3.5 Constructor

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The private constructor.

16.3.6 DeleteProperty(name as string, byref JSException as JSValueMBS) as boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Deletes a property from an object.
Example:

```
dim c as new JSContextMBS

dim v as JSObjectMBS = c.globalObject
dim e as JSValueMBS

v.SetProperty "Hello", c.valueWithString("World"), e
v.SetProperty "Value", c.valueWithDouble(5), e

MsgBox v.JSONString

call v.DeleteProperty "Hello", e

MsgBox v.JSONString
```

Notes: Name: A string containing the property's name.
JSException: A JSValueMBS in which to store an exception, if any.
Returns true if the delete operation succeeds, otherwise false (for example, if the property has the kJSPropertyAttributeDontDelete attribute set).

16.3.7 GetProperty(name as string, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Gets a property from an object.
Example:

```
dim c as new JSContextMBS

dim v as JSObjectMBS = c.globalObject
dim e as JSValueMBS

v.SetProperty "Hello", c.valueWithString("World"), e
```

```
MsgBox v.GetProperty("Hello", e).StringValue
```

Notes: object: The JSObject whose property you want to get.
Name: A string containing the property's name.
JSException: A JSValueMBS in which to store an exception, if any.
Returns the property's value if object has the property, otherwise the undefined value.

16.3.8 GetPropertyAtIndex(propertyIndex as Integer, byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Gets a property from an object by numeric index.
Example:

```
dim c as new JSContextMBS

dim v as JSValueMBS = c.valueWithJSON(" [ 1,2,3 ] ")
dim o as JSObjectMBS = JSObjectMBS(v) // arrays are objects

dim e as JSValueMBS
dim p as JSValueMBS = o.GetProperty("length", e)

MsgBox "Length: "+p.StringValue

dim n as JSValueMBS = o.GetPropertyAtIndex(2, e)
MsgBox "3rd value in array: "+n.StringValue
```

Notes: The JSObject whose property you want to get.
propertyIndex: An integer value that is the property's name.
JSException: A JSValueMBS in which to store an exception, if any.

Returns the property's value if object has the property, otherwise the undefined value.

Calling GetPropertyAtIndex is equivalent to calling GetProperty with a string containing propertyIndex, but GetPropertyAtIndex provides optimized access to numeric properties.

16.3.9 HasProperty(name as string) as boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether an object has a given property.
Example:

```
dim c as new JSContextMBS

dim e as JSValueMBS
dim v as JSObjectMBS = c.NewArray(nil, e)
MsgBox str(v.HasProperty("length"))
```

Notes: name: A string containing the property's name.
Returns true if the object has a property whose name matches propertyName, otherwise false.

16.3.10 PropertyNames as String()

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Gets the names of an object's enumerable properties.
Example:

```
dim c as new JSContextMBS

dim v as JSObjectMBS = c.globalObject
dim e as JSValueMBS

v.SetProperty "Hello", c.valueWithString("World"), e
v.SetProperty "Value", c.valueWithDouble(5), e

MsgBox Join(v.PropertyNames, EndOfLine)
```

16.3.11 SetProperty(name as string, value as JSValueMBS, byref JSException as JSValueMBS)

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Sets a property on an object.
Example:

```
dim c as new JSContextMBS
```

```
dim v as JSObjectMBS = c.globalObject
dim e as JSValueMBS

v.SetProperty "Hello", c.valueWithString("World"), e
v.SetProperty "Value", c.valueWithDouble(5), e
```

Notes: Name: A string containing the property's name.
Value: A JSValue to use as the property's value.
JSException A pointer to a JSValueRef in which to store an exception, if any.

16.3.12 SetPropertyAtIndex(propertyIndex as Integer, value as JSValueMBS, byref JSException as JSValueMBS)

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Sets a property on an object by numeric index.
Notes: propertyIndex: The property's name as a number.
value: A JSValue to use as the property's value.
exception: A JSValueMBS in which to store an exception, if any.

Calling SetPropertyAtIndex is equivalent to calling SetProperty with a string containing propertyIndex, but SetPropertyAtIndex provides optimized access to numeric properties.

16.3.13 Properties

16.3.14 isConstructor as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether an object can be called as a constructor.
Notes: Returns true if the object can be called as a constructor, otherwise false.
(Read only property)

16.3.15 isFunction as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether an object can be called as a function.
Example:

```
dim c as new JSContextMBS
```

```
dim f as JSObjectMBS = c.NewFunction("Hello")

MsgBox str(f.isFunction)
```

Notes: Returns true if the object can be called as a function, otherwise false.
(Read only property)

16.3.16 Prototype as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: An object's prototype.
Example:

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithJSON(" { ""tag"": 1 } ")

dim o as JSObjectMBS = JSObjectMBS(j)
MsgBox "object prototyp: "+o.Prototype.StringValue
```

Notes: (Read and Write property)

16.4 class JSValueMBS

16.4.1 class JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The class for a Javascript value.
Example:

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithDouble(1)
MsgBox j.StringValue
```

Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

16.4.2 Methods

16.4.3 Constructor

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The private constructor.

16.4.4 DoubleValue(byref JSException as JSValueMBS) as Double

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Converts a JavaScript value to number and returns the resulting number.
Notes: Returns the numeric result of conversion, or NaN if an exception is thrown.
See also:

- 16.4.15 doubleValue as Double 618

16.4.5 IsEqual(OtherValue as JSValueMBS, byref JSException as JSValueMBS) as boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether two JavaScript values are equal, as compared by the JS == operator.
Example:

```
dim c as new JSContextMBS
dim s1 as JSValueMBS = c.valueWithJSON("""Hello""")
dim s2 as JSValueMBS = c.valueWithJSON("""Hello""")
dim e as JSValueMBS
MsgBox str(s1.IsEqual(s2, e))
```

Notes: OtherValue The second value to test.
exception: A JSValueMBS in which to store an exception, if any.
Returns true if the two values are equal, false if they are not equal or an exception is thrown.

16.4.6 IsInstanceOfConstructor(ConstructorFunction as JSObjectMBS, byref JSException as JSValueMBS) as boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value is an object constructed by a given constructor, as compared by the JS instanceof operator.
Notes: ConstructorFunction: The constructor to test against.
JSException: A JSValueMBS in which to store an exception, if any.
Returns true if value is an object constructed by constructor, as compared by the JS instanceof operator, otherwise false.

16.4.7 IsObjectOfClass(ClassObject as JSValueMBS) as boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value is an object with a given class in its class chain.
Notes: ClassObject The JSClass to test against.
Returns true if value is an object and has jsClass in its class chain, otherwise false.

16.4.8 IsStrictEqual(OtherValue as JSValueMBS) as boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether two JavaScript values are strict equal, as compared by the JS === operator.
Example:

```
dim c as new JSContextMBS
dim j1 as JSValueMBS = c.valueWithDouble(1)
dim j2 as JSValueMBS = c.valueWithDouble(2)

MsgBox str(j1.IsStrictEqual(j2)) // false
```

```
MsgBox str(j1.IsStrictEqual(j1)) // true
```

Notes: OtherValue: The second value to test.
Returns true if the two values are strict equal, otherwise false.

16.4.9 JSONString(indent as Integer = 0, byref JSException as JSValueMBS) as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript string containing the JSON serialized representation of a JS value.
Example:

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithJSON(" { ""tag"":""Hello"", ""value"":1 } ")
dim e as JSValueMBS
MsgBox j.JSONString(5, e)
```

Notes: Requires Mac OS X 10.7 and newer.

The number of spaces to indent when nesting. If 0, the resulting JSON will not contains newlines. The size of the indent is clamped to 10 spaces.
JSException: A JSValueMBS in which to store an exception, if any.
Returns a JSString with the result of serialization, or nil if an exception is thrown.
See also:

- 16.4.25 JSONString as string 622

16.4.10 ObjectValue(byref JSException as JSValueMBS) as JSValueMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Converts a JavaScript value to object and returns the resulting object.
Notes: JSException: A JSValueMBS in which to store an exception, if any.
Returns the JSObject result of conversion, or nil if an exception is thrown.

16.4.11 StringValue(byref JSException as JSValueMBS) as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Converts a JavaScript value to string and copies the result into a JavaScript string.
Notes: JSException: A JSValueMBS in which to store an exception, if any.
Returns a JSString with the result of conversion, or nil if an exception is thrown.
See also:

- 16.4.26 StringValue as String 622

16.4.12 Properties

16.4.13 booleanValue as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Converts a JavaScript value to boolean and returns the resulting boolean.
Example:

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithBool(true)
MsgBox str(j.booleanValue)
```

Notes: (Read only property)

16.4.14 context as JSContextMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The context for this value.
Notes: (Read only property)

16.4.15 doubleValue as Double

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Converts a JavaScript value to number and returns the resulting number.
Example:

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithDouble(5.3)
MsgBox str(j.doubleValue)
```

Notes: Returns the numeric result of conversion, or NaN if an exception is thrown.

(Read only property)
See also:

- 16.4.4 DoubleValue(byref JSException as JSValueMBS) as Double 615

16.4.16 Handle as Integer

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

16.4.17 isArray as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value is an array.
Example:

```
dim c as new JSContextMBS

dim e as JSValueMBS
dim v as JSValueMBS = c.NewArray(nil, e)

MsgBox str(v.isArray)
```

Notes: Returns true if value is an array, otherwise false.
Requires OS X 10.11 or newer.
(Read only property)

16.4.18 isBoolean as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value's type is the boolean type.
Example:

```
dim c as new JSContextMBS
dim j as JSValueMBS = c.valueWithBool(true)
MsgBox str(j.isBoolean)
```

Notes: Returns true if value's type is the boolean type, otherwise false.
(Read only property)

16.4.19 isDate as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value is a date.
Example:

```
dim c as new JSContextMBS

dim year as JSValueMBS = c.valueWithDouble(2015)
dim month as JSValueMBS = c.valueWithDouble(5)
dim day as JSValueMBS = c.valueWithDouble(12)

dim e as JSValueMBS // exception
dim d as JSValueMBS = c.NewDate(array(year, month, day), e)

MsgBox str(d.isDate)
```

Notes: Returns true if value is a date, otherwise false.
Requires OS X 10.11 or newer.
(Read only property)

16.4.20 isNull as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value's type is the null type.
Example:

```
dim c as new JSContextMBS
dim n as JSValueMBS = c.valueWithNull

MsgBox str(n.isNull)
```

Notes: Returns true if value's type is the null type, otherwise false.
(Read only property)

16.4.21 isNumber as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value's type is the number type.
Example:

```
dim c as new JSContextMBS

dim j as JSValueMBS = c.valueWithDouble(5)
MsgBox str(j.isNumber)
```

Notes: Returns true if value's type is the number type, otherwise false.
(Read only property)

16.4.22 isObject as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value's type is the object type.
Example:

```
dim c as new JSContextMBS

dim e as JSValueMBS
dim v as JSValueMBS = c.NewArray(nil, e)

MsgBox str(v.isObject)
```

Notes: Returns true if value's type is the object type, otherwise false.
(Read only property)

16.4.23 isString as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value's type is the string type.
Example:

```
dim c as new JSContextMBS
dim s as JSValueMBS = c.valueWithJSON("""Hello""")
MsgBox str(s.isString)
```

Notes: Returns true if value's type is the string type, otherwise false.
(Read only property)

16.4.24 isUndefined as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Tests whether a JavaScript value's type is the undefined type.
Example:

```
dim c as new JSContextMBS

dim j as JSValueMBS = c.valueWithUndefined
MsgBox str(j.isUndefined)
```

Notes: Returns true if value's type is the undefined type, otherwise false.
(Read only property)

16.4.25 JSONString as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Creates a JavaScript string containing the JSON serialized representation of a JS value.
Example:

```
dim c as new JSContextMBS

dim v as JSValueMBS = c.valueWithString("Hello")
MsgBox v.JSONString
```

Notes: Requires Mac OS X 10.7 and newer.
(Read only property)
See also:

- 16.4.9 JSONString(indent as Integer = 0, byref JSException as JSValueMBS) as string 617

16.4.26 StringValue as String

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Converts a JavaScript value to string and copies the result into a JavaScript string.
Example:

```
dim c as new JSContextMBS

dim v as JSValueMBS = c.valueWithString("Hello")
MsgBox v.StringValue
```

Notes: Returns a JSString with the result of conversion, or NULL if an exception is thrown.
(Read only property)
See also:

- 16.4.11 StringValue(byref JSException as JSValueMBS) as string 617

16.4.27 Tag as Variant

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The tag value.
Notes: You can store anything here and as long as the JSValue object exists, this value is kept referenced.
(Read and Write property)

16.4.28 Type as Integer

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns a JavaScript value's type.
Example:

```
dim c as new JSContextMBS
dim j as JSValueMBS

j = c.valueWithDouble(1) // double
'j = c.valueWithNull // null
'j = c.valueWithUndefined // undefined
'j = c.valueWithString("Hello") // string
'j = c.valueWithJSON(" { ""tag"": 1 } ") // object
'j = c.valueWithBool(true)

Select case j.Type
case JSValueMBS.kJSTypeUndefined
MsgBox "undefined"
case JSValueMBS.kJSTypeNull
MsgBox "null"
case JSValueMBS.kJSTypeBoolean
```

```
MsgBox "boolean "+str(j.booleanValue)
case JSValueMBS.kJSTypeNumber
MsgBox "number "+str(j.doubleValue)
case JSValueMBS.kJSTypeString
MsgBox "string "+j.StringValue
case JSValueMBS.kJSTypeObject
MsgBox "object "+j.JSONString
else
Break
end Select
```

Notes: (Read only property)

16.4.29 Constants

Types

Constant	Value	Description
kJSTypeBoolean	2	A primitive boolean value, one of true or false.
kJSTypeNull	1	The unique null value.
kJSTypeNumber	3	A primitive number value.
kJSTypeObject	5	An object value (meaning that this JSValueMBS is a JSObjectMBS).
kJSTypeString	4	A primitive string value.
kJSTypeUndefined	0	The unique undefined value.

Chapter 17

Login Items

17.1 class LSSharedFileListItemMBS

17.1.1 class LSSharedFileListItemMBS

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class for a list item.
Notes: Requires Mac OS X 10.5.

17.1.2 Methods

17.1.3 DisplayName as string

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Obtain item's display name.
Example:

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kRecentDocumentItems)

if l.Handle=0 then
MsgBox "Failed to get list."
else
dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
dim lines(-1) as string

for each x as LSSharedFileListItemMBS in a
lines.append x.DisplayName
next
```

```
MsgBox Join(lines, EndOfLine)
end if
```

17.1.4 Icon as Variant

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Obtain item's icon.
Notes: Returns an IconMBS object.

17.1.5 ID as UInt32

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Obtain unique item id.
Example:

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)

if l.Handle=0 then
MsgBox "Failed to get list."
else
dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
dim lines(-1) as string

for each x as LSSharedFileListItemMBS in a
lines.append x.DisplayName+": "+str(x.ID)
next

MsgBox Join(lines, EndOfLine)
end if
```

17.1.6 Resolve(flags as UInt32) as folderitem

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Resolve item and return its folderitem.
Example:

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kRecentDocumentItems)
```

```
if l.Handle=0 then
MsgBox "Failed to get list."
else
dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
dim lines(-1) as string

for each x as LSSharedFileListItemMBS in a
lines.append x.Resolve(0).NativePath
next

MsgBox Join(lines, EndOfLine)
end if
```

Notes: Pass values like 0, kNoUserInteraction, kDoNotMountVolumes or kDoNotMountVolumes+kNoUserInteraction.

17.1.7 ResolveURL(flags as UInt32) as string

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Resolve item and return its URL.
Example:

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kRecentDocumentItems)

if l.Handle=0 then
MsgBox "Failed to get list."
else
dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
dim lines(-1) as string

for each x as LSSharedFileListItemMBS in a
lines.append x.ResolveURL(x.kNoUserInteraction)
next

MsgBox Join(lines, EndOfLine)
end if
```

Notes: Pass values like 0, kNoUserInteraction, kDoNotMountVolumes or kDoNotMountVolumes+kNoUserInteraction.

17.1.8 Properties

17.1.9 Handle as Integer

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal reference to the item.
Notes: (Read and Write property)

17.1.10 Lasterror as Integer

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The last error code.
Notes: (Read and Write property)

17.1.11 ItemHidden as boolean

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Is item hidden in UI?
Example:

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)

if l.Handle=0 then
MsgBox "Failed to get list."
else
dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
dim lines(-1) as string

for each x as LSSharedFileListItemMBS in a
lines.append x.DisplayName+": "+str(x.ItemHidden)
next

MsgBox Join(lines, EndOfLine)
end if
```

Notes: (Read and Write computed property)

17.1.12 LoginItemHidden as boolean

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Should UI hide login item's window?
Example:

```
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)

if l.Handle=0 then
MsgBox "Failed to get list."
else
dim a(-1) as LSSharedFileListItemMBS = l.Snapshot
dim lines(-1) as string

for each x as LSSharedFileListItemMBS in a
lines.append x.DisplayName+": "+str(x.LoginItemHidden)
next

MsgBox Join(lines, EndOfLine)
end if
```

Notes: Requires Mac OS X 10.6.
(Read and Write computed property)

17.1.13 Constants

Constants

Constant	Value	Description
kDoNotMountVolumes	2	One of the flags for resolve. do not mount volumes during resolution
kNoUserInteraction	1	One of the flags for resolve. no user interaction during resolution

17.2 class LSSharedFileListMBS

17.2.1 class LSSharedFileListMBS

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The shared list class.
Notes: The shared file list API is for sharing and storing list of references to file system objects. The shared file list is a persistent list of objects, where each item has assigned display name, icon, and url as well as other optional properties.
Each list can also have various properties attached.

Requires Mac OS X 10.5.
Blog Entries

- MBS Plugins updated for Xojo 2019r2
- MBS Real Studio Plugins, version 12.4pr8
- Adding Login Items on Mac OS X

17.2.2 Methods

17.2.3 Constructor(type as Integer)

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates shared file list reference to be used for changing list and reading its various properties.
Notes: type: A constant indicating list type to create. See the constants in this class.

17.2.4 GetSeedValue as UInt32

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns seed value of the shared list.

17.2.5 InsertFile(AfterItem as LSSharedFileListItemMBS, DisplayName as string, Icon as object, file as folderitem) as LSSharedFileListItemMBS

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Insert item into shared list.
Example:

```
// Add iPhoto to launch items

// pick app
dim app as FolderItem = SpecialFolder.Applications.Child("iPhoto.app")

// get list object
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)

// insert file
dim item as LSSharedFileListItemMBS = l.InsertFile(l.kLSSharedFileListItemBeforeFirst, "Launch iPhoto",
nil, app)

// check error
if l.Lasterror = 0 then
MsgBox "OK"
else
MsgBox "Failed: "+str(l.Lasterror)
end if
```

Notes: Inserts item into shared list at specified location. If the item already exists in the list it will be moved and its icon, display name and properties will be updated.

AfterItem: Item after which new item has to be inserted. To insert at the beginning of the list use kLSSharedFileListItemBeforeFirst or to insert at the end of the list use kLSSharedFileListItemLast.

DisplayName: Display name of the new item. Can be NULL.
Icon: IconMBS of the new item. Can be nil.
File: FolderItem of the new item.

17.2.6 InsertURL(AfterItem as LSSharedFileListItemMBS, DisplayName as string, Icon as object, URL as string) as LSSharedFileListItemMBS

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Insert item into shared list.
Notes: Inserts item into shared list at specified location. If the item already exists in the list it will be moved and its icon, display name and properties will be updated.

AfterItem: Item after which new item has to be inserted. To insert at the beginning of the list use kLSSharedFileListItemBeforeFirst or to insert at the end of the list use kLSSharedFileListItemLast.

DisplayName: Display name of the new item. Can be "".

Icon: IconMBS object for the icon. Can be nil.
URL: URL of the new item.

17.2.7 kLSSharedFileListItemBeforeFirst as LSSharedFileListItemMBS

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: A virtual item reference for inserting new item at beginning of the list.
Example:

```
dim n as LSSharedFileListItemMBS = LSSharedFileListMBS.kLSSharedFileListItemBeforeFirst
MsgBox str(n.Handle) // a special handle value for this virtual item: 1
```

17.2.8 kLSSharedFileListItemLast as LSSharedFileListItemMBS

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: A virtual item reference for inserting new item at end of the list.
Example:

```
dim n as LSSharedFileListItemMBS = LSSharedFileListMBS.kLSSharedFileListItemLast
MsgBox str(n.Handle) // a special handle value for this virtual item: 2
```

17.2.9 Move(item as LSSharedFileListItemMBS, MoveAfterItem as LSSharedFileListItemMBS)

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Moves item at specified location.
Notes: item: Item to move.
MoveAfterItem: New icon of the new item. Use kLSSharedFileListItemBeforeFirst and kLSSharedFileListItemLast to move at the beginning or the end of the shared list.

17.2.10 Remove(item as LSSharedFileListItemMBS)

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Remove item from shared list.
Example:

```
// Remove iPhoto from launch items

// get list object
dim l as new LSSharedFileListMBS(LSSharedFileListMBS.kSessionLoginItems)

// get items
dim items(-1) as LSSharedFileListItemMBS = l.Snapshot

// check all items
for each item as LSSharedFileListItemMBS in items
dim file as FolderItem = item.Resolve(LSSharedFileListItemMBS.kNoUserInteraction)

if file<>nil then
if file.Name = "iPhoto.app" then
l.Remove item

if l.Lasterror = 0 then
MsgBox "OK"
else
MsgBox "Error: "+str(l.Lasterror)
end if
Return
end if
end if

next
```

17.2.11 RemoveAllItems

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Remove all items from shared list.

17.2.12 SetAuthorization(handle as Integer)

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Set authorization reference for the shared list.
Notes: Before attempting to perform a privileged operation on the shared list caller must authorize appropriate rights. For example, modifying kGlobalLoginItems list requires "system.global-login-items." right authorized.

17.2.13 Snapshot as LSSharedFileListItemMBS()

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates snapshot array, which is list of all items at the moment this method was called.
See also:

- 17.2.14 Snapshot(byref seed as UInt32) as LSSharedFileListItemMBS() 634

17.2.14 Snapshot(byref seed as UInt32) as LSSharedFileListItemMBS()

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates snapshot array, which is list of all items at the moment this method was called.
Notes: seed: Returned seed value at which snapshot was taken.
See also:

- 17.2.13 Snapshot as LSSharedFileListItemMBS() 634

17.2.15 Properties

17.2.16 Handle as Integer

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal reference to the list.
Notes: (Read and Write property)

17.2.17 Lasterror as Integer

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: The last error code.
Notes: (Read and Write property)

17.2.18 RecentItemsMaxAmount as Integer

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Maximum amount of items in the list.
Notes: (Read and Write computed property)

17.2.19 VolumesComputerVisible as boolean

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Is Computer item visible in favorite volumes list?
Notes: (Read and Write computed property)

17.2.20 VolumesIDiskVisible as boolean

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Is iDisk item visible in favorite volumes list.
Notes: (Read and Write computed property)

17.2.21 VolumesNetworkVisible as boolean

Plugin Version: 9.8, Platform: macOS, Targets: Desktop, Console & Web.

Function: Is Network item visible in favorite volumes list?
Notes: (Read and Write computed property)

17.2.22 Events

17.2.23 Changed

Plugin Version: 9.8, Platform: macOS, Targets: .

Function: The event called whenever the list is changed by an application.

17.2.24 Constants

Constants

Constant	Value	Description
kFavoriteItems	2	One of the list type constants.
kFavoriteVolumes	1	One of the list type constants.
kGlobalLoginItems	7	One of the list type constants.
kRecentApplicationItems	3	One of the list type constants.
kRecentDocumentItems	4	One of the list type constants.
kRecentServerItems	5	One of the list type constants.
kSessionLoginItems	6	One of the list type constants.

Chapter 18

Mac

18.1 class SummaryMBS

18.1.1 class SummaryMBS

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: A class using SearchKit on Mac OS X 10.4 and newer to summarize texts.
Example:

```
dim s as new SummaryMBS("Hello World. This is just a test.")

MsgBox s.SentenceSummaryString(1)
```

Blog Entries

- MBS Plugins 10.3 Release Notes
- MBS REALbasic Plugins, version 10.3pr4

18.1.2 Methods

18.1.3 Constructor(text as string)

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Creates a summary object based on a text string.
Example:

```
dim s as new SummaryMBS("Hello World. This is just a test.")
```

```
MsgBox s.SentenceSummaryString(1)
```

Notes: text: The text string that you want to summarize.
On success the handle property is not zero.

The constructor creates a summarization object that pre-analyzes a text string to support fast summarization.
Available in Mac OS X v10.4 and later.

18.1.4 ParagraphAtIndex(index as Integer) as string

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Gets a specified paragraph from the text in a summarization object.
Example:

```
dim s as new SummaryMBS("Hello World. This is just a test.")
MsgBox s.ParagraphAtIndex(0)
```

Notes: index: The ordinal number of the paragraph in the original text, with the first paragraph designated by zero (this function uses zero-based indexing).

Return a string containing the specified paragraph, or "" on failure.

Available in Mac OS X v10.4 and later.

18.1.5 ParagraphIndexOfParagraphs as Integer()

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Returns the array containing the ordinal number for each paragraph in the original text.

18.1.6 ParagraphIndexOfSentences as Integer()

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Returns an array of indexes to map a sentence index to it's paragraph index.

18.1.7 ParagraphSummaryString(numParagraphs as Integer) as string

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Gets a text string consisting of a summary with, at most, the requested number of paragraphs.
Notes: numParagraphs: The maximum number of paragraphs you want in the summary.
Returns a string containing the requested summary.
Available in Mac OS X v10.4 and later.

18.1.8 RankOrderOfParagraphs as Integer()

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Returns an array with the summarization relevance rank of each paragraph in the original text.

18.1.9 RankOrderOfSentences as Integer()

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Returns an array with the summarization relevance rank of each sentence in the original text.

18.1.10 SentenceAtIndex(index as Integer) as string

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Gets a specified sentence from the text in a summarization object.
Example:

```
dim s as new SummaryMBS("Hello World.  This is just a test.")
MsgBox s.SentenceAtIndex(0)
```

Notes: index: The ordinal number of the sentence in the original text, with the first sentence designated by zero (this function uses zero-based indexing).
Returns a string containing the specified sentence, or NULL on failure.
Available in Mac OS X v10.4 and later.

18.1.11 SentenceIndexOfSentences as Integer()

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Returns an array of the ordinal number for each sentence in the original text.

18.1.12 SentenceSummaryString(numSentences as Integer) as string

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Gets a text string consisting of a summary with, at most, the requested number of sentences.
Example:

```
dim s as new SummaryMBS("Hello World. This is just a test.")

MsgBox s.SentenceSummaryString(1)
```

Notes: numSentences: The maximum number of sentences you want in the summary.
Returns a string containing the requested summary.
Available in Mac OS X v10.4 and later.

18.1.13 Properties

18.1.14 Handle as Integer

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: The internal reference to the SKSummary object.
Example:

```
dim s as new SummaryMBS("Hello World. This is just a test.")
MsgBox str(s.handle)
```

Notes: (Read and Write property)

18.1.15 ParagraphCount as Integer

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Gets the number of paragraphs in a summarization object.
Example:

```
dim s as new SummaryMBS("Hello World. This is just a test.")
MsgBox str(s.ParagraphCount)
```

Notes: (Read only property)

18.1.16 SentenceCount as Integer

Plugin Version: 10.3, Platform: macOS, Targets: All.

Function: Gets the number of sentences in a summarization object.
Example:

```
dim s as new SummaryMBS("Hello World. This is just a test.")
MsgBox str(s.SentenceCount)
```

Notes: (Read only property)

Chapter 19

MapKit

19.1 control DesktopMapKitViewControlMBS

19.1.1 control DesktopMapKitViewControlMBS

Plugin Version: 21.5, Platform: macOS, Targets: Desktop only.

Function: The control for showing a map in Xojo.
Notes: This control is designed for Xojo (it may or may not work in REAL Studio if the Cocoa target is chosen)

As Xojo provides some events for us automatically like for context menu or mouse wheel, it does not mean that those events do work. The webview used in the map view seems to consume them before the plugin gets them.
Blog Entries

- Apple MapView In Xojo
- News from the MBS Xojo Plugins in version 21.5
- New desktop controls
- MBS Xojo Plugins, version 21.3pr1
- Three new controls for iOS in Xojo
- MBS Xojo Plugins, version 20.6pr3
- MBS Xojo Plugins, version 19.5pr1
- MapKit Framework for Xojo
- MBS Xojo / Real Studio Plugins, version 14.2pr6

Videos

- Presentation from Xojo Developer Conference 2019 in Miami.
- Apple MapView In Xojo
- Apple MapView In Xojo

Xojo Developer Magazine

- 18.6, page 69: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

19.1.2 Properties

19.1.3 View as MKMapViewMBS

Plugin Version: 21.5, Platform: macOS, Targets: Desktop only.

Function: The map view used for this control.
Notes: The plugin creates it automatically when the constructor runs.
(Read only property)

19.1.4 Events

19.1.5 annotationViewDidChangeDragState(mapView as MKMapViewMBS, annotationView as MKAnnotationViewMBS, newState as Integer, oldState as Integer)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that the drag state of one of its annotation views changed.
Notes: mapView: The map view containing the annotation view.
annotationView: The annotation view whose drag state changed.
newState: The new drag state of the annotation view.
oldState: The previous drag state of the annotation view.

The drag state typically changes in response to user interactions with the annotation view. However, the annotation view itself is responsible for changing that state as well.

19.1.6 beginGestureWithEvent(e as NSEventMBS) as boolean

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Informs the receiver that the user has begun a touch gesture.
Notes: e: An event object representing the gesture beginning.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.1.7 BoundsChanged

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The event called when the bounds, but not the frame, changed.

19.1.8 ClusterAnnotationForMemberAnnotations(mapView as MKMapViewMBS, memberAnnotations() as MKAnnotationMBS) as MKClusterAnnotationMBS

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Asks you to provide a cluster annotation object for the specified annotations.
Notes: mapView: The map view containing the specified annotations.
memberAnnotations: The annotations to be clustered together. The returned MKClusterAnnotation object must include the specific annotations in this parameter.

Return the cluster annotation object.

Use this method to customize the cluster annotations displayed on your map. Normally, MapKit creates cluster annotation objects automatically when one or more annotations with the same cluster identifier are too close together. However, you can implement this method and return a custom cluster annotation object for the specified set of annotations.

19.1.9 didAddAnnotationViews(mapView as MKMapViewMBS, AnnotationViews() as MKAnnotationViewMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that one or more annotation views were added to the map.
Notes: mapView: The map view that added the annotation views.
views: An array of MKAnnotationView objects representing the views that were added.

By the time this method is called, the specified views are already added to the map.

19.1.10 DidAddOverlayRenderers(mapView as MKMapViewMBS, renderers() as MKOverlayRendererMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells you that one or more renderer objects were added to the map.
Notes: mapView: The map view that added the renderer objects.
renderers: The renderer objects that were added.

The map view adds renderer objects when it needs them to draw their contents, which might be prior to those contents appearing onscreen. It calls this method to let you know that the renderer is active and in use. By the time this method is called, the specified renderers have already been added to the map.

19.1.11 didAddOverlayViews(mapView as MKMapViewMBS, overlayViews() as NSViewMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The event to inform you about added overlay views.

19.1.12 didCloseContextualMenu(menu as NSMenuMBS, NSEvent as NSEventMBS)

Plugin Version: 24.1, Platform: macOS, Targets: .

Function: Did close contextual menu.
Notes: Allows you to restart any animation you may have stopped in the willShowContextualMenu event.

19.1.13 didDeselectAnnotationView(mapView as MKMapViewMBS, view as MKAnnotationViewMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that one of its annotation views was deselected.
Notes: mapView: The map view containing the annotation view.
view: The annotation view that was deselected.

You can use this method to track changes in the selection state of annotation views.

19.1.14 didFailLoadingMap(mapView as MKMapViewMBS, error as NSErrorMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that the specified view was unable to load the map data.
Notes: mapView: The map view that started the load operation.
error: The reason that the map data could not be loaded.

This method might be called in situations where the device does not have access to the network or is unable to load the map data for some reason. It may also be called if a request for additional map tiles comes in while a previous request for tiles is still pending. You can use this message to notify the user that the map data is unavailable.

19.1.15 didFailToLocateUserWithError(mapView as MKMapViewMBS, error as NSErrorMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that an attempt to locate the user's position failed.
Notes: mapView: The map view that is tracking the user's location.
error: An error object containing the reason why location tracking failed.

19.1.16 didFinishLoadingMap(mapView as MKMapViewMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that the specified map view successfully loaded the needed map data.
Notes: mapView: The map view that started the load operation.

This method is called when the map tiles associated with the current request have been loaded. Map tiles are requested when a new visible area is scrolled into view and tiles are not already available. Map tiles may also be requested for portions of the map that are not currently visible. For example, the map view may load tiles immediately surrounding the currently visible area as needed to handle small pans by the user.

19.1.17 DidFinishRenderingMap(mapView as MKMapViewMBS, fullyRendered as boolean)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells you that the map view has finished rendering all visible tiles.
Notes: fullyRendered: This parameter is set to true if the map view was able to render all tiles completely

or false if errors prevented all tiles from being rendered.

This method lets you know when the map view finishes rendering all of the currently visible tiles to the best of its ability. This method is called regardless of whether all tiles were rendered successfully. If there were errors loading one or more tiles that prevented map view from rendering them, the fullyRendered parameter is set to false.

19.1.18 didSelectAnnotationView(mapView as MKMapViewMBS, view as MKAnnotationViewMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that one of its annotation views was selected.
Notes: mapView: The map view containing the annotation view.
view: The annotation view that was selected.

You can use this method to track changes in the selection state of annotation views.

19.1.19 didStopLocatingUser(mapView as MKMapViewMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that the map view stopped tracking the user's location.
Notes: mapView: The map view that stopped tracking the user's location.

This method is called when the value of the showsUserLocation property changes to false.

19.1.20 didUpdateUserLocation(mapView as MKMapViewMBS, userLocation as MKUserLocationMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that the location of the user was updated.
Notes: mapView: The map view that is tracking the user's location.
userLocation: The location object representing the user's latest location. This property may be nil.

While the showsUserLocation property is set to true, this method is called whenever a new location update is received by the map view. This method is also called if the map view's user tracking mode is set to MKUserTrackingModeFollowWithHeading and the heading changes.

This method is not called if the application is currently running in the background. If you want to receive location updates while running in the background, you must use the Core Location framework.

19.1.21 endGestureWithEvent(e as NSEventMBS) as boolean

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Informs the receiver that the user has ended a touch gesture.
Notes: e: An event object representing the gesture end.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.1.22 FocusLost

Plugin Version: 21.5, Platform: macOS, Targets: .

Function:

The control lost focus.
In older Xojo versions, this event is named LostFocus.
Notes:

This only fires if the control itself lost focus and not a sub control.

19.1.23 FocusReceived

Plugin Version: 21.5, Platform: macOS, Targets: .

Function:

The control itself got focus.
In older Xojo versions, this event is named GotFocus.
Notes:

This only fires if the control itself got focus and not a sub control.

19.1.24 FrameChanged

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The event called when the frame changed.
Notes: This event notifies you, that the control changed it's bounding frame, which is position and/or size.

19.1.25 magnifyWithEvent(e as NSEventMBS) as boolean

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Informs the receiver that the user has begun a pinch gesture.
Notes: e: An event object representing the magnify gesture.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.1.26 MenuBarSelected

Plugin Version: 21.5, Platform: macOS, Targets: .

Function:

The event where you can enable menu items.
In older Xojo versions, this event is named EnableMenuItems.

19.1.27 MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The mouse button was pressed inside the control,Äôs region at the location passed in to x, y.
Notes: The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner or the Control.
Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

19.1.28 MouseDrag(x as Integer, y as Integer)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: This event fires continuously after the mouse button was pressed inside the Control.
Notes: Mouse location is local to the control passed in to x, y.
As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

19.1.29 MouseUp(x as Integer, y as Integer)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The mouse button was released.
Notes: Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

19.1.30 pressureChange(e as NSEventMBS) as boolean

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Informs the current object that a pressure change occurred on a system that supports pressure sensitivity.
Notes: This method is invoked automatically in response to user actions. event is the event that initiated the change in pressure.
Available in OS X v10.10.3 and later.

19.1.31 regionDidChangeAnimated(mapView as MKMapViewMBS, animated as boolean)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that the region displayed by the map view just changed.
Notes: mapView: The map view whose visible region changed.
animated: If true, the change to the new region was animated.

This method is called whenever the currently displayed map region changes. During scrolling, this method may be called many times to report updates to the map position. Therefore, your implementation of this method should be as lightweight as possible to avoid affecting scrolling performance.

19.1.32 regionWillChangeAnimated(mapView as MKMapViewMBS, animated as boolean)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that the region displayed by the map view is about to change.
Notes: mapView: The map view whose visible region is about to change.
animated: If true, the change to the new region will be animated. If NO, the change will be made immediately.

This method is called whenever the currently displayed map region changes. During scrolling, this method may be called many times to report updates to the map position. Therefore, your implementation of this

method should be as lightweight as possible to avoid affecting scrolling performance.

19.1.33 rendererForOverlay(mapView as MKMapViewMBS, overlay as MKOverlayMBS) as MKOverlayRendererMBS

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Asks the control for a renderer object to use when drawing the specified overlay.
Notes: mapView: The map view that requested the renderer object.
overlay: The overlay object that is about to be displayed.

Return the renderer to use when presenting the specified overlay on the map.

You must implement this method and use it to provide an appropriate renderer object for your overlays. The renderer object is responsible for drawing the contents of your overlay when asked to do so by the map view. Map Kit supports many different types of standard renderer objects and you may also define your own custom renderers.

If you don't implement this event, the MBS Plugin returns a default renderer.

19.1.34 rotateWithEvent(e as NSEventMBS) as boolean

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Informs the receiver that the user has begun a rotation gesture.
Notes: e: An event object representing the rotate gesture.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.1.35 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The backing store scale factor has changed.
Notes: Please invalidate any cached bitmaps or other relevant state.

19.1.36 swipeWithEvent(e as NSEventMBS) as boolean

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Informs the receiver that the user has begun a swipe gesture.
Notes: e: An event object representing the swipe gesture.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.1.37 viewForAnnotation(mapView as MKMapViewMBS, annotation as MKAnnotationMBS) as MKAnnotationViewMBS

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The event to query an annotation view for the given annotation.

19.1.38 willShowContextualMenu(menu as NSMenuMBS, NSEvent as NSEventMBS)

Plugin Version: 24.1, Platform: macOS, Targets: .

Function: Will show contextual menu.
Notes: Your chance to modify the menu before it is shown, e.g. to add menu entries.

19.1.39 willStartLoadingMap(mapView as MKMapViewMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that the specified map view is about to retrieve some map data.
Notes: mapView: The map view that began loading the data.

This method is called whenever a new group of map tiles need to be downloaded from the server. This typically occurs whenever you expose portions of the map by panning or zooming the content. You can use this method to mark the time that it takes for the map view to load the data.

19.1.40 willStartLocatingUser(mapView as MKMapViewMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells the control that the map view will start tracking the user's position.
Notes: mapView: The map view that is tracking the user's location.

This method is called when the value of the showsUserLocation property changes to true.

19.1.41 WillStartRenderingMap(mapView as MKMapViewMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Tells you that the map view is about to start rendering some of its tiles.
Notes: The map view calls this method when one or more tiles are revealed and require rendering.

19.2 control MapKitIOSControlMBS

19.2.1 control MapKitIOSControlMBS

Plugin Version: 21.0, Platform: iOS, Targets: iOS only.

Function: The control for showing a map in Xojo.
Notes: This control is designed for Xojo 2020r2 or newer.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 23.5
- MBS Xojo Plugins, version 23.5pr7
- Apple MapView In Xojo
- MBS Xojo Plugins Version 21.0 News
- MonkeyBread Software Releases the MBS Xojo Plugins in version 21.0
- Three new controls for iOS in Xojo
- MBS Xojo Plugins, version 20.6pr3

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 22.1, page 9: News
- 19.2, page 9: News

19.2.2 Properties

19.2.3 View as MKMapViewMBS

Plugin Version: 21.0, Platform: iOS, Targets: iOS only.

Function: The map view used for this control.
Notes: The plugin creates it automatically when the constructor runs.
(Read only property)

19.2.4 Events

19.2.5 annotationViewDidChangeDragState(mapView as MKMapViewMBS, annotationView as MKAnnotationViewMBS, newState as integer, oldState as integer)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that the drag state of one of its annotation views changed.
Notes: mapView: The map view containing the annotation view.
annotationView: The annotation view whose drag state changed.
newState: The new drag state of the annotation view.
oldState: The previous drag state of the annotation view.

The drag state typically changes in response to user interactions with the annotation view. However, the annotation view itself is responsible for changing that state as well.

19.2.6 Close

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: The control is about to close.

19.2.7 ClusterAnnotationForMemberAnnotations(mapView as MKMapViewMBS, memberAnnotations() as MKAnnotationMBS) as MKClusterAnnotationMBS

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Asks you to provide a cluster annotation object for the specified annotations.
Notes: mapView: The map view containing the specified annotations.
memberAnnotations: The annotations to be clustered together. The returned MKClusterAnnotation object must include the specific annotations in this parameter.

Return the cluster annotation object.

Use this method to customize the cluster annotations displayed on your map. Normally, MapKit creates cluster annotation objects automatically when one or more annotations with the same cluster identifier are too close together. However, you can implement this method and return a custom cluster annotation object for the specified set of annotations.

19.2.8 didAddAnnotationViews(mapView as MKMapViewMBS, AnnotationViews() as MKAnnotationViewMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that one or more annotation views were added to the map.
Notes: mapView: The map view that added the annotation views.
views: An array of MKAnnotationView objects representing the views that were added.

By the time this method is called, the specified views are already added to the map.

19.2.9 DidAddOverlayRenderers(mapView as MKMapViewMBS, renderers() as MKOverlayRendererMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells you that one or more renderer objects were added to the map.
Notes: mapView: The map view that added the renderer objects.
renderers: The renderer objects that were added.

The map view adds renderer objects when it needs them to draw their contents, which might be prior to those contents appearing onscreen. It calls this method to let you know that the renderer is active and in use. By the time this method is called, the specified renderers have already been added to the map.

19.2.10 didAddOverlayViews(mapView as MKMapViewMBS, overlayViews() as NSViewMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: The event to inform you about added overlay views.

19.2.11 didDeselectAnnotationView(mapView as MKMapViewMBS, view as MKAnnotationViewMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that one of its annotation views was deselected.
Notes: mapView: The map view containing the annotation view.
view: The annotation view that was deselected.

You can use this method to track changes in the selection state of annotation views.

19.2.12 didFailLoadingMap(mapView as MKMapViewMBS, error as NSErrorMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that the specified view was unable to load the map data.
Notes: mapView: The map view that started the load operation.
error: The reason that the map data could not be loaded.

This method might be called in situations where the device does not have access to the network or is unable to load the map data for some reason. It may also be called if a request for additional map tiles comes in while a previous request for tiles is still pending. You can use this message to notify the user that the map data is unavailable.

19.2.13 didFailToLocateUserWithError(mapView as MKMapViewMBS, error as NSErrorMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that an attempt to locate the user's position failed.
Notes: mapView: The map view that is tracking the user's location.
error: An error object containing the reason why location tracking failed.

19.2.14 didFinishLoadingMap(mapView as MKMapViewMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that the specified map view successfully loaded the needed map data.
Notes: mapView: The map view that started the load operation.

This method is called when the map tiles associated with the current request have been loaded. Map tiles are requested when a new visible area is scrolled into view and tiles are not already available. Map tiles may also be requested for portions of the map that are not currently visible. For example, the map view may load tiles immediately surrounding the currently visible area as needed to handle small pans by the user.

19.2.15 DidFinishRenderingMap(mapView as MKMapViewMBS, fullyRendered as boolean)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells you that the map view has finished rendering all visible tiles.
Notes: fullyRendered: This parameter is set to true if the map view was able to render all tiles completely or false if errors prevented all tiles from being rendered.

This method lets you know when the map view finishes rendering all of the currently visible tiles to the best of its ability. This method is called regardless of whether all tiles were rendered successfully. If there were errors loading one or more tiles that prevented map view from rendering them, the fullyRendered parameter is set to false.

19.2.16 didSelectAnnotationView(mapView as MKMapViewMBS, view as MKAnnotationViewMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that one of its annotation views was selected.
Notes: mapView: The map view containing the annotation view.
view: The annotation view that was selected.

You can use this method to track changes in the selection state of annotation views.

19.2.17 didStopLocatingUser(mapView as MKMapViewMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that the map view stopped tracking the user's location.
Notes: mapView: The map view that stopped tracking the user's location.

This method is called when the value of the showsUserLocation property changes to false.

19.2.18 didUpdateUserLocation(mapView as MKMapViewMBS, userLocation as MKUserLocationMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that the location of the user was updated.
Notes: mapView: The map view that is tracking the user's location.

userLocation: The location object representing the user's latest location. This property may be nil.

While the showsUserLocation property is set to true, this method is called whenever a new location update is received by the map view. This method is also called if the map view's user tracking mode is set to MKUserTrackingModeFollowWithHeading and the heading changes.

This method is not called if the application is currently running in the background. If you want to receive location updates while running in the background, you must use the Core Location framework.

19.2.19 GotFocus

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: The control itself got focus.
Notes: This only fires if the control itself got focus and not a sub control.

19.2.20 LostFocus

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: The control lost focus.
Notes: This only fires if the control itself lost focus and not a sub control.

19.2.21 Open

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: The control is about to was created and you can initialize it.

19.2.22 regionDidChangeAnimated(mapView as MKMapViewMBS, animated as boolean)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that the region displayed by the map view just changed.
Notes: mapView: The map view whose visible region changed.
animated: If true, the change to the new region was animated.

This method is called whenever the currently displayed map region changes. During scrolling, this method

may be called many times to report updates to the map position. Therefore, your implementation of this method should be as lightweight as possible to avoid affecting scrolling performance.

19.2.23 regionWillChangeAnimated(mapView as MKMapViewMBS, animated as boolean)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that the region displayed by the map view is about to change.
Notes: mapView: The map view whose visible region is about to change.
animated: If true, the change to the new region will be animated. If NO, the change will be made immediately.

This method is called whenever the currently displayed map region changes. During scrolling, this method may be called many times to report updates to the map position. Therefore, your implementation of this method should be as lightweight as possible to avoid affecting scrolling performance.

19.2.24 rendererForOverlay(mapView as MKMapViewMBS, overlay as MKOverlayMBS) as MKOverlayRendererMBS

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Asks the control for a renderer object to use when drawing the specified overlay.
Notes: mapView: The map view that requested the renderer object.
overlay: The overlay object that is about to be displayed.

Return the renderer to use when presenting the specified overlay on the map.

You must implement this method and use it to provide an appropriate renderer object for your overlays. The renderer object is responsible for drawing the contents of your overlay when asked to do so by the map view. Map Kit supports many different types of standard renderer objects and you may also define your own custom renderers.

If you don't implement this event, the MBS Plugin returns a default renderer.

19.2.25 touchesBegan(e as NSEventMBS, touches() as NSTouchMBS) as boolean

Plugin Version: 23.5, Platform: iOS, Targets: .

Function: Tells this object that one or more new touches occurred in a view or window.
Notes: e: The event to which the touches belong.

UIKit calls this method when a new touch is detected in a view or window. Many UIKit classes override this method and use it to handle the corresponding touch events. The default implementation of this method forwards the message up the responder chain.

Return true if you handled it as otherwise we pass it on.

19.2.26 touchesCancelled(e as NSEventMBS, touches() as NSTouchMBS) as boolean

Plugin Version: 23.5, Platform: iOS, Targets: .

Function: Tells the responder when a system event (such as a system alert) cancels a touch sequence.
Notes: e: The event to which the touches belong.

UIKit calls this method when it receives a system interruption requiring cancellation of the touch sequence. An interruption is anything that causes the application to become inactive or causes the view handling the touch events to be removed from its window. Your implementation of this method should clean up any state associated with handling the touch sequence.

Return true if you handled it as otherwise we pass it on.

19.2.27 touchesEnded(e as NSEventMBS, touches() as NSTouchMBS) as boolean

Plugin Version: 23.5, Platform: iOS, Targets: .

Function: Tells the responder when one or more fingers are raised from a view or window.
Notes: e: The event to which the touches belong.

UIKit calls this method when a finger or Apple Pencil is no longer touching the screen. Many UIKit classes override this method and use it to clean up state involved in the handling of the corresponding touch events. The default implementation of this method forwards the message up the responder chain.

Return true if you handled it as otherwise we pass it on.

19.2.28 touchesMoved(e as NSEventMBS, touches() as NSTouchMBS) as boolean

Plugin Version: 23.5, Platform: iOS, Targets: .

Function: Tells the responder when one or more touches associated with an event changed.
Notes: e: The event to which the touches belong.

UIKit calls this method when the location or force of a touch changes. Many UIKit classes override this method and use it to handle the corresponding touch events. The default implementation of this method forwards the message up the responder chain.

Return true if you handled it as otherwise we pass it on.

19.2.29 viewForAnnotation(mapView as MKMapViewMBS, annotation as MKAnnotationMBS) as MKAnnotationViewMBS

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: The event to query an annotation view for the given annotation.

19.2.30 willStartLoadingMap(mapView as MKMapViewMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that the specified map view is about to retrieve some map data.
Notes: mapView: The map view that began loading the data.

This method is called whenever a new group of map tiles need to be downloaded from the server. This typically occurs whenever you expose portions of the map by panning or zooming the content. You can use this method to mark the time that it takes for the map view to load the data.

19.2.31 willStartLocatingUser(mapView as MKMapViewMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells the control that the map view will start tracking the user's position.
Notes: mapView: The map view that is tracking the user's location.

This method is called when the value of the showsUserLocation property changes to true.

19.2.32 WillStartRenderingMap(mapView as MKMapViewMBS)

Plugin Version: 21.0, Platform: iOS, Targets: .

Function: Tells you that the map view is about to start rendering some of its tiles.
Notes: The map view calls this method when one or more tiles are revealed and require rendering.

19.3 control MapKitViewControlMBS

19.3.1 control MapKitViewControlMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop only.

Function: The control for showing a map in Xojo.
Notes: This control is designed for Xojo (it may or may not work in REAL Studio if the Cocoa target is chosen)

As Xojo provides some events for us automatically like for context menu or mouse wheel, it does not mean that those events do work. The webview used in the map view seems to consume them before the plugin gets them.
Blog Entries

- Apple MapView In Xojo
- News from the MBS Xojo Plugins in version 21.5
- New desktop controls
- MBS Xojo Plugins, version 21.3pr1
- Three new controls for iOS in Xojo
- MBS Xojo Plugins, version 20.6pr3
- MBS Xojo Plugins, version 19.5pr1
- MapKit Framework for Xojo
- MBS Xojo / Real Studio Plugins, version 14.2pr6

Videos

- Presentation from Xojo Developer Conference 2019 in Miami.
- Apple MapView In Xojo
- Apple MapView In Xojo

Xojo Developer Magazine

- 18.6, page 69: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

19.3.2 Properties

19.3.3 View as MKMapViewMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop only.

Function: The map view used for this control.
Notes: The plugin creates it automatically when the constructor runs.
(Read only property)

19.3.4 Events

19.3.5 annotationViewDidChangeDragState(mapView as MKMapViewMBS, annotationView as MKAnnotationViewMBS, newState as Integer, oldState as Integer)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that the drag state of one of its annotation views changed.
Notes: mapView: The map view containing the annotation view.
annotationView: The annotation view whose drag state changed.
newState: The new drag state of the annotation view.
oldState: The previous drag state of the annotation view.

The drag state typically changes in response to user interactions with the annotation view. However, the annotation view itself is responsible for changing that state as well.

19.3.6 beginGestureWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: Informs the receiver that the user has begun a touch gesture.
Notes: e: An event object representing the gesture beginning.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.3.7 BoundsChanged

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The event called when the bounds, but not the frame, changed.

19.3.8 Close

Plugin Version: 14.1, Platform: macOS, Targets: .

Function:

The control is about to close.
In Xojo version 2021r3 and newer this event is named Closing.

19.3.9 ClusterAnnotationForMemberAnnotations(mapView as MKMapViewMBS, memberAnnotations() as MKAnnotationMBS) as MKClusterAnnotationMBS

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: Asks you to provide a cluster annotation object for the specified annotations.
Notes: mapView: The map view containing the specified annotations.
memberAnnotations: The annotations to be clustered together. The returned MKClusterAnnotation object must include the specific annotations in this parameter.

Return the cluster annotation object.

Use this method to customize the cluster annotations displayed on your map. Normally, MapKit creates cluster annotation objects automatically when one or more annotations with the same cluster identifier are too close together. However, you can implement this method and return a custom cluster annotation object for the specified set of annotations.

19.3.10 ConstructContextualMenu(base as MenuItem, x as Integer, y as Integer) as Boolean

Plugin Version: 22.1, Platform: macOS, Targets: .

Function: This event is called when it is appropriate to display a contextual menu for the control.

19.3.11 ContextualMenuAction(hitItem as MenuItem) as Boolean

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: Called when a menuitem is choosen.
Notes: This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

19.3.12 didAddAnnotationViews(mapView as MKMapViewMBS, AnnotationViews() as MKAnnotationViewMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that one or more annotation views were added to the map.
Notes: mapView: The map view that added the annotation views.
views: An array of MKAnnotationView objects representing the views that were added.

By the time this method is called, the specified views are already added to the map.

19.3.13 DidAddOverlayRenderers(mapView as MKMapViewMBS, renderers() as MKOverlayRendererMBS)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: Tells you that one or more renderer objects were added to the map.
Notes: mapView: The map view that added the renderer objects.
renderers: The renderer objects that were added.

The map view adds renderer objects when it needs them to draw their contents, which might be prior to those contents appearing onscreen. It calls this method to let you know that the renderer is active and in use. By the time this method is called, the specified renderers have already been added to the map.

19.3.14 didAddOverlayViews(mapView as MKMapViewMBS, overlayViews() as NSViewMBS)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: The event to inform you about added overlay views.

19.3.15 didCloseContextualMenu(menu as NSMenuMBS, NSEvent as NSEventMBS)

Plugin Version: 24.1, Platform: macOS, Targets: .

Function: Did close contextual menu.
Notes: Allows you to restart any animation you may have stopped in the willShowContextualMenu event.

19.3.16 didDeselectAnnotationView(mapView as MKMapViewMBS, view as MKAnnotationViewMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that one of its annotation views was deselected.
Notes: mapView: The map view containing the annotation view.
view: The annotation view that was deselected.

You can use this method to track changes in the selection state of annotation views.

19.3.17 didFailLoadingMap(mapView as MKMapViewMBS, error as NSErrorMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that the specified view was unable to load the map data.
Notes: mapView: The map view that started the load operation.
error: The reason that the map data could not be loaded.

This method might be called in situations where the device does not have access to the network or is unable to load the map data for some reason. It may also be called if a request for additional map tiles comes in while a previous request for tiles is still pending. You can use this message to notify the user that the map data is unavailable.

19.3.18 didFailToLocateUserWithError(mapView as MKMapViewMBS, error as NSErrorMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that an attempt to locate the user's position failed.
Notes: mapView: The map view that is tracking the user's location.
error: An error object containing the reason why location tracking failed.

19.3.19 didFinishLoadingMap(mapView as MKMapViewMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that the specified map view successfully loaded the needed map data.
Notes: mapView: The map view that started the load operation.

This method is called when the map tiles associated with the current request have been loaded. Map tiles are requested when a new visible area is scrolled into view and tiles are not already available. Map tiles may also be requested for portions of the map that are not currently visible. For example, the map view may load tiles immediately surrounding the currently visible area as needed to handle small pans by the user.

19.3.20 DidFinishRenderingMap(mapView as MKMapViewMBS, fullyRendered as boolean)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: Tells you that the map view has finished rendering all visible tiles.
Notes: fullyRendered: This parameter is set to true if the map view was able to render all tiles completely or false if errors prevented all tiles from being rendered.

This method lets you know when the map view finishes rendering all of the currently visible tiles to the best of its ability. This method is called regardless of whether all tiles were rendered successfully. If there were errors loading one or more tiles that prevented map view from rendering them, the fullyRendered parameter is set to false.

19.3.21 didSelectAnnotationView(mapView as MKMapViewMBS, view as MKAnnotationViewMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that one of its annotation views was selected.
Notes: mapView: The map view containing the annotation view.
view: The annotation view that was selected.

You can use this method to track changes in the selection state of annotation views.

19.3.22 didStopLocatingUser(mapView as MKMapViewMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that the map view stopped tracking the user's location.
Notes: mapView: The map view that stopped tracking the user's location.

This method is called when the value of the showsUserLocation property changes to false.

19.3.23 didUpdateUserLocation(mapView as MKMapViewMBS, userLocation as MKUserLocationMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that the location of the user was updated.
Notes: mapView: The map view that is tracking the user's location.
userLocation: The location object representing the user's latest location. This property may be nil.

While the showsUserLocation property is set to true, this method is called whenever a new location update is received by the map view. This method is also called if the map view's user tracking mode is set to MKUserTrackingModeFollowWithHeading and the heading changes.

This method is not called if the application is currently running in the background. If you want to receive location updates while running in the background, you must use the Core Location framework.

19.3.24 EnableMenuItems

Plugin Version: 17.1, Platform: macOS, Targets: .

Function:

The event where you can enable menu items.
In Xojo version 2021r3 and newer this event is named MenuBarSelected.

19.3.25 endGestureWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: Informs the receiver that the user has ended a touch gesture.
Notes: e: An event object representing the gesture end.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.3.26 FrameChanged

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The event called when the frame changed.
Notes: This event notifies you, that the control changed it's bounding frame, which is position and/or size.

19.3.27 GotFocus

Plugin Version: 16.5, Platform: macOS, Targets: .

Function:

The control itself got focus.
In Xojo version 2021r3 and newer this event is named FocusReceived.
Notes:

This only fires if the control itself got focus and not a sub control.

19.3.28 LostFocus

Plugin Version: 16.5, Platform: macOS, Targets: .

Function:

The control lost focus.
In Xojo version 2021r3 and newer this event is named FocusLost.
Notes:

This only fires if the control itself lost focus and not a sub control.

19.3.29 magnifyWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: Informs the receiver that the user has begun a pinch gesture.
Notes: e: An event object representing the magnify gesture.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.3.30 MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The mouse button was pressed inside the control,Äôs region at the location passed in to x, y.
Notes: The coordinates x and y are local to the control, i.e. they represent the position of the mouse click

relative to the upper-left corner or the Control.
Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

19.3.31 MouseDrag(x as Integer, y as Integer)

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: This event fires continuously after the mouse button was pressed inside the Control.
Notes: Mouse location is local to the control passed in to x, y.
As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

19.3.32 MouseUp(x as Integer, y as Integer)

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The mouse button was released.
Notes: Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

19.3.33 Open

Plugin Version: 14.1, Platform: macOS, Targets: .

Function:

The control is about to was created and you can initialize it.
In Xojo version 2021r3 and newer this event is named Opening.

19.3.34 pressureChange(e as NSEventMBS) as boolean

Plugin Version: 15.1, Platform: macOS, Targets: .

Function: Informs the current object that a pressure change occurred on a system that supports pressure sensitivity.

Notes: This method is invoked automatically in response to user actions. event is the event that initiated the change in pressure.
Available in OS X v10.10.3 and later.

19.3.35 regionDidChangeAnimated(mapView as MKMapViewMBS, animated as boolean)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that the region displayed by the map view just changed.
Notes: mapView: The map view whose visible region changed.
animated: If true, the change to the new region was animated.

This method is called whenever the currently displayed map region changes. During scrolling, this method may be called many times to report updates to the map position. Therefore, your implementation of this method should be as lightweight as possible to avoid affecting scrolling performance.

19.3.36 regionWillChangeAnimated(mapView as MKMapViewMBS, animated as boolean)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that the region displayed by the map view is about to change.
Notes: mapView: The map view whose visible region is about to change.
animated: If true, the change to the new region will be animated. If NO, the change will be made immediately.

This method is called whenever the currently displayed map region changes. During scrolling, this method may be called many times to report updates to the map position. Therefore, your implementation of this method should be as lightweight as possible to avoid affecting scrolling performance.

19.3.37 rendererForOverlay(mapView as MKMapViewMBS, overlay as MKOverlayMBS) as MKOverlayRendererMBS

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: Asks the control for a renderer object to use when drawing the specified overlay.
Notes: mapView: The map view that requested the renderer object.
overlay: The overlay object that is about to be displayed.

Return the renderer to use when presenting the specified overlay on the map.

You must implement this method and use it to provide an appropriate renderer object for your overlays. The renderer object is responsible for drawing the contents of your overlay when asked to do so by the map view. Map Kit supports many different types of standard renderer objects and you may also define your own custom renderers.

If you don't implement this event, the MBS Plugin returns a default renderer.

19.3.38 rotateWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: Informs the receiver that the user has begun a rotation gesture.
Notes: e: An event object representing the rotate gesture.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.3.39 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The backing store scale factor has changed.
Notes: Please invalidate any cached bitmaps or other relevant state.

19.3.40 swipeWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: Informs the receiver that the user has begun a swipe gesture.
Notes: e: An event object representing the swipe gesture.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

19.3.41 viewForAnnotation(mapView as MKMapViewMBS, annotation as MKAnnotationMBS) as MKAnnotationViewMBS

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: The event to query an annotation view for the given annotation.

19.3.42 willShowContextualMenu(menu as NSMenuMBS, NSEvent as NSEventMBS)

Plugin Version: 24.1, Platform: macOS, Targets: .

Function: Will show contextual menu.
Notes: Your chance to modify the menu before it is shown, e.g. to add menu entries.

19.3.43 willStartLoadingMap(mapView as MKMapViewMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that the specified map view is about to retrieve some map data.
Notes: mapView: The map view that began loading the data.

This method is called whenever a new group of map tiles need to be downloaded from the server. This typically occurs whenever you expose portions of the map by panning or zooming the content. You can use this method to mark the time that it takes for the map view to load the data.

19.3.44 willStartLocatingUser(mapView as MKMapViewMBS)

Plugin Version: 14.1, Platform: macOS, Targets: .

Function: Tells the control that the map view will start tracking the user's position.
Notes: mapView: The map view that is tracking the user's location.

This method is called when the value of the showsUserLocation property changes to true.

19.3.45 WillStartRenderingMap(mapView as MKMapViewMBS)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: Tells you that the map view is about to start rendering some of its tiles.
Notes: The map view calls this method when one or more tiles are revealed and require rendering.

19.4 class MKAnnotationViewMBS

19.4.1 class MKAnnotationViewMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The visual representation of one of your annotation objects.
Notes: See
https://developer.apple.com/documentation/mapkit/mkannotationview
Subclass of the NSViewMBS class.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 20.4
- MBS Xojo Plugins, version 20.4pr8
- Mapview with icons in Xojo
- MapKit Framework for Xojo

Xojo Developer Magazine

- 19.1, pages 80 to 82: Maps Part 8, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 19.1, page 78: Maps Part 8, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, pages 78 to 79: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, page 74: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, pages 64 to 65: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.5, pages 80 to 81: Maps (Part 6), A deep dive into Annotations by Markus Winter

19.4.2 Methods

19.4.3 Constructor(annotation as MKAnnotationMBS, reuseIdentifier as string = "", EnableEvents as Boolean = false)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a new annotation view.
Notes: annotation: The annotation object to associate with the new view.
reuseIdentifier: If you plan to reuse the annotation view for similar types of annotations, pass a string to

identify it. Although you can pass nil if you do not intend to reuse the view, reusing annotation views is generally recommended.

Returns the initialized annotation view or nil if there was a problem initializing the object.

The reuse identifier provides a way for you to improve performance by recycling annotation views as they are scrolled on and off of the map. As views are no longer needed, they are moved to a reuse queue by the map view. When a new annotation becomes visible, your application can request a view for that annotation by passing the appropriate reuse identifier string to the dequeueReusableAnnotationViewWithIdentifier: method of MKMapView.

Added EnableEvents parameter to enable new prepareForDisplay and prepareForReuse events. But please keep reference in some global array to those objects to keep the events working.
See also:

- 19.4.4 Constructor(Handle as Integer) 678

19.4.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKAnnotationView reference from a declare.
The object is retained.
See also:

- 19.4.3 Constructor(annotation as MKAnnotationMBS, reuseIdentifier as string = "", EnableEvents as Boolean = false) 677

19.4.5 Destructor

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

19.4.6 MKAnnotationCalloutInfoDidChangeNotification as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The notification name for the case callout info changed.

19.4.7 setDragState(State as Integer, animated as Boolean)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Sets the current drag state for the annotation view.
Notes: newDragState: The new drag state for the annotation view.
animated: If true, the change to the new drag state should be animated; otherwise, it should be made without animations.

Applications targeting iOS 4.2 and later can override this method and use it to implement drag support for custom annotation views. As the system detects user actions that would indicate a drag, it calls this method to update the drag state. In response to these changes, your custom implementation of this method should do the following:
When the drag state changes to MKAnnotationViewDragStateStarting, set the state to MKAnnotationViewDragStateDragging. If you perform an animation to indicate the beginning of a drag, and the animated parameter is true, perform that animation before changing the state.

When the state changes to either MKAnnotationViewDragStateCanceling or MKAnnotationViewDragStateEnding, set the state to MKAnnotationViewDragStateNone. If you perform an animation at the end of a drag, and the animated parameter is true, you should perform that animation before changing the state.

The default implementation of this method sets the value of the dragState property to the value in the newDragState parameter only. Therefore, direct subclasses can simply call the inherited version of this method to change the drag state; otherwise, just change the value in the draggable property directly.

Changing the state to MKAnnotationViewDragStateDragging or MKAnnotationViewDragStateNone is the way to signal to the map view that you are done with any animations you wanted to perform. For example, when a drag operation begins for a pin annotation, the MKPinAnnotationView class executes an animation to lift the pin off the map. Similarly, when the pin is dropped, the class performs a drop animation. Even if you do not perform any animations, you should call the inherited version of this method to update the dragState property.

You must not try to abort a new drag operation by changing the state from MKAnnotationViewDragStateStarting to MKAnnotationViewDragStateNone. If you do not want your annotation view to be draggable, set the draggable property to NO.

19.4.8 setSelected(selected as boolean, animated as boolean)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Sets the selection state of the annotation view.
Notes: selected: Contains the value true if the view should display itself as selected.
animated: Set to true if the change in selection state is animated.

You should not call this method directly. An MKMapView object calls this method in response to user interactions with the annotation.

19.4.9 Properties

19.4.10 annotation as MKAnnotationMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The annotation object currently associated with the view.
Notes: You should not change the value of this property directly. This property contains a non-nil value only while the annotation view is visible on the map. If the view is queued and waiting to be reused, the value is nil
(Read and Write property)

19.4.11 CalloutOffset as NSPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The offset (in points) at which to place the callout bubble.
Notes: This property determines the additional distance by which to move the callout bubble. When this property is set to (0, 0), the anchor point of the callout bubble is placed on the top-center point of the annotation view,Äôs frame. Specifying positive offset values moves the callout bubble down and to the right, while specifying negative values moves it up and to the left.
The calloutOffset property is not used in macOS apps. Instead, macOS apps use leftCalloutOffset and rightCalloutOffset.
(Read and Write property)

19.4.12 canShowCallout as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the annotation view is able to display extra information in a callout bubble.
Notes: If the value of this property is YES, a standard callout bubble is shown when the user taps a selected annotation view. The callout uses the title and subtitle text from the associated annotation object. If there is no title text, though, the annotation view is treated as if its enabled property is set to NO. The callout also displays any custom callout views stored in the leftCalloutAccessoryView and rightCalloutAccessoryView properties.
If the value of this property is NO, the value of the title and subtitle strings are ignored and the annotation view remains enabled by default. You can still disable the view explicitly using the enabled property.

(Read and Write property)

19.4.13 CenterOffset as NSPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The offset (in points) at which to display the view.
Notes: By default, the center point of an annotation view is placed at the coordinate point of the associated annotation. You can use this property to reposition the annotation view as needed. This x and y offset values are measured in points. Positive offset values move the annotation view down and to the right, while negative values move it up and to the left.
(Read and Write property)

19.4.14 clusterAnnotationView as MKAnnotationViewMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The clustering annotation view currently standing in for this annotation view.
Notes: When the annotation view is being displayed on the map, the value of this property is nil.
(Read only property)

19.4.15 clusteringIdentifier as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: An identifier that determines whether the annotation view participates in clustering.
Notes: The default value of this property is empty, which prevents the annotation view from being clustered with other annotation views. Setting the property to a non empty value it to participate in clustering. Clustering occurs when there is a collision between multiple annotation views with the same identifier on the map surface. The annotation views involved in the collision are removed from the map view and replaced by a clustering annotation view, which displays the title from one of the annotations and provides access to the other annotations.
(Read and Write property)

19.4.16 collisionMode as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The collision mode to use when interpreting the collision frame rectangle.
Notes: (Read and Write property)

19.4.17 detailCalloutAccessoryView as NSViewMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The detail accessory view to be used in the standard callout.
Notes: (Read and Write property)

19.4.18 displayPriority as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The display priority of this annotation view.
Notes: An annotation view whose priority is set to DisplayPriorityRequired is always visible on the map, whereas other priorities may result in the annotation view being hidden.
The default value of this property is DisplayPriorityRequired.
(Read and Write property)

19.4.19 draggable as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean indicating whether the annotation view is draggable.
Notes: Setting this property to true makes an annotation draggable by the user. If true, the associated annotation object must also implement the setCoordinate: method. The default value of this property is false.
Setting this property to true, lets the map view know that the annotation is always draggable. In other words, you cannot conditionalize drag operations by attempting to stop an operation that has already been initiated; doing so can lead to undefined behavior. Once begun, the drag operation should always continue to completion.
(Read and Write property)

19.4.20 dragState as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The current drag state of the annotation view.
Notes: To support drag operations, you must override the implementation of this property and update the drag state at the following times:
When the drag state changes to MKAnnotationViewDragStateStarting, you should set the state to MKAnnotationViewDragStateDragging. If you perform an animation to indicate the beginning of a drag, you should perform that animation before changing the state. Changing the state to the new value lets the map know that your animations are done.
When the state changes to either MKAnnotationViewDragStateCanceling or MKAnnotationViewDragSta-

teEnding, set the state to MKAnnotationViewDragStateNone. If you perform an animation at the end of a drag, you should perform that animation before changing the state.

Changing the state to the MKAnnotationViewDragStateDragging or MKAnnotationViewDragStateNone value is the way to signal to the map view that you are done with any animations you wanted to perform. For example, when a drag operation begins for a pin annotation, the MKPinAnnotationView class executes an animation to lift the pin off the map. Similarly, when the pin is dropped, the class performs a drop animation. Even if you do not perform any animations, you should still change the value of this property to reflect the correct state.

You must not try to abort a new drag operation by changing the state from MKAnnotationViewDragStateStarting to MKAnnotationViewDragStateNone. If you do not want your annotation view to be draggable, set the draggable property to NO.
(Read and Write property)

19.4.21 enabled as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the annotation is enabled.
Notes: The default value of this property is YES. If the value of this property is NO, the annotation view ignores touch events and cannot be selected. Subclasses may also display the annotation contents differently depending on the value of this property.
(Read and Write property)

19.4.22 highlighted as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the annotation view is highlighted.
Notes: You should not set the value of this property directly. The map view sets it in response to touch events entering or exiting the annotation view,Äôs bounds.
(Read and Write property)

19.4.23 image as NSImageMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The image to be displayed by the annotation view.
Notes: Looks like MKPinAnnotationViewMBS likes to ignore it, so you may prefer to use MKAnnotationViewMBS directly.

(Read and Write property)

19.4.24 leftCalloutAccessoryView as NSViewMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The view to display on the left side of the standard callout bubble.
Notes: The default value of this property is nil. The left callout view is typically used to display information about the annotation or to link to custom information provided by your application.
In an iOS app, if the view you specify is also a descendant of the UIControl class, you can use the map view,Äôs delegate to receive notifications when your control is tapped. If it does not descend from UIControl, your view is responsible for handling any touch events within its bounds.
In a macOS app, the callout view,Äôs view controller can implement an action method that responds when a user clicks the control in a callout view.
(Read and Write property)

19.4.25 leftCalloutOffset as NSPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop only.

Function: The offset in points from the middle-left of the annotation view.
Notes: This property specifies where the anchor of the callout should be shown when it,Äôs oriented off the left side of the annotation view.
(Read and Write property)

19.4.26 reuseIdentifier as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The string that identifies that this annotation view is reusable.
Notes: You specify the reuse identifier when you create the view. You use this type later to retrieve an annotation view that was created previously but which is currently unused because its annotation is not on screen.
If you define distinctly different types of annotations (with distinctly different annotation views to go with them), you can differentiate between the annotation types by specifying different reuse identifiers for each one.
(Read only property)

19.4.27 rightCalloutAccessoryView as NSViewMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The view to display on the right side of the standard callout bubble.
Notes: This property is set to nil by default. The right callout view is typically used to link to more detailed information about the annotation. In an iOS app, a common view to specify for this property is a button object whose type is set to UIButtonTypeDetailDisclosure.
In an iOS app, if the view you specify is also a descendant of the UIControl class, you can use the map view,Äôs delegate to receive notifications when your control is tapped. If it does not descend from UIControl, your view is responsible for handling any touch events within its bounds.
In a macOS app, the callout view,Äôs view controller can implement an action method that responds when a user clicks the control in a callout view.
(Read and Write property)

19.4.28 rightCalloutOffset as NSPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop only.

Function: The offset in points from the middle-right of the annotation view.
Notes: This property specifies where the anchor of the callout should be shown when it,Äôs oriented off the right side of the annotation view.
(Read and Write property)

19.4.29 selected as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the annotation view is currently selected.
Notes: You should not set the value of this property directly. If the property contains true, the annotation view is displaying a callout bubble.
(Read and Write property)

19.4.30 Events

19.4.31 prepareForDisplay

Plugin Version: 20.4, Platform: macOS, Targets: .

Function: Notifies the annotation view that it is about to be displayed on the map.
Notes: Use this event to prepare the content of your annotation view.

19.4.32 prepareForReuse

Plugin Version: 20.4, Platform: macOS, Targets: .

Function: Called when the view is removed from the reuse queue.
Notes: You can implement this event in your custom annotation views and use it to put the view in a known state before it is returned to your map view delegate.

19.4.33 Constants

Collision Modes

Constant	Value	Description
CollisionModeCircle	1	
CollisionModeRectangle	0	

Display Priorities

Constant	Value	Description
DisplayPriorityDefaultHigh	750	A constant indicating that the item's display priority is high.
DisplayPriorityDefaultLow	250	A constant indicating that the item's display priority is low.
DisplayPriorityRequired	1000	A constant indicating that the item is required.

Drag States

Constant	Value	Description
DragStateCanceling	3	Drag was cancelled.
DragStateDragging	2	Drag is happening.
DragStateEnding	4	Drag is ending.
DragStateNone	0	No dragging.
DragStateStarting	1	Drag is starting.

19.5 class MKCircleMBS

19.5.1 class MKCircleMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The MKCircle class is a concrete overlay object representing a circular area on a map.
Notes: This class manages the data that defines the area and is typically used in conjunction with an MKCircleView object, which handles the drawing of the circular area on a map.
Subclass of the MKShapeMBS class.
Blog Entries

- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

Interfaces: MKOverlayMBS

19.5.2 Methods

19.5.3 boundingMapRect as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The projected rectangle that encompasses the overlay.
Notes: This property contains the smallest rectangle that completely encompasses the overlay. Implementers of this interface must set this area when implementing their overlay class, and after setting it, you must not change it. The rectangle should be specified using projected coordinates—that is, coordinates obtained by projecting the globe onto a two-dimensional surface.

Part of the MKOverlayMBS interface.
See also:

- 19.5.15 boundingMapRect as MKMapRectMBS 690

19.5.4 canReplaceMapContent as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a Boolean indicating whether the overlay content replaces the underlying map content.
Notes: true if the map view can skip the loading and drawing of the underlying map tiles or false if the map tiles should still be drawn.

The map view uses the return value of this method as a hint to determine whether it should load and render its tiles. If your overlay covers its designated region entirely with opaque content, and effectively replaces the content of underlying map tiles, implement this method and return true. Doing so alleviates the need for the map to render its tiles.
If you do not implement this method, or if you return false from it, the map view continues to load and render its tiles.

Part of MKOverlayMBS interface.

19.5.5 circleWithCenterCoordinate(coord as CLLocationCoordinate2DMBS, radius as Double) as MKCircleMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKCircle object using the specified coordinate and radius.
Example:

```
dim mapview as MKMapViewMBS // your map view
dim centerCoordinate as CLLocationCoordinate2DMBS = mapview.centerCoordinate
dim radius as Integer = 300 // 300 meter

dim circle as MKCircleMBS = MKCircleMBS.circleWithCenterCoordinate(centerCoordinate, radius)
mapview.addOverlay circle
```

Notes: coord: The center point of the circle, specified as a latitude and longitude value.
radius: The radius of the circle, measured in meters from the center point.
See also:

- 19.5.6 circleWithCenterCoordinate(Latitude as Double, Longitude as Double, radius as Double) as MKCircleMBS 688

19.5.6 circleWithCenterCoordinate(Latitude as Double, Longitude as Double, radius as Double) as MKCircleMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKCircle object using the specified coordinate and radius.
Notes: Latitude and Longitude: The center point of the circle, specified as a latitude and longitude value.
radius: The radius of the circle, measured in meters from the center point.
See also:

- 19.5.5 circleWithCenterCoordinate(coord as CLLocationCoordinate2DMBS, radius as Double) as MKCircleMBS 688

19.5.7 circleWithMapRect(mapRect as MKMapRectMBS) as MKCircleMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates new circle object with given rectangle.

19.5.8 Constructor(coord as CLLocationCoordinate2DMBS, radius as Double)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKCircle object using the specified coordinate and radius.
Notes: coord: The center point of the circle, specified as a latitude and longitude value.
radius: The radius of the circle, measured in meters from the center point.
See also:

- 19.5.9 Constructor(Handle as Integer) 689
- 19.5.10 Constructor(Latitude as Double, Longitude as Double, radius as Double) 689
- 19.5.11 Constructor(mapRect as MKMapRectMBS) 690

19.5.9 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKCircle reference from a declare.
The object is retained.
See also:

- 19.5.8 Constructor(coord as CLLocationCoordinate2DMBS, radius as Double) 689
- 19.5.10 Constructor(Latitude as Double, Longitude as Double, radius as Double) 689
- 19.5.11 Constructor(mapRect as MKMapRectMBS) 690

19.5.10 Constructor(Latitude as Double, Longitude as Double, radius as Double)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKCircle object using the specified coordinate and radius.
Notes: Latitude and Longitude: The center point of the circle, specified as a latitude and longitude value.
radius: The radius of the circle, measured in meters from the center point.
See also:

19.5.11 Constructor(mapRect as MKMapRectMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates new circle object with given rectangle.
See also:

19.5.12 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.
See also:

19.5.13 intersectsMapRect(mapRect as MKMapRectMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Whether this overlay intersects with the given map rectangle.
Notes: Part of the MKOverlayMBS interface.

19.5.14 Properties

19.5.15 boundingMapRect as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The projected rectangle that encompasses the overlay.
Notes: This property contains the smallest rectangle that completely encompasses the overlay. Implementers of this interface must set this area when implementing their overlay class, and after setting it, you

must not change it. The rectangle should be specified using projected coordinates—that is, coordinates obtained by projecting the globe onto a two-dimensional surface.

Part of the MKOverlayMBS interface.
(Read only property)
See also:

- 19.5.3 boundingMapRect as MKMapRectMBS 687

19.5.16 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The center point of the circular area, specified as a latitude and longitude.
Notes: (Read only property)
See also:

- 19.5.12 coordinate as CLLocationCoordinate2DMBS 690

19.5.17 radius as Double

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The radius of the circular area, measured in meters.
Notes: (Read only property)

19.6 class MKCircleRendererMBS

19.6.1 class MKCircleRendererMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The visual representation for a circular overlay.
Notes: This renderer fills and strokes the circular region represented by the overlay object. You can change the color and other drawing attributes of the circle by modifying the properties inherited from the parent class. You typically use this class as is and do not subclass it.

You create an instance of this class in your map view rendererForOverlay event.
Subclass of the MKOverlayPathRendererMBS class.
Blog Entries

- MapKit Framework for Xojo

19.6.2 Methods

19.6.3 Constructor(Circle as MKCircleMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a new overlay view using the specified circle overlay object.
Notes: circle: The circle overlay containing the information about the circular area to be drawn. The renderer maintains a strong reference to the object you provide. This parameter must not be nil.
See also:

- 19.6.4 Constructor(Handle as Integer) 692

19.6.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKCircleRenderer reference from a declare.
The object is retained.
See also:

- 19.6.3 Constructor(Circle as MKCircleMBS) 692

19.6.5 Properties

19.6.6 circle as MKCircleMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The circle overlay object that contains the information used to draw the overlay.
Notes: (Read only property)

19.7 class MKClusterAnnotationMBS

19.7.1 class MKClusterAnnotationMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: An annotation that groups two or more distinct annotations into a single entity.
Notes: A cluster annotation object stands in for the group of annotations. Cluster views promote legibility of the underlying annotations by displaying a single annotation whose title is taken from one annotation and whose subtitle indicates how many additional annotations belong to the group.

MapKit automatically creates cluster annotations when two or more annotation views become grouped too closely together on the map surface. To customize the cluster annotations displayed on your map, implement the clusterAnnotationForMemberAnnotations event in your map's control.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 19.1, pages 87 to 89: Maps Part 8, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 19.1, pages 82 to 83: Maps Part 8, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, page 80: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, pages 74 to 77: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.5, pages 85 to 87: Maps (Part 6), A deep dive into Annotations by Markus Winter

Interfaces: MKAnnotationMBS

19.7.2 Methods

19.7.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.7.4 Constructor(Handle as Integer) 695
- 19.7.5 Constructor(memberAnnotations() as MKAnnotationMBS) 695

19.7.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKClusterAnnotation reference from a declare.
The object is retained.
See also:

- 19.7.3 Constructor 694
- 19.7.5 Constructor(memberAnnotations() as MKAnnotationMBS) 695

19.7.5 Constructor(memberAnnotations() as MKAnnotationMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes the cluster annotations with the specified individual annotations.
Notes: memberAnnotations: The annotations to group together as a single entity.

Returns an initialized MKClusterAnnotationMBS object or nil if the object could not be created.
See also:

- 19.7.3 Constructor 694
- 19.7.4 Constructor(Handle as Integer) 695

19.7.6 Coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.7.7 memberAnnotations as MKAnnotationMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The annotations that are grouped together by the cluster.

19.7.8 SetCoordinate(newCoordinate as CLLocationCoordinate2DMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Set the coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.7.9 SubTitle as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKOverlayMBS interface.
See also:

- 19.7.13 SubTitle as String 696

19.7.10 Title as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
See also:

- 19.7.14 Title as String 697

19.7.11 Properties

19.7.12 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The internal object reference.
Notes: (Read and Write property)

19.7.13 SubTitle as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKOverlayMBS interface.
(Read and Write property)
See also:

- 19.7.9 SubTitle as String 696

19.7.14 Title as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
(Read and Write property)
See also:

- 19.7.10 Title as String 696

19.8 class MKCoordinateRegionMBS

19.8.1 class MKCoordinateRegionMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: A structure that defines which portion of the map to display.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 18.6, page 74: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.3, page 79: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter

19.8.2 Methods

19.8.3 Constructor(center as CLLocationCoordinate2DMBS, span as MKCoordinateSpanMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor to initialize an object of this class.

19.8.4 MakeWithDistance(center as CLLocationCoordinate2DMBS, latitudinalMeters as double, longitudinalMeters as double) as MKCoordinateRegionMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a region with given center and size.

19.8.5 Properties

19.8.6 center as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The center point of the region.
Notes: (Read and Write property)

19.8.7 span as MKCoordinateSpanMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The horizontal and vertical span representing the amount of map to display.
Notes: The span also defines the current zoom level used by the map view object.
(Read and Write property)

19.9 class MKCoordinateSpanMBS

19.9.1 class MKCoordinateSpanMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: A structure that defines the area spanned by a map region.
Notes: You use the delta values in this structure to indicate the desired zoom level of the map, with smaller delta values corresponding to a higher zoom level.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 18.6, page 74: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

19.9.2 Methods

19.9.3 Constructor(latitudeDelta as Double, longitudeDelta as Double)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor to initialize this class.

19.9.4 Properties

19.9.5 latitudeDelta as Double

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The amount of north-to-south distance (measured in degrees) to display on the map.
Notes: Unlike longitudinal distances, which vary based on the latitude, one degree of latitude is always approximately 111 kilometers (69 miles).
(Read and Write property)

19.9.6 longitudeDelta as Double

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The amount of east-to-west distance (measured in degrees) to display for the map region.
Notes: The number of kilometers spanned by a longitude range varies based on the current latitude. For

example, one degree of longitude spans a distance of approximately 111 kilometers (69 miles) at the equator but shrinks to 0 kilometers at the poles.
(Read and Write property)

19.10 class MKCustomAnnotationMBS

19.10.1 class MKCustomAnnotationMBS

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The class for a custom MKAnnotationMBS.
Notes: As MKAnnotationMBS is an interface, you need a Cocoa class to implement coordinate, title and subtitle properties.
So you can subclass this class if you like.
Blog Entries

- MBS Xojo Plugins, version 19.2pr1

Interfaces: MKAnnotationMBS

19.10.2 Methods

19.10.3 Constructor

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

- 19.10.4 Constructor(Handle as Integer) 702

19.10.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKCustomAnnotation reference from a declare.
The object is retained.
See also:

- 19.10.3 Constructor 702

19.10.5 Coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.10.6 SetCoordinate(newCoordinate as CLLocationCoordinate2DMBS)

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: Set the coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.10.7 SubTitle as String

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKAnnotationMBS interface.
See also:

- 19.10.11 subtitle as String 703

19.10.8 Title as String

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
See also:

- 19.10.12 title as String 704

19.10.9 Properties

19.10.10 Handle as Integer

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.10.11 subtitle as String

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKAnnotationMBS interface.

(Read and Write property)
See also:

- 19.10.7 SubTitle as String 703

19.10.12 title as String

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
(Read and Write property)
See also:

- 19.10.8 Title as String 703

19.11 class MKCustomOverlayMBS

19.11.1 class MKCustomOverlayMBS

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The class for a custom overlay.
Blog Entries

- MBS Xojo Plugins, version 19.2pr1

Xojo Developer Magazine

- 17.5, page 54: Maps (Part 1), Implementing Maps in Xojo desktop apps with the MapKitMBS plug-in by Markus Winter

Interfaces: MKOverlayMBS, MKAnnotationMBS

19.11.2 Methods

19.11.3 boundingMapRect as MKMapRectMBS

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The projected rectangle that encompasses the overlay.
Notes: This property contains the smallest rectangle that completely encompasses the overlay. Implementers of this interface must set this area when implementing their overlay class, and after setting it, you must not change it. The rectangle should be specified using projected coordinates—that is, coordinates obtained by projecting the globe onto a two-dimensional surface.

Part of the MKOverlayMBS interface.

19.11.4 canReplaceMapContent as Boolean

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a Boolean indicating whether the overlay content replaces the underlying map content.
Notes: true if the map view can skip the loading and drawing of the underlying map tiles or false if the map tiles should still be drawn.

The map view uses the return value of this method as a hint to determine whether it should load and render its tiles. If your overlay covers its designated region entirely with opaque content, and effectively replaces the content of underlying map tiles, implement this method and return true. Doing so alleviates the need

for the map to render its tiles.
If you do not implement this method, or if you return false from it, the map view continues to load and render its tiles.

Part of MKOverlayMBS interface.
See also:

- 19.11.14 canReplaceMapContent as Boolean 707

19.11.5 Constructor

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

- 19.11.6 Constructor(Handle as Integer) 706

19.11.6 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKCustomOverlay reference from a declare.
The object is retained.
See also:

- 19.11.5 Constructor 706

19.11.7 Coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The center point of the circular area, specified as a latitude and longitude.

19.11.8 intersectsMapRect(mapRect as MKMapRectMBS) as Boolean

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: Whether this overlay intersects with the given map rectangle.
Notes: Part of the MKOverlayMBS interface.

19.11.9 setBoundingMapRect(m as MKMapRectMBS)

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: Sets boundingMapRect property.

19.11.10 SetCoordinate(newCoordinate as CLLocationCoordinate2DMBS)

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: Set the coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.11.11 SubTitle as String

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKOverlayMBS interface.
See also:

- 19.11.16 subtitle as String 708

19.11.12 Title as String

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
See also:

- 19.11.17 title as String 708

19.11.13 Properties

19.11.14 canReplaceMapContent as Boolean

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: a Boolean indicating whether the overlay content replaces the underlying map content.
Notes: true if the map view can skip the loading and drawing of the underlying map tiles or false if the map tiles should still be drawn.

The map view uses the return value of this method as a hint to determine whether it should load and render its tiles. If your overlay covers its designated region entirely with opaque content, and effectively replaces the content of underlying map tiles, implement this method and return true. Doing so alleviates the need for the map to render its tiles.
If you do not implement this method, or if you return false from it, the map view continues to load and render its tiles.
(Read and Write property)
See also:

- 19.11.4 canReplaceMapContent as Boolean 705

19.11.15 Handle as Integer

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The internal object reference.
Notes: (Read and Write property)

19.11.16 subtitle as String

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKOverlayMBS interface.
(Read and Write property)
See also:

- 19.11.11 SubTitle as String 707

19.11.17 title as String

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
(Read and Write property)
See also:

- 19.11.12 Title as String 707

19.12 class MKCustomOverlayRendererMBS

19.12.1 class MKCustomOverlayRendererMBS

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The renderer for custom overlays.
Notes: A special renderer with events for Xojo.
Subclass of the MKOverlayRendererMBS class.
Blog Entries

- MBS Xojo Plugins, version 19.2pr1

Xojo Developer Magazine

- 17.5, page 54: Maps (Part 1), Implementing Maps in Xojo desktop apps with the MapKitMBS plug-in by Markus Winter

19.12.2 Methods

19.12.3 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKCustomOverlayRenderer reference from a declare.
The object is retained.
See also:

- 19.12.4 Constructor(overlay as MKOverlayMBS) 709

19.12.4 Constructor(overlay as MKOverlayMBS)

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
Notes: The overlay can be any overlay, not just a MKCustomOverlayMBS one.
See also:

- 19.12.3 Constructor(Handle as Integer) 709

19.12.5 Destructor

Plugin Version: 19.2, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

19.12.6 Events

19.12.7 canDrawMapRect(mapRect as MKMapRectMBS, zoomScale as Double) as Boolean

Plugin Version: 19.2, Platform: macOS, Targets: .

Function: Event to return a Boolean value indicating whether the overlay view is ready to draw its content.
Example:

```
Function canDrawMapRect(mapRect as MKMapRectMBS, zoomScale as Double) Handles canDrawMapRect as Boolean
Return True
End Function
```

Notes: mapRect: The map rectangle that needs to be updated.
zoomScale: The current scale factor applied to the map.

Return yes if this overlay renderer is ready to draw its contents on the map or false if it is not.

Overlay renderers can override this method in situations where they may depend on the availability of other information to draw their contents. For example, a renderer showing traffic information might want to delay drawing until it has all of the traffic data it needs. In such a case, it can return NO from this method to indicate that it is not ready. An overlay renderer might also return false if it does not draw content in the specified rectangle.

If you return false from this method, your application is responsible for calling the setNeedsDisplayInMapRect method when the overlay renderer subsequently becomes ready to draw its contents.

The default implementation of this method returns YES.

As callback may come on a thread, MBS Xojo Plugin invokes event on the main thread. For best performance, please make sure your code does not take long time to execute.

19.12.8 DrawMapRect(mapRect as MKMapRectMBS, zoomScale as Double, context as CGContextMBS)

Plugin Version: 19.2, Platform: macOS, Targets: .

Function: The event to draw the overlay,Äôs contents at the specified location on the map.
Example:

```
Sub DrawMapRect(mapRect as MKMapRectMBS, zoomScale as Double, context as CGContextMBS) Handles DrawMapRect
// change coordinate system to show just our area
Dim rect As CGRectMBS = Self.RectForMapRect(overlay.boundingMapRect)
context.ScaleCTM(1.0, -1.0)
context.TranslateCTM(0.0, -rect.size.height)

// and fill it all in red
context.SetRGBFillColor 1,0,0,0.3
context.FillRect rect

context.Flush
End Sub
```

Notes: mapRect: The map rectangle that needs to be updated. Your drawing code should avoid drawing outside of this rectangle.
zoomScale: The current zoom factor applied to the map content. You can use this value for configuring the stroke width of lines or other attributes that might be affected by the scale of the map,Äôs contents.
context: The graphics context to use for drawing the overlay,Äôs contents.

The default implementation of this method does nothing. Subclasses are expected to implement this event and use it to draw the overlay,Äôs contents.

When determining where to draw content, make your initial calculations relative to the map itself. In other words, compute the position and size of any overlay content using map points and map rectangles, convert those values to regular CGPoint and CGRect types using the methods of this class, and then pass the converted points to any drawing primitives.
It is recommended that you use Core Graphics to draw any content for your overlays.

To improve drawing performance, the map view may divide your overlay into multiple tiles and render each one on a separate thread.

As callback may come on a thread, MBS Xojo Plugin invokes event on the main thread. For best performance, please make sure your code does not take long time to execute.

19.13 class MKDirectionsMBS

19.13.1 class MKDirectionsMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A utility object that computes directions and travel-time information based on the route information you provide.
Notes: You use an MKDirections object to ask the Apple servers to provide walking or driving directions for a route, which you specify using an MKDirectionsRequestMBS object. After making a request, MapKit delivers the results asynchronously to the completion handler that you provide. You can also get the estimated travel time for the route.

Each MKDirectionsMBS object handles a single request for directions, although you can cancel and restart that request as needed. You can create multiple instances of this class and process different route requests at the same time, but you should make requests only when you plan to present the corresponding route information to the user. Apps may receive a MKErrorLoadingThrottled error if too many requests have been made from the current device in too short a time period.
Blog Entries

- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

19.13.2 Methods

19.13.3 calculateDirections(tag as variant = nil)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Begins calculating the requested route information asynchronously.
Notes: Calls calculateDirectionsCompleted event later.

This method initiates the request for directions and calls your calculateDirectionsCompleted event with the results. The implementation of your event handler should check for errors and then incorporate the response data as appropriate.

If you call this method while a previous request is in process, this method calls your event with an error. You can determine if a request is in process by checking the value of the calculating property. You can also cancel a request as needed.

19.13.4 calculateETA(tag as variant = nil)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Begins calculating the requested travel-time information asynchronously.
Notes: This method initiates a request for a travel-time estimate and calls your calculateETAWithCompleted event handler block with the results. Travel-time estimates take much less time to generate than directions, so use this method in situations where you want a time estimate only. The implementation of your handler should check for errors and then incorporate the response data as appropriate.

If you call this method while a previous request is in process, this method calls your event handler with an error. You can determine if a request is in process by checking the value of the calculating property. You can also cancel a request as needed.

19.13.5 cancel

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Cancels a pending request.
Notes: After canceling a request, you can call the calculateDirections method again (if you want) to restart the request process.

19.13.6 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKDirections reference from a declare.
The object is retained.
See also:

- 19.13.7 Constructor(request as MKDirectionsRequestMBS) 713

19.13.7 Constructor(request as MKDirectionsRequestMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a directions object using the specified request.
Notes: request: The request object containing the start and end points of the route. This parameter must not be nil.

After initializing your directions object, you must call the calculateDirections or calculateETA method to perform the request.

See also:

- 19.13.6 Constructor(Handle as Integer) 713

19.13.8 Destructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

19.13.9 Properties

19.13.10 Calculating as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether a request is currently in process.
Notes: (Read only property)

19.13.11 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.13.12 Request as MKDirectionsRequestMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The request used to create this object.
Notes: (Read only property)

19.13.13 Events

19.13.14 calculateDirectionsCompleted(response as MKDirectionsResponseMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: The event called when calculateDirections method finished.
Notes: This event takes three parameters:

- The response parameter contains the route information for the request. If an error occurred or no route could be determined, this parameter is nil.
- The error parameter contains information about any errors that occurred. If no errors occurred, this parameter is nil.
- The tag passed to the method.

The implementation of your block should check for a value in the error parameter and, if that parameter is nil, incorporate the route information provided in the response parameter.

19.13.15 calculateETAWithCompleted(response as MKETAResponseMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: Event called by calculateETA when method is done.

19.14 class MKDirectionsRequestMBS

19.14.1 class MKDirectionsRequestMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The start and end points of a route, along with the planned mode of transportation.
Notes: You use an MKDirectionsRequestMBS object when requesting or providing directions. If your app provides directions, use this class to decode the URL sent to you by Maps. If you need to request directions from Apple, pass an instance of this class to an MKDirections object. For example, an app that provides subway directions might request walking directions to and from relevant subway stations.

For apps that provide directions, you receive direction-related URLs in your app delegate,Äôs application:openURL:sourceApplication:annotation: method. Upon receiving a URL, call the isDirectionsRequestURL method of this class to determine if the URL is related to routing directions. If it is, create an instance of this class using the provided URL and extract the map items associated with the start and end points.

To provide routing directions, your app must include special keys in its Info.plist file and be able to handle URLs sent to it by the Maps app. These keys indicate a special URL type that your app must be prepared to handle. For information about how to implement this support, see Location and Maps Programming Guide.
Blog Entries

- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

19.14.2 Methods

19.14.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The construtor.
See also:

- 19.14.4 Constructor(Handle as Integer) 716
- 19.14.5 Constructor(URL as string) 717

19.14.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKDirectionsRequest reference from a declare.
The object is retained.
See also:

- 19.14.3 Constructor 716
- 19.14.5 Constructor(URL as string) 717

19.14.5 Constructor(URL as string)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a directions request object using the specified URL.
Notes: You should use the isDirectionsRequestURL method to verify that the specified URL is of the correct format before calling this method to initialize the object.
See also:

- 19.14.3 Constructor 716
- 19.14.4 Constructor(Handle as Integer) 716

19.14.6 isDirectionsRequestURL(URL as string) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a Boolean indicating whether the specified URL contains a directions request.
Notes: True if the URL contains a directions request that your app should display to the user or false if it does not.

19.14.7 Properties

19.14.8 arrivalDate as Date

Plugin Version: 19.0, Platform: macOS, Targets: Desktop only.

Function: The arrival date for the trip.
Notes: Specifying an arrival date provides the server with extra information that it can use to optimize the returned routes. For example, for a trip that takes place during commute hours, the server might consider alternatives to routes that are typically congested at that time.
The use of this property is optional.
(Read and Write property)

19.14.9 arrivalDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: Desktop & iOS.

Function: The arrival date for the trip.
Notes: Specifying an arrival date provides the server with extra information that it can use to optimize the returned routes. For example, for a trip that takes place during commute hours, the server might consider alternatives to routes that are typically congested at that time.
The use of this property is optional.
(Read and Write property)

19.14.10 departureDate as Date

Plugin Version: 19.0, Platform: macOS, Targets: Desktop only.

Function: The departure date for the trip.
Notes: Specifying a departure date provides the server with extra information that it can use to optimize the returned routes. For example, for a trip that takes place during commute hours, the server might consider alternatives to routes that are typically congested at that time.
The use of this property is optional.
(Read and Write property)

19.14.11 departureDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: Desktop & iOS.

Function: The departure date for the trip.
Notes: Specifying a departure date provides the server with extra information that it can use to optimize the returned routes. For example, for a trip that takes place during commute hours, the server might consider alternatives to routes that are typically congested at that time.
The use of this property is optional.
(Read and Write property)

19.14.12 destination as MKMapItemMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The end point for routing directions.
Notes: (Read and Write property)

19.14.13 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.14.14 requestsAlternateRoutes as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean indicating whether your app wants multiple routes when they are available.
Notes: When this property is set to false, the server returns a single route between the start and end points. When this property is YES, the server may return additional routes for the user to follow. The server returns additional routes only if they are available and represent a reasonable path that the user might take.
The default value of this property is false.
(Read and Write property)

19.14.15 source as MKMapItemMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The starting point for routing directions.
Notes: (Read and Write property)

19.14.16 transportType as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The type of conveyance to which the directions should apply.
Notes: You can use this property to specify whether you want directions suited to a particular type of transportation. For example, you can use this to specify that you want walking directions or driving directions.
The default value of this property is TransportTypeAny.
(Read and Write property)

19.14.17 Constants

Transport Types

Constant	Value	Description
TransportTypeAny	&h0FFFFFFF	Directions suitable for any transportation option.
TransportTypeAutomobile	1	Directions suitable for use while driving.
TransportTypeTransit	3	Directions suitable for public transportation.
TransportTypeWalking	2	Directions suitable for a pedestrian.

19.15 class MKDirectionsResponseMBS

19.15.1 class MKDirectionsResponseMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The route information returned by Apple servers in response to one of your requests for directions.
Notes: You do not create instances of this class directly. Instead, you initiate a request for directions by calling the calculateDirection method of an MKDirectionsMBS object. The calculateDirectionCompleted event handler receives an MKDirectionsResponseMBS object with the results.
Blog Entries

- MapKit Framework for Xojo

19.15.2 Methods

19.15.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.15.4 Constructor(Handle as Integer) 721

19.15.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKDirectionsResponse reference from a declare.
The object is retained.
See also:

- 19.15.3 Constructor 721

19.15.5 routes as MKRouteMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: An array of route objects representing the directions between the start and end points.
Notes: The array contains one or more MKRouteMBS objects, each of which represents a possible set of directions for the user to follow. If you did not request alternate routes in the original directions request, this array contains at most one object.
Each route object contains geometry information that you can use to display that route on your app,Äôs

map view. Routes may also contain additional information that is relevant to that particular route, such as the expected travel time and any trip advisory notices.

19.15.6 Properties

19.15.7 destination as MKMapItemMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The end point of the route.
Notes: The item in this property may contain additional details that were not included in the original item used to create the MKDirectionsRequestMBS object.
(Read only property)

19.15.8 firstRoute as MKRouteMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The first route.
Notes: Mainly for debugging, so you can see the routes in debugger.
(Read only property)

19.15.9 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.15.10 routeCount as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Number of routes.
Notes: (Read only property)

19.15.11 source as MKMapItemMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The start point of the route.
Notes: The item in this property may contain additional details that were not included in the original item used to create the MKDirectionsRequestMBS object.
(Read only property)

19.15.12 Constants

Transport Types

Constant	Value	Description
TransportTypeAny	&h0FFFFFFF	Directions suitable for any transportation option.
TransportTypeAutomobile	1	Directions suitable for use while driving.
TransportTypeTransit	3	Directions suitable for public transportation.
TransportTypeWalking	2	Directions suitable for a pedestrian.

19.16 class MKDistanceFormatterMBS

19.16.1 class MKDistanceFormatterMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A utility object that converts between a geographic distance and a string-based expression of that distance.
Example:

```
dim f as new MKDistanceFormatterMBS

f.Units = f.UnitsMetric
f.UnitStyle = f.UnitStyleFull

MsgBox f.stringFromDistance(1234.56)
```

Notes: You use a distance formatter when you need to display distances to the user or when you want to parse user-specified text to obtain a numerical value for a distance. When formatting strings containing distances, a distance formatter object takes into account the user,Äôs locale and language settings. You can also specify a custom locale or custom units for any distances that you format.
Blog Entries

- MapKit Framework for Xojo

19.16.2 Methods

19.16.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

- 19.16.4 Constructor(Handle as Integer) 724

19.16.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKDistanceFormatter reference from a declare.
The object is retained.
See also:

19.16.5 distanceFromString(distance as String) as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the distance value parsed from the specified string.
Notes: distance: A formatted string that specifies a distance.

Returns the distance value represented by the string or -1.0 if the string does not contain a recognized distance value.

This method searches the provided string for a number that could represent a distance. Distances must be specified as purely numerical values. Do not specify distances as fractions such as "1/4 mile".

19.16.6 formatter as MKDistanceFormatterMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The singelton instance for easy use.
Example:

```
// shows e.g. 1,2km
// depending on the locale
MsgBox MKDistanceFormatterMBS.formatter.stringFromDistance(1234)
```

Notes: The plugin keeps an object, so you get the same one everytime and you can reuse it often.

19.16.7 stringFromDistance(distance as Double) as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a string representation of the specified distance.
Notes: distance: The distance value that you want to convert to a string.

Returns a user-readable string that describes the distance based on the formatter settings.

19.16.8 Properties

19.16.9 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.16.10 Locale as NSLocaleMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The locale to use when formatting strings.
Notes: If you do not specify an explicit locale, the formatter uses the user,Äôs current locale information.
(Read and Write property)

19.16.11 Units as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The measuring system (imperial or metric) to use for units.
Notes: You can use this property to explicitly set the measuring system for units. The default value of this property is UnitsDefault, which bases the measuring system on the user,Äôs locale.
(Read and Write property)

19.16.12 UnitStyle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The preferred style for units.
Notes: Units can be abbreviated or fully spelled out. The default value of this property is UnitStyleDefault, which bases the style on the user,Äôs locale and language settings.
(Read and Write property)

19.16.13 Constants

Units

Constant	Value	Description
UnitsDefault	0	The format uses the locale information to determine which units to use. Some locales mix metric and imperial units so do not assume this means one or the other.
UnitsImperial	2	The format uses imperial units.
UnitsImperialWithYards	3	The format uses imperial units that include measurements in yards.
UnitsMetric	1	The format uses metric units.

Util Styles

Constant	Value	Description
UnitStyleAbbreviated	1	Use abbreviated units. For example, use the abbreviation km instead of kilometer.
UnitStyleDefault	0	The decision to abbreviate is based on the current locale and user language settings.
UnitStyleFull	2	Spell out units in full. For example, use kilometer instead of the abbreviation km.

19.17 class MKETAResponseMBS

19.17.1 class MKETAResponseMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The travel-time information returned by Apple servers.
Notes: You do not create instances of this class directly. Instead, you initiate a request for the travel time by calling the calculateETA method of an MKDirectionsMBS object. The completion event handler receives an MKETAResponseMBS object with the results.
Blog Entries

- MapKit Framework for Xojo

19.17.2 Methods

19.17.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.17.4 Constructor(Handle as Integer) 728

19.17.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKETAResponse reference from a declare.
The object is retained.
See also:

- 19.17.3 Constructor 728

19.17.5 Properties

19.17.6 destination as MKMapItemMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The end point of the route.
Notes: The item in this property may contain additional details that were not included in the original item

used to create the MKDirectionsRequestMBS object.
(Read only property)

19.17.7 distance as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The expected travel distance, in meters.
Notes: This property contains the overall distance traversed by the route.
(Read only property)

19.17.8 expectedArrivalDate as Date

Plugin Version: 19.0, Platform: macOS, Targets: Desktop only.

Function: The expected arrival time.
Notes: The value of this property is dependent on whether you specified a departure date or arrival date in your MKDirectionsRequestMBS object. If you specified a departure date, the date in this property is computed by starting at your departure date and adding the expected travel time. If you specified an arrival time but not a departure date, this property is set to your arrival time. If you did not specify an arrival date or departure date, this property is set to the date computed by adding the travel time to the current time.
(Read only property)

19.17.9 expectedArrivalDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: Desktop & iOS.

Function: The expected arrival time.
Notes: The value of this property is dependent on whether you specified a departure date or arrival date in your MKDirectionsRequestMBS object. If you specified a departure date, the date in this property is computed by starting at your departure date and adding the expected travel time. If you specified an arrival time but not a departure date, this property is set to your arrival time. If you did not specify an arrival date or departure date, this property is set to the date computed by adding the travel time to the current time.
(Read only property)

19.17.10 expectedDepartureDate as Date

Plugin Version: 19.0, Platform: macOS, Targets: Desktop only.

Function: The expected departure time.
Notes: The value of this property is dependent on whether you specified a departure date or arrival date in

your MKDirectionsRequestMBS object. If you specified a departure date, that date is copied to this property. If you specified an arrival date but not a departure date, the departure date is computed by subtracting the expected travel time from your arrival date. If you did not specify an arrival date or departure date, this property is set to the current time.
(Read only property)

19.17.11 expectedDepartureDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: Desktop & iOS.

Function: The expected departure time.
Notes: The value of this property is dependent on whether you specified a departure date or arrival date in your MKDirectionsRequestMBS object. If you specified a departure date, that date is copied to this property. If you specified an arrival date but not a departure date, the departure date is computed by subtracting the expected travel time from your arrival date. If you did not specify an arrival date or departure date, this property is set to the current time.
(Read only property)

19.17.12 expectedTravelTime as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The expected travel time in seconds.
Notes: The expected travel time reflects the time it takes to traverse the route, taking expected traffic into account. The actual amount of time may vary based on changes in traffic and other travel conditions.
(Read only property)

19.17.13 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.17.14 source as MKMapItemMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The start point of the route.
Notes: This item in this property may contain additional details that were not included in the original item used to create the MKDirectionsRequestMBS object.

(Read only property)

19.17.15 transportType as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The type of conveyance used to determine the travel time.
Notes: You specify the desired transportation type in your MKDirectionsRequestMBS object. If you specified TransportTypeAny, this property contains the transportation type used to generate the estimated information.
(Read only property)

19.17.16 Constants

Transport Types

Constant	Value	Description
TransportTypeAny	&h0FFFFFFF	Directions suitable for any transportation option.
TransportTypeAutomobile	1	Directions suitable for use while driving.
TransportTypeTransit	3	Directions suitable for public transportation.
TransportTypeWalking	2	Directions suitable for a pedestrian.

19.18 class MKGeodesicPolylineMBS

19.18.1 class MKGeodesicPolylineMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A line-based shape that follows the contours of the Earth to create the shortest path between the specified points.
Notes: A geodesic polyline contains a set of points that are connected end-to-end in the order that you provide them. The first and last points are not automatically connected to each other. When displayed on a two-dimensional map view, the line segment between any two points may appear curved.
Subclass of the MKPolylineMBS class.
Blog Entries

- MapKit Framework for Xojo

19.18.2 Methods

19.18.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.18.4 Constructor(coords() as CLLocationCoordinate2DMBS) 732
- 19.18.5 Constructor(Handle as Integer) 733
- 19.18.6 Constructor(points() as MKMapPointMBS) 733

19.18.4 Constructor(coords() as CLLocationCoordinate2DMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns a geodesic polyline using the specified coordinates.
Notes: coords: The array of coordinates that define the path.

Returns a new geodesic polyline object.
See also:

- 19.18.3 Constructor 732
- 19.18.5 Constructor(Handle as Integer) 733
- 19.18.6 Constructor(points() as MKMapPointMBS) 733

19.18.5 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKGeodesicPolyline reference from a declare.
The object is retained.
See also:

- 19.18.3 Constructor 732
- 19.18.4 Constructor(coords() as CLLocationCoordinate2DMBS) 732
- 19.18.6 Constructor(points() as MKMapPointMBS) 733

19.18.6 Constructor(points() as MKMapPointMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns a geodesic polyline using the specified map points.
Notes: points: The array of map points that define the path.

Returns a new geodesic polyline object.
See also:

- 19.18.3 Constructor 732
- 19.18.4 Constructor(coords() as CLLocationCoordinate2DMBS) 732
- 19.18.5 Constructor(Handle as Integer) 733

19.18.7 polylineWithCoordinates(coords() as CLLocationCoordinate2DMBS) as MKGeodesicPolylineMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns a geodesic polyline using the specified coordinates.
Notes: coords: The array of coordinates that define the path.

Returns a new geodesic polyline object.

19.18.8 polylineWithPoints(points() as MKMapPointMBS) as MKGeodesicPolylineMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns a geodesic polyline using the specified map points.
Notes: points: The array of map points that define the path.

Returns a new geodesic polyline object.

19.19 class MKLocalSearchCompleterMBS

19.19.1 class MKLocalSearchCompleterMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A utility object for generating a list of completion strings based on a partial search string that you provide.
Notes: You use an MKLocalSearchCompleter object to retrieve auto-complete suggestions for your own map-based search controls. As the user types text, you feed the current text string into the search completer object, which delivers possible string completions that match locations or points of interest.

You create and configure MKLocalSearchCompleterMBS objects yourself. You should subclass this class to fill the event handler. You should also specify a search region to restrict results to a designated area.

Update the value of the completer,Äôs queryFragment property to begin a search query. You can update this property in real time as the user types new characters into a text field because the completer object waits a short amount of time for the query string to stabilize. When modifications to the query strong stop, the completer initiates a new search and returns the results to your delegate as an array of MKLocalSearch-CompletionMBS objects.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 17.6, page 36: Maps Part 2, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

19.19.2 Methods

19.19.3 cancel

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Cancels an in-progress search operation.
Notes: If a search operation is currently in progress, this method attempts to cancels it. If cancellation is successful, the search completer does not notify its delegate. If no search operation is in progress, this method does nothing.

19.19.4 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.

19.19.5 Destructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

19.19.6 results as MKLocalSearchCompletionMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The most recently received search completions.
Notes: This property is nil initially. After a successful query, the property is set to the array of MKLocalSearchCompletionMBS objects returned by that query. Each new successful query replaces the previous value of this property.

19.19.7 Properties

19.19.8 filterType as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The filter options for the search results.
Notes: Use this property to determine whether you want completions that represent points-of-interest or whether completions might yield additional relevant query strings.
(Read and Write property)

19.19.9 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.19.10 QueryFragment as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The search string for which you want completions.
Notes: Assigning a string to this property initiates a search based on that string. The completer object waits a short amount of time before initiating new searches. This delay gives you enough time to update the search string based on typed input from the user. For example, if you are using a text field to manage the input from the user, you could use the TextChange event to update the value of this property.
(Read and Write property)

19.19.11 region as MKCoordinateRegionMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The region that defines the geographic scope of the search.
Notes: Use this property to limit search results to the specified geographic area. The default value of this property is a region that spans the entire world.
(Read and Write property)

19.19.12 Searching as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether a search operation is in progress.
Notes: (Read only property)

19.19.13 Events

19.19.14 DidFailWithError(error as NSErrorMBS)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: Called when the specified search completer is unable to generate a list of search results.
Notes: completer: The search completer object reporting the error.
error: The error object containing the reason for the failure.

Use this object to process any errors that occurred while generating search results. Even when an error occurs, the search completer starts a new search if it already has a new search string. Depending on the error, you might do nothing or let the user know that you were unable to obtain a list of search completions.

19.19.15 DidUpdateResults

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: Called when the specified search completer updates its array of search completions.
Notes: After receiving results from a query, the search completer updates its results property with the new MKLocalSearchCompletionMBS objects and calls this method. Use this method to update your app,Äôs interface based on the new search results. For example, you might update a table that you use to display search results to the user.

19.19.16 Constants

Filter Types

Constant	Value	Description
FilterTypeLocationsAndQueries	0	Points of interest and query suggestions. Specify this value when you want both map-based points of interest and common query terms used to find locations. For example, the search string ,Äúcof,Äù yields a completion for ,Äúcoffee,Äù.
FilterTypeLocationsOnly	1	Points of interest only. Specify this value when you want the search string to yield completions that correspond to a specific point-of-interest on the map.

19.20 class MKLocalSearchCompletionMBS

19.20.1 class MKLocalSearchCompletionMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A fully formed string that completes a partial string.
Notes: You do not create instances of this class directly. Instead, you use an MKLocalSearchCompleterMBS to initiate a search based on a set of partial search strings. That object stores any matches in its results property. Retrieve any MKLocalSearchCompletionMBS objects from that property and display the search terms in your interface or use one to initiate a search for content based on that search term.

When displaying text completions for a partial search term in your user interface, you might want to use a bold version of a font or add some other highlighting to the portion of the completion string that caused it to match the partial search term. To help you add this styling, the completion object includes highlight ranges for the title and subtitle strings.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 18.3, page 77: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter
- 18.3, page 74: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter
- 17.6, page 36: Maps Part 2, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

19.20.2 Methods

19.20.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructors.

19.20.4 subtitleHighlightRanges as NSRangeMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The ranges of characters to highlight in the subtitle string.
Notes: This property contains an array of NSRangeMBS objects, each defining a range of characters in the subtitle string. Use this property to identify the ranges of characters in the subtitle string that you should highlight. Highlighting the matching text of a search completion is optional, but does provide helpful information to the user and is recommended.

Zerobased ranges.

19.20.5 titleHighlightRanges as NSRangeMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The ranges of characters to highlight in the title string.
Notes: This property contains an array of NSRangeNBS objects, each defining a range of characters in the title string. Use this property to identify the ranges of characters in the title string that you should highlight. Highlighting the matching text of a search completion is optional, but does provide helpful information to the user and is recommended.

Range is zero based.

19.20.6 Properties

19.20.7 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.20.8 subtitle as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle (if any) associated with the point-of-interest.
Notes: The string in this property may be empty.
(Read only property)

19.20.9 title as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The title string associated with the point-of-interest.
Notes: This string is guaranteed not to be empty.
(Read only property)

19.21 class MKLocalSearchMBS

19.21.1 class MKLocalSearchMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A utility object for initiating map-based searches and processing the results.
Notes: Use an MKLocalSearchMBS object to execute a single search request. You might use this class to search for addresses or points of interest on the map. Upon completion of the request, the object delivers the results to the SearchFinished event handler that you provide.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 17.6, page 34: Maps Part 2, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

19.21.2 Methods

19.21.3 cancel

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Cancels an in-progress search operation.
Notes: If no search operation is in progress, this method does nothing.

19.21.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKLocalSearch reference from a declare.
The object is retained.
See also:

- 19.21.5 Constructor(request as MKLocalSearchRequestMBS) 742

19.21.5 Constructor(request as MKLocalSearchRequestMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a search object configured with the specified parameters.
Notes: request: The search request information. This parameter must not be nil.

This method stores a copy of the object in the request parameter. So any changes you make to your request object after calling this method are ignored.
See also:

- 19.21.4 Constructor(Handle as Integer) 742

19.21.6 Start(tag as variant = nil)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Starts the search and delivers the results to the specified completion handler.
Notes: Triggers SearchFinished event later.

You use this method to initiate a map-based search operation. The search runs until the results are delivered, at which point the specified completion handler is called.
You should call this method only once to start the search operation. Calling this method while the search is running does not stop the original search operation from finishing. However, for each subsequent call, the search object executes your completion handler and passes an error object to it.
The provided completion handler is always executed on your app,Äôs main thread. The local search object keeps a reference to the completion handler block until the results (or an error) are delivered, at which point it relinquishes that reference.

19.21.7 Properties

19.21.8 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.21.9 Searching as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean indicating whether the search is currently in progress.
Notes: The value of this property is set to true when a search is initiated and remains in that state until the search results (or an appropriate error) are delivered, at which time the property is set to false.
(Read only property)

19.21.10 Events

19.21.11 SearchFinished(response as MKLocalSearchResponseMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: The event handler that processes the results. This parameter must not be nil.
Notes: Called by Start asynchronously.

19.22 class MKLocalSearchRequestMBS

19.22.1 class MKLocalSearchRequestMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The parameters to use when searching for points of interest on the map.
Notes: You create an MKLocalSearchRequest object when you want to search for map locations based on a natural language string. For example, if your interface allows the user to type in addresses, you would place the typed text in this object and pass it to an MKLocalSearch object to begin the search process. When specifying your search strings, include a map region to narrow the search results to the specified geographical area.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 18.3, page 77: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter

19.22.2 Methods

19.22.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

19.22.4 Constructor(completion as MKLocalSearchCompletionMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a search request based on the specified search completion data.
Notes: completion: A search completion object obtained from an MKLocalSearchCompleterMBS object. The search request uses the provided object to set the value of the naturalLanguageQuery property.

Use this method when initializing your object from MKLocalSearchCompleterMBS objects. You do not need to use this method if you intend to provide the search string and region information yourself.
See also:

19.22.5 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKLocalSearchRequest reference from a declare.
The object is retained.
See also:

19.22.6 Copy as MKLocalSearchRequestMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a copy of the request.

19.22.7 Properties

19.22.8 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.22.9 naturalLanguageQuery as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A string containing the desired search item.
Notes: You specify this parameter as a string describing the map-based item you want to look for. The text is equivalent to what the user would type in a search field in the Maps app. For example, the text might contain all or part of an address or it might contain the name of a point of interest.
(Read and Write property)

19.22.10 region as MKCoordinateRegionMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A map region that provides a hint as to where to search.
Notes: You can use this parameter to narrow the list of search results to those inside or close to the specified region. Specifying a region does not guarantee that the results will all be inside the region. It is merely a hint to the search engine.
(Read and Write property)

19.23 class MKLocalSearchResponseMBS

19.23.1 class MKLocalSearchResponseMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The results from a map-based search.
Notes: You do not create instances of this class directly. After initiating a map search using an MKLocalSearchMBS object, MapKit passes an instance of this class to your event handler.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 18.3, page 80: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter
- 18.3, page 72: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter
- 17.6, page 35: Maps Part 2, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

19.23.2 Methods

19.23.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.23.4 Constructor(Handle as Integer) 748

19.23.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKLocalSearchResponse reference from a declare.
The object is retained.
See also:

- 19.23.3 Constructor 748

19.23.5 mapItems as MKMapItemMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: An array of map items representing the search results.
Notes: This property contains an array of MKMapItemMBS objects, each of which represents a returned search result. You can use these objects to retrieve information about the search result, such as the name of the point of interest, the address, the geographic location, and so on.

19.23.6 Properties

19.23.7 boundingRegion as MKCoordinateRegionMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The map region that encloses the returned search results.
Notes: The returned region is the smallest bounding box that encloses all of the map items. If there is only one search result, the size of the region may be (0, 0).
(Read only property)

19.23.8 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.24 class MKMapCameraMBS

19.24.1 class MKMapCameraMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A virtual camera for defining the appearance of the map.
Notes: A camera object defines a virtual viewpoint above the map surface and affects how the map is presented to the user. You use a camera object to specify the location of the camera on the map, the compass heading indicating the camera,Äôs viewing direction, the pitch of the camera relative to the map perpendicular, and the camera,Äôs altitude above the map. These factors create a map view with a three dimensional perspective.
After creating an instance of this class, configure it with the desired attributes and assign it to your map view. When you assign a camera to your map view, the map centers the map using the value in your camera object,Äôs centerCoordinate property, updating the map,Äôs own region information in the process. The map also takes the camera,Äôs the pitch and altitude into account when calculating the visible region, ensuring that the region always encompasses the visible content on the map.
Blog Entries

- MapKit Framework for Xojo

19.24.2 Methods

19.24.3 camera as MKMapCameraMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a new camera object for you to configure.
Notes: You must change the values of the returned camera object before using it.

19.24.4 cameraLookingAtCenterCoordinate(centerCoordinate as CLLocationCoordinate2DMBS, distance as double, pitch as double, heading as double) as MKMapCameraMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a new camera object using the specified distance, pitch, and heading information.
Notes: centerCoordinate: The coordinate point on which the map should be centered.
distance: The line-of-sight distance from the camera to the center coordinate of the map.
pitch: The viewing angle of the camera, measured in degrees. A value of 0 results in a camera pointed straight down at the map. Angles greater than 0 result in a camera that is pitched toward the horizon by the specified number of degrees.
heading: The heading of the camera (measured in degrees) relative to true north. The value 0 means that the top edge of the map view corresponds to true north. The value 90 means the top of the map is pointing

due east. The value 180 means the top of the map points due south, and so on.

Returns a new camera object initialized with the specified information.
The altitude of the camera is obtained by multiplying distance by the cosine of the pitch value.
See also:

- 19.24.5 cameraLookingAtCenterCoordinate(centerCoordinate as CLLocationCoordinate2DMBS, eyeCoordinate as CLLocationCoordinate2DMBS, eyeAltitude as double) as MKMapCameraMBS 751

19.24.5 cameraLookingAtCenterCoordinate(centerCoordinate as CLLocationCoordinate2DMBS, eyeCoordinate as CLLocationCoordinate2DMBS, eyeAltitude as double) as MKMapCameraMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a new camera object using the specified viewing angle information.
Notes: centerCoordinate: The coordinate point on which the map should be centered.
eyeCoordinate: The coordinate point at which to place the camera. If the value for this parameter is equal to the value in the centerCoordinate parameter, the map is displayed as if the camera is looking straight down. If this point is offset from the centerCoordinate value, the map is displayed with an appropriate heading and pitch angle.
eyeAltitude: The altitude (in meters) above the ground at which to place the camera.

Returns a new camera object initialized with the specified information.

This method calculates the required pitch and heading angles to accommodate the specified eye position and altitude.
See also:

- 19.24.4 cameraLookingAtCenterCoordinate(centerCoordinate as CLLocationCoordinate2DMBS, distance as double, pitch as double, heading as double) as MKMapCameraMBS 750

19.24.6 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a new camera object for you to configure.
Notes: You must change the values of the returned camera object before using it.
See also:

- 19.24.7 Constructor(centerCoordinate as CLLocationCoordinate2DMBS, distance as double, pitch as double, heading as double) 752
- 19.24.8 Constructor(centerCoordinate as CLLocationCoordinate2DMBS, eyeCoordinate as CLLocationCoordinate2DMBS, eyeAltitude as double) 752

19.24.7 Constructor(centerCoordinate as CLLocationCoordinate2DMBS, distance as double, pitch as double, heading as double)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a new camera object using the specified distance, pitch, and heading information.
Notes: centerCoordinate: The coordinate point on which the map should be centered.
distance: The line-of-sight distance from the camera to the center coordinate of the map.
pitch: The viewing angle of the camera, measured in degrees. A value of 0 results in a camera pointed straight down at the map. Angles greater than 0 result in a camera that is pitched toward the horizon by the specified number of degrees.
heading: The heading of the camera (measured in degrees) relative to true north. The value 0 means that the top edge of the map view corresponds to true north. The value 90 means the top of the map is pointing due east. The value 180 means the top of the map points due south, and so on.

Returns a new camera object initialized with the specified information.
The altitude of the camera is obtained by multiplying distance by the cosine of the pitch value.
See also:

19.24.8 Constructor(centerCoordinate as CLLocationCoordinate2DMBS, eyeCoordinate as CLLocationCoordinate2DMBS, eyeAltitude as double)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a new camera object using the specified viewing angle information.
Notes: centerCoordinate: The coordinate point on which the map should be centered.
eyeCoordinate: The coordinate point at which to place the camera. If the value for this parameter is equal to the value in the centerCoordinate parameter, the map is displayed as if the camera is looking straight down. If this point is offset from the centerCoordinate value, the map is displayed with an appropriate heading and pitch angle.
eyeAltitude: The altitude (in meters) above the ground at which to place the camera.

Returns a new camera object initialized with the specified information.

This method calculates the required pitch and heading angles to accommodate the specified eye position and altitude.
See also:

19.24.9 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMapCamera reference from a declare.
The object is retained.
See also:

19.24.10 copy as MKMapCameraMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a copy of the camera object.

19.24.11 Properties

19.24.12 altitude as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The altitude above the ground, measured in meters.
Notes: The value you specify for this property must not be less than 0.
Changing this property may also change the maximum pitch that is allowed for the map. If the current pitch value exceeds the new maximum, the pitch property is clamped to the new maximum.
(Read and Write property)

19.24.13 centerCoordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The map coordinate at the center of the map view.
Notes: This point represents the coordinate on which the map should be centered. When the camera pitch is 0, this property also corresponds to the geographic position of the camera. Changing the pitch to a nonzero value moves the camera but does not affect this property.
(Read and Write property)

19.24.14 heading as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The heading of the camera (measured in degrees) relative to true north.
Notes: The value 0 means that the top edge of the map view corresponds to true north. The value 90 means the top of the map is pointing due east. The value 180 means the top of the map points due south, and so on.
(Read and Write property)

19.24.15 pitch as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The viewing angle of the camera, measured in degrees.
Notes: A value of 0 results in a camera pointed straight down at the map. Angles greater than 0 result in a camera that is pitched toward the horizon by the specified number of degrees. If the map type is MapTypeSatellite or MapTypeHybrid, the pitch value is clamped to 0.
The value in this property may be clamped to a maximum value to maintain map readability. There is no fixed maximum value, though, because the actual maximum value is dependent on the current altitude of the camera.
(Read and Write property)

19.25 class MKMapItemMBS

19.25.1 class MKMapItemMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A point of interest on the map.
Notes: A map item includes a geographic location and any interesting data that might apply to that location, such as the address at that location and the name of a business at that address. You can also create a special MKMapItem object representing the user's current location.

Use this class to do the following:

- Share map-related data with the Maps app.
- Handle requests for directions that originate from the Maps app.

To display information in Maps, create an MKMapItem object with the information you want to display and call the openMapsWithItems method. Maps displays that location on the map and shows the information you provide.
If you implement a routing app, Maps provides you with two MKMapItem objects representing the start and end points. Use the information in those two objects to plot the route and generate directions.
Blog Entries

- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 18.4, page 73: Maps Part 5 (Finding and Displaying Addresses), Implementing Maps in Xojo desktop apps with the MapKitMBS plug-in by Markus Winter
- 18.3, pages 79 to 80: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter
- 17.6, page 35: Maps Part 2, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

19.25.2 Methods

19.25.3 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMapItem reference from a declare.
The object is retained.
See also:

- 19.25.4 Constructor(PlaceMark as MKPlacemarkMBS) 756

19.25.4 Constructor(PlaceMark as MKPlacemarkMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a map item object using the specified placemark object.
Notes: placemark: The placemark object corresponding to the desired map location. This parameter must not be nil.

Use this method to create a map item for an existing placemark. Do not use it to create a map item representing the user,Äôs current location. To do that, use the mapItemForCurrentLocation method instead.
See also:

- 19.25.3 Constructor(Handle as Integer) 755

19.25.5 mapItemForCurrentLocation as MKMapItemMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns a singleton map item object representing the device,Äôs current location.
Notes: For privacy reasons, and because the user,Äôs location can change, the map item returned by this method does not contain any coordinate data. When you need the actual location of the user, you must use the Core Location framework to retrieve it.

19.25.6 MKLaunchOptionsCameraKey as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The virtual camera to use for viewing the map.
Notes: The value of this key is an MKMapCameraMBS object that describes a virtual camera that can specify a 3D perspective for the map. If you do not specify this key, Maps uses its current settings to define the appearance of the map.

19.25.7 MKLaunchOptionsDirectionsModeDefault as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Directions that match the user,Äôs preferred transportation type.

19.25.8 MKLaunchOptionsDirectionsModeDriving as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Driving directions between the specified start and end points.

19.25.9 MKLaunchOptionsDirectionsModeKey as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The mode of transportation.
Notes: The value of this key is an NSString corresponding to one of the values described in Directions Mode Values. You specify this key to tell the Maps app which mode of transport to use when generating directions.

19.25.10 MKLaunchOptionsDirectionsModeTransit as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Public transit directions between the specified start and end points.

19.25.11 MKLaunchOptionsDirectionsModeWalking as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Walking directions between the specified start and end points.

19.25.12 MKLaunchOptionsMapCenterKey as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate value on which to center the map.
Notes: The value of this key is an NSValue object that contains an encoded CLLocationCoordinate2D structure.

19.25.13 MKLaunchOptionsMapSpanKey as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The amount of the map to display.
Notes: The value of this key is an NSValue object that contains an encoded MKCoordinateSpan structure.

19.25.14 MKLaunchOptionsMapTypeKey as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The type of map (standard, satellite, or hybrid) to display.
Notes: The value of this key is an NSNumber object whose value is an integer corresponding to an MKMap-Type value.

19.25.15 MKLaunchOptionsShowsTrafficKey as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether to display traffic information.
Notes: The value of this key is a Boolean value. If you do not specify this key, Maps uses its current settings to determine whether or not to display traffic.

19.25.16 openInMaps(LaunchOptions as Dictionary) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Open the Maps app and display this map item.
Notes: launchOptions: Additional information that the Maps app can use to configure the map display. For example, you can use the launch options to specify the visible map region and the map type. For a list of keys you can put into this dictionary, see Launch Options Dictionary Keys.

This parameter may be nil.

Returns true if this map item was successfully opened by the Maps app, or false if there was an error.

You use this method to pass the current map item to the Maps app. If your map item contains descriptive information about the location (such as a name or URL), the Maps app displays that information at the specified coordinate.
If you specify the MKLaunchOptionsDirectionsModeKey option in the launchOptions dictionary, the Maps app interprets that as an attempt to map from the user,Äôs current location to the location specified by this

map item.
If you do not include the MKLaunchOptionsMapCenterKey and MKLaunchOptionsMapSpanKey keys in your launchOptions dictionary, Maps constructs a region around the current item. It uses that region to set the visible portion of the map.

19.25.17 openMapsWithItems(items() as MKMapItemMBS, launchOptions as Dictionary) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Open the Maps app and display the specified map items.
Notes: mapItems: An array containing one or more MKMapItemMBS objects representing the items you want to display on the map.
launchOptions: Additional information that the Maps app can use to configure the map display. For example, you can use the launch options to specify the visible map region, a 3D perspective, and the map type. For a list of keys you can put into this dictionary, see Launch Options Dictionary Keys.

You may specify nil for this parameter.

Returns true if the map items were successfully opened by the Maps app, or false if there was an error.

You use this method to pass one or more map items to the Maps app. For example, you might use this method to ask the Maps app to display location-based search results generated by your app. Maps displays pins at each location you specify and uses the contents of each map item object to display additional information.
If you specify the MKLaunchOptionsDirectionsModeKey option in the launchOptions dictionary, the mapItems array must have no more than two items in it. If the array contains one item, the Maps app generates directions from the user,Äôs current location to the location specified by the map item. If the array contains two items, the Maps app generates directions from the location of the first item to the location of the second item in the array.
If you do not include the MKLaunchOptionsMapCenterKey and MKLaunchOptionsMapSpanKey keys in your launchOptions dictionary, Maps constructs a region that encompasses the provided items. It uses this region to set the visible portion of the map.

19.25.18 Properties

19.25.19 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.25.20 isCurrentLocation as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the map item represents the user,Äôs current location.
Notes: If the value of this property is true, the map item represents the user,Äôs current location. If true, the value in the placemark property is set to nil.
(Read only property)

19.25.21 Name as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The descriptive name associated with the map item.
Notes: Use this property to specify the name associated with the location. For example, if there is a business at the specified location, you would use this property to specify the name of the business.
If this map item represents the user,Äôs current location, the value in property is set to a localized version of ,ÄúCurrent Location,Äù.
(Read and Write property)

19.25.22 phoneNumber as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The phone number associated with a business at the specified location.
Notes: If there is a relevant phone number associated with the location, such as a phone number for a business at the location, use this property to specify that value.
(Read and Write property)

19.25.23 placemark as MKPlacemarkMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The placemark object containing the location information.
Notes: If you created the map item using the mapItemForCurrentLocation method, the value of this property is nil and the isCurrentLocation property is set to true.
(Read only property)

19.25.24 timeZone as NSTimeZoneMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The time zone of the specified location.
Notes: When you search for map items, MapKit populates this field with the time zone information as a convenience. You may also set the time zone for any map items you create.
(Read and Write property)

19.25.25 URL as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The URL associated with the specified location.
Notes: If there is a relevant URL associated with the location, such as a URL for a business at the location, use this property to specify that value.
(Read and Write property)

19.26 class MKMapPointMBS

19.26.1 class MKMapPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The class for a point on the map.
Example:

```
// take some coordinates
dim c1 as new CLLocationCoordinate2DMBS(52.518611, 13.408333) // Berlin
dim c2 as new CLLocationCoordinate2DMBS(48.137222, 11.575556) // Munich

// convert to points on map
dim p1 as MKMapPointMBS = MKMapPointMBS.Point(c1)
dim p2 as MKMapPointMBS = MKMapPointMBS.Point(c2)

// show
MsgBox p1.StringValue+EndOfLine+p2.StringValue

// create locations
dim l1 as new CLLocationMBS(c1.latitude, c1.longitude)
dim l2 as new CLLocationMBS(c2.latitude, c2.longitude)

// show
MsgBox l1.Description+EndOfLine+l2.Description

// now get distance on two ways
dim d1 as Double = MKMapPointMBS.MetersBetweenMapPoints(p1,p2)
dim d2 as Double = l1.distanceFromLocation(l2)

// and format to show
dim s1 as string = MKDistanceFormatterMBS.formatter.stringFromDistance(d1)
dim s2 as string = MKDistanceFormatterMBS.formatter.stringFromDistance(d2)

MsgBox "Distance: "+s1+" vs. "+s2
// not the same due to rounding!
```

Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 19.4, page 49: Maps,ÄîPart 10, Mapping GPS data with the MapKitMBS plugin by Markus Winter

19.26.2 Methods

19.26.3 Constructor(other as MKMapPointMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The copy constructor.
See also:

- 19.26.4 Constructor(x as double = 0, y as double = 0) 763

19.26.4 Constructor(x as double = 0, y as double = 0)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The map constructor.
See also:

- 19.26.3 Constructor(other as MKMapPointMBS) 763

19.26.5 Coordinate(point as MKMapPointMBS) as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Converts point in map to coordinate.

19.26.6 Equal(other as MKMapPointMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Compares two point objects.
Notes: Returns true if both are equal.

19.26.7 MapPointsPerMeterAtLatitude(Latitude as Double) as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the number of map points that represent one meter at the given latitude.
Notes: The number of map points per meter increases as the latitude approaches the poles.

19.26.8 MetersBetweenMapPoints(point1 as MKMapPointMBS, point2 as MKMapPointMBS) as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the number of meters between two map points.
Notes: This distance reflects the actual distance between the two points on the surface of the globe, taking into account the curvature of the Earth.

19.26.9 MetersPerMapPointAtLatitude(Latitude as Double) as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the distance spanned by one map point at the specified latitude.
Example:

```
MsgBox str(MKMapPointMBS.MetersPerMapPointAtLatitude(50.0))
```

Notes: latitude: The latitude for which to return the value.

Returns the distance (in meters) spanned by a single map point.

The distance between map points decreases as the latitude approaches the poles. This relationship parallels the relationship between longitudinal coordinates at different latitudes.

19.26.10 Point(coordinate as CLLocationCoordinate2DMBS) as MKMapPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Converts coordinate in point in map.
See also:

- 19.26.11 Point(x as double = 0, y as double = 0) as MKMapPointMBS 764

19.26.11 Point(x as double = 0, y as double = 0) as MKMapPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a new point with given values.
See also:

- 19.26.10 Point(coordinate as CLLocationCoordinate2DMBS) as MKMapPointMBS 764

19.26.12 Properties

19.26.13 StringValue as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Formats point as text for display in debugger.
Example:

```
dim p as new MKMapPointMBS(12, 34)

MsgBox p.StringValue
```

Notes: (Read only property)

19.26.14 X as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The X coordinate.
Notes: (Read and Write property)

19.26.15 Y as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The Y coordinate.
Notes: (Read and Write property)

19.27 class MKMapRectMBS

19.27.1 class MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The class for a map rectangle.
Blog Entries

- MapKit Framework for Xojo

19.27.2 Methods

19.27.3 Constructor(origin as MKMapPointMBS, size as MKMapSizeMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
Notes: Copies values from point and size to build new rectangle.
See also:

- 19.27.4 Constructor(other as MKMapRectMBS) 766
- 19.27.5 Constructor(x as double = 0, y as double = 0, w as double = 0, h as double = 0) 766

19.27.4 Constructor(other as MKMapRectMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The copy constructor.
See also:

- 19.27.3 Constructor(origin as MKMapPointMBS, size as MKMapSizeMBS) 766
- 19.27.5 Constructor(x as double = 0, y as double = 0, w as double = 0, h as double = 0) 766

19.27.5 Constructor(x as double = 0, y as double = 0, w as double = 0, h as double = 0)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

- 19.27.3 Constructor(origin as MKMapPointMBS, size as MKMapSizeMBS) 766
- 19.27.4 Constructor(other as MKMapRectMBS) 766

19.27.6 Contains(other as MKMapPointMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns true if point is included in rectangle area.
See also:

- 19.27.7 Contains(other as MKMapRectMBS) as Boolean 767

19.27.7 Contains(other as MKMapRectMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns true if given rectangle is included in rectangle area.
See also:

- 19.27.6 Contains(other as MKMapPointMBS) as Boolean 767

19.27.8 Divide(byref slice as MKMapRectMBS, byref remainder as MKMapRectMBS, amount as double, edge as Integer)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Divides rectangle in slice and remainder.

19.27.9 Equal(other as MKMapRectMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Compares two rectangle objects.
Notes: Returns true if both are equal.

19.27.10 Inset(dx as Double, dy as Double) as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Insets rectangle by given delta and returns new rectangle.

19.27.11 Intersection(other as MKMapRectMBS) as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns intersection of two map rectangles.

19.27.12 Intersects(other as MKMapRectMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Checks whether the given rectangle intersects with the current one.

19.27.13 Null as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Queries a null rectangle.

19.27.14 Offset(dx as Double, dy as Double) as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Offsets map rectangle by given offset.

19.27.15 Rect(x as double = 0, y as double = 0, width as double = 0, heigth as double = 0) as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates new rectangle with given values.

19.27.16 Region as MKCoordinateRegionMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creation region covering the map rectangle.

19.27.17 Remainder as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: For map rects that span the 180th meridian, this returns the portion of the rect that lies outside of the world rect wrapped around to the other side of the world.
Notes: The portion of the rect that lies inside the world rect can be determined with rect.Intersection(MKMapRectMBS.World).

19.27.18 Union(other as MKMapRectMBS) as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns union of both rectangles.

19.27.19 World as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The world rectangle.
Notes: The rect that contains every map point in the world.

19.27.20 Properties

19.27.21 Height as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The height of the rectangle.
Notes: (Read and Write property)

19.27.22 isEmpty as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns true if rectangle is empty.
Notes: (Read only property)

19.27.23 isNull as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns true if rectangle is null rectangle.
Notes: (Read only property)

19.27.24 MaxX as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Maximum X value of rectangle.
Notes: (Read only property)

19.27.25 MaxY as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The maximum X value of the rectangle.
Notes: (Read only property)

19.27.26 MidX as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The middle x value of this rectangle.
Notes: (Read only property)

19.27.27 MidY as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Middle Y value of rectangle.
Notes: (Read only property)

19.27.28 MinX as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Minimum X value of rectangle.
Notes: (Read only property)

19.27.29 MinY as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Minimum Y value of rectangle.
Notes: (Read only property)

19.27.30 Origin as MKMapPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The origin point of the rectangle.
Notes: Returns new point object with given values.
(Read and Write property)

19.27.31 Size as MKMapSizeMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The size of the rectangle.
Notes: Returns new size object with given values.
(Read and Write property)

19.27.32 Spans180thMeridian as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Whether this map rectangle spans the 180th meridian.
Notes: (Read only property)

19.27.33 StringValue as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Formats rect as text for display in debugger.
Example:

```
dim r as new MKMapRectMBS(1,2,3,4)

MsgBox r.StringValue
```

Notes: (Read only property)

19.27.34 Width as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The width of the rectangle.
Notes: (Read and Write property)

19.27.35 X as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The X origin coordinate.
Notes: (Read and Write property)

19.27.36 Y as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The Y origin coordinate.
Notes: (Read and Write property)

19.28 class MKMapSizeMBS

19.28.1 class MKMapSizeMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The class for a size in maps.
Blog Entries

- MapKit Framework for Xojo

19.28.2 Methods

19.28.3 Constructor(other as MKMapSizeMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The copy constructor.
See also:

- 19.28.4 Constructor(width as double = 0, height as double = 0) 773

19.28.4 Constructor(width as double = 0, height as double = 0)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

- 19.28.3 Constructor(other as MKMapSizeMBS) 773

19.28.5 Equal(other as MKMapSizeMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Compares two size objects.
Notes: Returns true if both are equal.

19.28.6 Size(Width as double = 0, Height as double = 0) as MKMapSizeMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates new size object with given values.

19.28.7 World as MKMapSizeMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The size that contains every map point in the world.

19.28.8 Properties

19.28.9 Height as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The height of the size.
Notes: (Read and Write property)

19.28.10 StringValue as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Formats size as text for display in debugger.
Notes: (Read only property)

19.28.11 Width as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The width of the size.
Notes: (Read and Write property)

19.29 class MKMapSnapshotMBS

19.29.1 class MKMapSnapshotMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The class to take map snapshots.
Blog Entries

- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

19.29.2 Methods

19.29.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.29.4 Constructor(Handle as Integer) 775

19.29.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMapSnapshot reference from a declare.
The object is retained.
See also:

- 19.29.3 Constructor 775

19.29.5 Destructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

19.29.6 pointForCoordinate(coordinate as CLLocationCoordinate2DMBS) as NSPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Translates a point in the coordinate to the point in the image.

19.29.7 Properties

19.29.8 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.29.9 Image as NSImageMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The image created.
Notes: Please use methods in NSImageMBS class to get PNG or JPEG data.
Or use methods to copy a xojo picture.
(Read only property)

19.29.10 Options as MKMapSnapshotOptionsMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The options used to create object.
Notes: (Read and Write property)

19.29.11 Tag as Variant

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The tag passed to creating the snapshot.
Notes: e.g. a ID for a database record.
(Read and Write property)

19.30 class MKMapSnapshotOptionsMBS

19.30.1 class MKMapSnapshotOptionsMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The class for snapshot options.
Blog Entries

- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

19.30.2 Methods

19.30.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

- 19.30.4 Constructor(Handle as Integer) 777

19.30.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMapSnapshotOptions reference from a declare.
The object is retained.
See also:

- 19.30.3 Constructor 777

19.30.5 Copy as MKMapSnapshotOptionsMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a copy of the options.

19.30.6 Properties

19.30.7 appearance as NSAppearanceMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop only.

Function: The appearance to use for rendering.
Notes: For MacOS 10.14 or newer.
(Read and Write property)

19.30.8 camera as MKMapCameraMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The camera to use.
Notes: (Read and Write property)

19.30.9 mapRect as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The rectangle in the map to query.
Notes: (Read and Write property)

19.30.10 mapType as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The map type to use.
Notes: (Read and Write property)

19.30.11 region as MKCoordinateRegionMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The region to use.
Notes: (Read and Write property)

19.30.12 showsBuildings as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Whether to show buildings.
Notes: Affects MKMapTypeStandard.
(Read and Write property)

19.30.13 showsPointsOfInterest as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Whether to show points of interest.
Notes: Affects MKMapTypeStandard and MKMapTypeHybrid.
(Read and Write property)

19.30.14 size as NSSizeMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The size of the image to create.
Notes: Defaults to 256x256 if nil.
(Read and Write property)

19.31 class MKMapSnapshotterMBS

19.31.1 class MKMapSnapshotterMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The class to take snapshots for maps.
Blog Entries

- MBS Xojo Plugins, version 19.1pr6
- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

19.31.2 Methods

19.31.3 Cancel

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Cancels the snapshot.

19.31.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMapSnapshotter reference from a declare.
The object is retained.
See also:

- 19.31.5 Constructor(options as MKMapSnapshotOptionsMBS) 780

19.31.5 Constructor(options as MKMapSnapshotOptionsMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
Notes: We keep reference to options in options property.
See also:

- 19.31.4 Constructor(Handle as Integer) 780

19.31.6 Destructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

19.31.7 Start(tag as variant = nil)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Starts the asynchronous snapshot process.
Notes: The tag value is passed to the snapshot for later reference.
Triggers SnapshotCompleted event later.
Sets Error and Snapshot properties on this object.

19.31.8 Properties

19.31.9 Error as NSErrorMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The last error.
Notes: (Read and Write property)

19.31.10 Loading as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Whether this is still loading.
Notes: (Read only property)

19.31.11 Options as MKMapSnapshotOptionsMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The options used to create object.
Notes: (Read and Write property)

19.31.12 Snapshot as MKMapSnapshotMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The last snapshot.
Notes: (Read and Write property)

19.31.13 Events

19.31.14 SnapshotCompleted(snapshot as MKMapSnapshotMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: The event to be called when snapshot is done.

19.32 class MKMapViewMBS

19.32.1 class MKMapViewMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: An MKMapView object provides an embeddable map interface, similar to the one provided by the Maps application.
Notes: You use this class as-is to display map information and to manipulate the map contents from your application. You can center the map on a given coordinate, specify the size of the area you want to display, and annotate the map with custom information.

In the IDE we show a generic map image as preview as the control itself doesn't perform well inside the Xojo IDE.
Subclass of the NSViewMBS class.
Blog Entries

- MBS Xojo Plugins, version 22.4pr5
- News from the MBS Xojo Plugins Version 22.0
- MonkeyBread Software Releases the MBS Xojo Plugins in version 22.0
- MBS Xojo Plugins, version 21.6pr1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 20.4
- MBS Xojo Plugins, version 20.4pr6
- MBS Xojo Plugins, version 20.1pr3
- MBS Xojo Plugins, version 19.5pr8
- MBS Xojo Plugins, version 19.5pr1
- MapKit Framework for Xojo

Videos

- Presentation from Xojo Developer Conference 2019 in Miami.
- Apple MapView In Xojo

Xojo Developer Magazine

- 20.2, page 10: News
- 19.1, pages 87 to 88: Maps Part 8, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

- 18.6, page 79: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, page 76: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, page 74: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, page 65: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, page 10: News
- 18.5, pages 86 to 87: Maps (Part 6), A deep dive into Annotations by Markus Winter
- 18.5, page 80: Maps (Part 6), A deep dive into Annotations by Markus Winter

19.32.2 Methods

19.32.3 addAnnotation(annotation as MKAnnotationMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Adds the specified annotation to the map view.
Example:

```
dim mapview as MKMapViewMBS // your map view

// new pin
dim pin as new MKPointAnnotationMBS

pin.coordinate = mapView.centerCoordinate
pin.title = "Hello"

// show on map
mapView.addAnnotation pin
```

19.32.4 addAnnotations(annotations() as MKAnnotationMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Adds an array of annotation objects to the map view.

19.32.5 addOverlay(overlay as MKOverlayMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Adds a single overlay object to the map.
Example:

```
dim mapview as MKMapViewMBS // your map view
dim centerCoordinate as CLLocationCoordinate2DMBS = mapview.centerCoordinate
dim radius as Integer = 300 // 300 meter

dim circle as MKCircleMBS = MKCircleMBS.circleWithCenterCoordinate(centerCoordinate, radius)
mapview.addOverlay circle
```

Notes: overlay: The overlay object to add. This object must conform to the MKOverlayMBS interface.

The specified object is added to the group of overlay objects in the MKOverlayLevelAboveLabels level. Adding an overlay causes the map view to begin monitoring the area represented by that overlay. As soon as the bounding rectangle of an overlay intersects the visible portion of the map, the map view adds a corresponding overlay view to the map. The overlay view is provided by the mapViewViewForOverlay event.

To remove an overlay from a map, use the removeOverlay method.
See also:

- 19.32.6 addOverlay(overlay as MKOverlayMBS, level as integer) 785

19.32.6 addOverlay(overlay as MKOverlayMBS, level as integer)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Adds the overlay object to the map at the specified level.
Notes: overlay: The overlay object to add. This object must conform to the MKOverlayMBS interface.
level: The map level at which to place the overlay. For a list of possible values for this parameter, see level constants.

Positioning an overlay at a specific level places that overlay,Äôs visual representation in front of or behind other map content such as map labels and point-of-interest icons.
This method adds the specified overlay to the end of the list of overlay objects at the given level. Adding an overlay also causes the map view to begin monitoring the area they represent. As soon as the bounding rectangle of the overlay intersects the visible portion of the map, the map view calls your rendererForOverlay event to get the renderer object to use when drawing the overlay.
To remove an overlay from a map, use the removeOverlay: method.
See also:

- 19.32.5 addOverlay(overlay as MKOverlayMBS) 785

19.32.7 addOverlays(overlays() as MKOverlayMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Adds an array of overlay objects to the map.
Notes: overlays: An array of objects, each of which must conform to the MKOverlayMBS interface.

The specified objects are added to the group of overlay objects in the MKOverlayLevelAboveLabels level. Adding an overlay causes the map view to begin monitoring the area represented by that overlay. As soon as the bounding rectangle of the overlay intersects the visible portion of the map, the map view tries to draw the overlay. As soon as the bounding rectangle of an overlay intersects the visible portion of the map, the map view adds a corresponding overlay view to the map. The overlay view is provided by the mapViewViewForOverlay method of the map view's delegate object.

To remove multiple overlays from a map, use the removeOverlays method.
See also:

- 19.32.8 addOverlays(overlays() as MKOverlayMBS, level as integer) 786

19.32.8 addOverlays(overlays() as MKOverlayMBS, level as integer)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Adds an array of overlay objects to the map at the specified level.
Notes: overlays: The array of overlay objects to add. Each object in the array must conform to the MKOverlayMBS interface.
level: The map level at which to place the overlays. For a list of possible values for this parameter, see MKOverlayLevel.

Positioning an overlay at a specific level places that overlay,Äôs visual representation in front of or behind other map content such as map labels and point-of-interest icons.

This method adds the specified overlays to the end of the list of overlay objects at the given level. Adding the overlays also causes the map view to begin monitoring the area they represent. As soon as the bounding rectangle of an overlay intersects the visible portion of the map, the map view calls your rendererForOverlay event to get the renderer object to use when drawing that overlay.

To remove multiple overlays from a map, use the removeOverlays method.
See also:

- 19.32.7 addOverlays(overlays() as MKOverlayMBS) 786

19.32.9 annotations as MKAnnotationMBS()

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The complete list of annotations associated with the receiver.
Notes: If no annotations are associated with the map view, the value of this property is empty.

19.32.10 annotationsInMapRect(mapRect as MKMapRectMBS) as MKAnnotationMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the annotation objects located in the specified map rectangle.
Notes: mapRect: The portion of the map that you want to search for annotations.

Returns the array of annotation objects located in mapRect.

This method offers a fast way to retrieve the annotation objects in a particular portion of the map. This method is much faster than doing a linear search of the objects in the annotations property yourself.

19.32.11 annotationViews as MKAnnotationViewMBS()

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: Queries internal list of MapView to get list of all annotation views.

19.32.12 available as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Whether this class is available.
Notes: Returns true for Mac 64-bit targets.

19.32.13 Constructor

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a new box view with size 100/100 and position 0/0
Example:

```
dim x as new MKMapViewMBS
```

Notes: On success the handle property is not zero.
See also:

- 19.32.14 Constructor(Handle as Integer) 788
- 19.32.15 Constructor(left as Double, top as Double, width as Double, height as Double) 788

19.32.14 Constructor(Handle as Integer)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates an object based on the given NSView handle.
Example:

```
dim t as new MKMapViewMBS(0, 0, 100, 100)
dim v as new MKMapViewMBS(t.handle)

MsgBox str(v.Bounds.Width)+" x "+str(v.Bounds.Height)
```

Notes: The handle is casted to a MKMapView and the plugin retains this handle.
See also:

- 19.32.13 Constructor 787
- 19.32.15 Constructor(left as Double, top as Double, width as Double, height as Double) 788

19.32.15 Constructor(left as Double, top as Double, width as Double, height as Double)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a new control with the given size and position.
Example:

```
dim left,top,width,height as Integer
// define rectangle
dim x as new MKMapViewMBS(left, top, width, height)
```

Notes: On success the handle property is not zero.
See also:

19.32.16 convertCoordinateToPointToView(coordinate as CLLocationCoordinate2DMBS, view as NSViewMBS) as NSPointMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Converts a map coordinate to a point in the specified view.
Notes: coordinate: The map coordinate for which you want to find the corresponding point.
view: The view in whose coordinate system you want to locate the specified map coordinate. If this parameter is nil, the returned point is specified in the window's coordinate system. If view is not nil, it must belong to the same window as the map view.

Returns the point (in the appropriate view or window coordinate system) corresponding to the specified latitude and longitude value.

19.32.17 convertPointToCoordinateFromView(point as NSPointMBS, view as NSViewMBS) as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Converts a point in the specified view's coordinate system to a map coordinate.
Notes: point: The point you want to convert.
view: The view that serves as the reference coordinate system for the point parameter.

Returns the map coordinate at the specified point.

19.32.18 convertRectToRegionFromView(rect as NSRectMBS, view as NSViewMBS) as MKCoordinateRegionMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Converts a rectangle in the specified view's coordinate system to a map region.
Example:

```
// convert mouse position in x/y to select annotation on the given mouse point
Dim xView As MKMapViewMBS = MapViewControl.View
Dim rect As New NSRectMBS(x,y,1,1)
Dim region As MKCoordinateRegionMBS = xView.convertRectToRegionFromView(rect,xView)
Dim center As CLLocationCoordinate2DMBS = region.center
Dim circle As New MKCircleMBS(center,32)
```

```
Dim mapRect As MKMapRectMBS = circle.boundingMapRect()
Dim xAnnos() As MKAnnotationMBS = xView.annotationsInMapRect(mapRect)

If xAnnos.LastRowIndex <>-1 Then
Dim xThisAnno As MKAnnotationMBS = xAnnos(0)
If xThisAnno IsA MKPointAnnotationMBS Then
me.View.selectAnnotation(xThisAnno,False)
Return True
End If
End If
```

Notes: rect: The rectangle you want to convert.
view: The view that serves as the reference coordinate system for the rect parameter.

Returns the map region corresponding to the specified view rectangle.

19.32.19 convertRegionToRectToView(region as MKCoordinateRegionMBS, view as NSViewMBS) as NSRectMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Converts a map region to a rectangle in the specified view.
Notes: region: The map region for which you want to find the corresponding view rectangle.
view: The view in whose coordinate system you want to locate the specified map region. If this parameter is nil, the returned rectangle is specified in the window's coordinate system. If view is not nil, it must belong to the same window as the map view.

Returns the rectangle corresponding to the specified map region.

19.32.20 dequeueReusableAnnotationViewWithIdentifier(identifier as string) as MKAnnotationViewMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a reusable annotation view located by its identifier.
Notes: identifier: A string identifying the annotation view to be reused. This string is the same one you specify when initializing the annotation view using the Constructor method.

Returns an annotation view with the specified identifier, or nil if no such object exists in the reuse queue.

For performance reasons, you should generally reuse MKAnnotationView objects in your map views. As annotation views move offscreen, the map view moves them to an internally managed reuse queue. As new annotations move onscreen, and your code is prompted to provide a corresponding annotation view, you should always attempt to dequeue an existing view before creating a new one. Dequeueing saves time and memory during performance-critical operations such as scrolling.

19.32.21 deselectAnnotation(annotation as MKAnnotationMBS, animated as boolean)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Deselects the specified annotation and hides its callout view.
Notes: annotation: The annotation object to deselect.
animated: If true, the callout view is animated offscreen.

19.32.22 Destructor

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

19.32.23 exchangeOverlay(index1 as Integer, index2 as Integer)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Exchanges the positions of the two overlay objects.
Notes: index1: The index of an overlay in the MKOverlayLevelAboveLabels map level.
index2: The index of another overlay in the MKOverlayLevelAboveLabels map level.

If you need to exchange overlays in other map levels, use the exchangeOverlay method.
See also:

- 19.32.24 exchangeOverlay(Overlay1 as MKOverlayMBS, Overlay2 as MKOverlayMBS) 791

19.32.24 exchangeOverlay(Overlay1 as MKOverlayMBS, Overlay2 as MKOverlayMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Exchanges the positions of the two overlay objects.
Notes: If the overlays are in the same map level, they exchange positions within that level,Äôs array of

overlay objects. If they are in different map levels, the two objects also swap levels. Swapping the position of the overlays affects their visibility in the map view.
See also:

- 19.32.23 exchangeOverlay(index1 as Integer, index2 as Integer) 791

19.32.25 insertOverlayAboveOverlay(overlay as MKOverlayMBS, aboveOverlay as MKOverlayMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Inserts one overlay object on top of another.
Notes: overlay: The overlay object to insert.
sibling: An existing object in the overlays array. This object must exist in the array and must not be nil.

This method inserts the overlay into the MKOverlayLevelAboveLabels level and positions it relative to the specified sibling. When displayed, this leads to the overlay's contents being displayed above that of its sibling. If sibling is not in the same map level, this method appends the overlay to the end of the list of overlays at the indicated level.

19.32.26 insertOverlayAtIndex(overlay as MKOverlayMBS, index as Integer)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Inserts an overlay object into the list associated with the map.
Notes: overlay: The overlay object to insert.
index: The index at which to insert the overlay object. If this value is greater than the number of objects in the overlays property, this method appends the object to the end of the array.

This method inserts the overlay into the MKOverlayLevelAboveLabels level.
See also:

- 19.32.27 insertOverlayAtIndex(overlay as MKOverlayMBS, index as integer, level as integer) 792

19.32.27 insertOverlayAtIndex(overlay as MKOverlayMBS, index as integer, level as integer)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Inserts an overlay object into the level at the specified index.
Notes: overlay: The overlay object to insert.
index: The index at which to insert the overlay object. If this value is greater than the number of objects in the overlays property, this method appends the object to the end of the array.

level: The map level at which to place the overlay. For a list of possible values for this parameter, see level constants.

Inserting an overlay at a specific level places that overlay,Äôs visual representation in front of or behind other map content such as map labels and point-of-interest icons.
See also:

- 19.32.26 insertOverlayAtIndex(overlay as MKOverlayMBS, index as Integer) 792

19.32.28 insertOverlayBelowOverlay(overlay as MKOverlayMBS, belowOverlay as MKOverlayMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Inserts one overlay object below another.
Notes: overlay: The overlay object to insert.
sibling: An existing object in the overlays array. This object must exist in the array and must not be nil.

This method inserts the overlay into the MKOverlayLevelAboveLabels level and positions it relative to the specified sibling. When displayed, this leads to the overlay's contents being displayed beneath that of its sibling. If sibling is not in the same map level, this method appends the overlay to the end of the list of overlays at the indicated level.

19.32.29 mapRectThatFits(mapRect as MKMapRectMBS) as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Adjusts the aspect ratio of the specified map rectangle to ensure that it fits in the map view,Äôs frame.
Notes: mapRect: The initial map rectangle whose width and height you want to adjust.

Returns a map rectangle that is still centered on the same point of the map but whose width and height are adjusted to fit in the map view,Äôs frame.

You can use this method to normalize map rectangle values before displaying the corresponding area. This method returns a new map rectangle that both contains the specified rectangle and fits neatly inside the map view,Äôs frame.
See also:

- 19.32.30 mapRectThatFits(mapRect as MKMapRectMBS, edgePaddingLeft as Double, edgePaddingTop as Double, edgePaddingRight as Double, edgePaddingBottom as Double) as MKMapRectMBS 794

19.32.30 mapRectThatFits(mapRect as MKMapRectMBS, edgePaddingLeft as Double, edgePaddingTop as Double, edgePaddingRight as Double, edgePaddingBottom as Double) as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Adjusts the aspect ratio of the specified map rectangle, incorporating the specified inset values.
Notes: A map rectangle that is still centered on the same point of the map but whose width and height are adjusted to fit in the map view,Äôs frame minus the inset values.
See also:

- 19.32.29 mapRectThatFits(mapRect as MKMapRectMBS) as MKMapRectMBS 793

19.32.31 MKErrorDomain as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The error domain for Map Kit.

19.32.32 MKMapViewDefaultAnnotationViewReuseIdentifier as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The default reuse identifier for your map's annotation views.
Notes: Use this constant to register a default annotation view. This default annotation view is used when your map view's delegate does not implement the viewForAnnotation event or when that method returns nil.

19.32.33 MKMapViewDefaultClusterAnnotationViewReuseIdentifier as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The default reuse identifier for the annotation view representing a cluster of annotations.
Notes: Use this constant to register a default annotation view to use for clusters of annotations. This cluster annotation view is used when your map view's delegate does not implement the viewForAnnotation event or when that method returns nil.

19.32.34 overlays as MKOverlayMBS()

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The overlay objects currently associated with the map view.
Notes: This property contains the union of all overlays at the different levels of the map. The objects in

this array must adopt the MKOverlayMBS interface. If no overlays are associated with the map view, the value of this property is an empty array.

The order of the objects in this array does not necessary reflect their visual order on the map.

19.32.35 overlaysInLevel(level as Integer) as MKOverlayMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The overlay objects in the specified level of the map.
Notes: level: The map level whose overlays you want. For a list of possible values for this parameter.

Returns an array of objects conforming to the MKOverlayMBS interfaces that display in the specified map level. If there are no overlays at the specified level, this method returns an empty array.

You can use this method to get all of the overlays assigned to a specific map level, which might be a subset of the complete set of overlay objects. For overlapping overlay objects, the order of objects in the array represents their visual order when displayed on the map, with objects in the beginning of the array located behind those at later indexes.

19.32.36 regionThatFits(region as MKCoordinateRegionMBS) as MKCoordinateRegionMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Adjusts the aspect ratio of the specified region to ensure that it fits in the map view,Äôs frame.
Notes: region: The initial region whose span you want to adjust.

Returns a region that is still centered on the same point of the map but whose span values are adjusted to fit in the map view,Äôs frame.

You can use this method to normalize the region values before displaying them in the map. This method returns a new region that both contains the specified region and fits neatly inside the map view,Äôs frame.

19.32.37 removeAnnotation(annotation as MKAnnotationMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Removes the specified annotation object from the map view.
Notes: annotation: The annotation object to remove. This object must conform to the MKAnnotationMBS

interface.

If the annotation is currently associated with an annotation view, and that view has a reuse identifier, this method removes the annotation view and queues it internally for later reuse. You can retrieve queued annotation views (and associate them with new annotations) using the dequeueReusableAnnotationViewWithIdentifier method.

Removing an annotation object disassociates it from the map view entirely, preventing it from being displayed on the map. Thus, you would typically call this method only when you want to hide or delete a given annotation.

19.32.38 removeAnnotations(annotations() as MKAnnotationMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Removes an array of annotation objects from the map view.
Notes: annotations: The array of annotations to remove. Objects in the array must conform to the MKAnnotationMBS interface.

If any annotation object in the array has an associated annotation view, and if that view has a reuse identifier, this method removes the annotation view and queues it internally for later reuse. You can retrieve queued annotation views (and associate them with new annotations) using the dequeueReusableAnnotationViewWithIdentifier method.

Removing annotation objects disassociates them from the map view entirely, preventing them from being displayed on the map. Thus, you would typically call this method only when you want to hide or delete the specified annotations.

19.32.39 removeOverlay(overlay as MKOverlayMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Removes a single overlay object from the map.
Notes: overlay: The overlay object to remove.

This method removes the overlay regardless of the level that it is in. Removing an overlay also removes its corresponding renderer, if one is in use. If the specified overlay is not currently associated with the map view, this method does nothing.

19.32.40 removeOverlays(overlays() as MKOverlayMBS)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Removes one or more overlay objects from the map.
Notes: overlays: An array of objects, each of which conforms to the MKOverlayMBS interface.

This method removes the specified overlays regardless of which level each one is in. Removing an overlay also removes its corresponding renderer, if one is in use. If a given overlay object is not associated with the map view, it is ignored.

19.32.41 rendererForOverlay(overlay as MKOverlayMBS) as MKOverlayRendererMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the renderer object used to draw the contents of the specified overlay object.
Notes: overlay: The overlay object whose renderer you want.

Returns the renderer object in use for the specified overlay or nil if the overlay is not onscreen.

This method returns the renderer object that your control provided in its xrendererForOverlay event.

19.32.42 selectAnnotation(annotation as MKAnnotationMBS, animated as boolean)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Selects the specified annotation and displays a callout view for it.
Notes: annotation: The annotation object to select.
animated: If true, the callout view is animated into position.

If the specified annotation is not onscreen, and therefore does not have an associated annotation view, this method has no effect.

19.32.43 selectedAnnotations as MKAnnotationMBS()

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The annotations that are currently selected.
Notes: Assigning a new array to this property selects only the first annotation in the array.

19.32.44 setCamera(camera as MKMapCameraMBS, Animated as boolean = true)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Changes the camera used for determining the map,Äôs viewing parameters and optionally animates the change.
Notes: camera: The camera object containing the viewing angle information. This parameter must not be nil.
animated: Specify true if you want the change in viewing angle to be animated or false if you want the map to reflect the changes without animations.

19.32.45 setCenterCoordinate(centerCoordinate as CLLocationCoordinate2DMBS, zoomLevel as double, animated as boolean)

Plugin Version: 19.5, Platform: macOS, Targets: Desktop & iOS.

Function: hanges the center coordinate of the map with zoom and optionally animates the change.
Notes: Zoomlevel is in range 1 to 20.

Latitude and Longitude in coordinate: The new center coordinate for the map.
animated: Specify true if you want the map view to scroll to the new location or false if you want the map to display the new location immediately.

Changing the center coordinate centers the map on the new coordinate without changing the current zoom level. It also updates the value in the region property to reflect the new center coordinate and the new span values needed to maintain the current zoom level.
See also:

- 19.32.46 setCenterCoordinate(coordinate as CLLocationCoordinate2DMBS, Animated as boolean = true) 798

19.32.46 setCenterCoordinate(coordinate as CLLocationCoordinate2DMBS, Animated as boolean = true)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Changes the center coordinate of the map and optionally animates the change.
Notes: Latitude and Longitude in coordinate: The new center coordinate for the map.
animated: Specify true if you want the map view to scroll to the new location or false if you want the map to display the new location immediately.

Changing the center coordinate centers the map on the new coordinate without changing the current zoom level. It also updates the value in the region property to reflect the new center coordinate and the new span

values needed to maintain the current zoom level.
See also:

- 19.32.45 setCenterCoordinate(centerCoordinate as CLLocationCoordinate2DMBS, zoomLevel as double, animated as boolean) 798

19.32.47 setRegion(c as CLLocationCoordinate2DMBS, animated as boolean = false)

Plugin Version: 14.2, Platform: macOS, Targets: Desktop & iOS.

Function: Changes the currently visible region and optionally animates the change.
Notes: Same as SetRegion with MKCoordinateRegionMBS but reuses current coordinate span.
See also:

- 19.32.48 setRegion(region as MKCoordinateRegionMBS, animated as boolean = false) 799

19.32.48 setRegion(region as MKCoordinateRegionMBS, animated as boolean = false)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Changes the currently visible region and optionally animates the change.
Example:

```
dim mapview as MKMapViewMBS // your mapview

// get current region
dim r as MKCoordinateRegionMBS = mapview.region

// make new span with double deltas
dim s as new MKCoordinateSpanMBS(r.span.latitudeDelta*2, r.span.longitudeDelta*2)

// make new region
dim n as new MKCoordinateRegionMBS(r.center, s)

// and zoom there
mapview.setRegion n, true
```

Notes: region: The new region to display in the map view.
animated: Specify true if you want the map view to animate the transition to the new region or false if you want the map to center on the specified region immediately.

Changing just the center coordinate of the region can still cause the span values to change implicitly. The span values might change because that the distances represented by a span change at different latitudes and

longitudes and the map view may need to adjust the span to account for the new location. If you want to change the center coordinate without changing the zoom level, use the setCenterCoordinate instead.

When setting a new region, the map may adjust the value in the region parameter so that it fits the visible area of the map precisely. This adjustment is normal and is done to ensure that the value in the region property always reflects the visible portion of the map. However, it does mean that if you get the value of that property right after calling this method, the returned value may not match the value you set. (You can use the regionThatFits method to determine the region that will actually be set by the map.)
See also:

- 19.32.47 setRegion(c as CLLocationCoordinate2DMBS, animated as boolean = false) 799

19.32.49 setVisibleMapRect(coordinate as MKMapRectMBS, Animated as boolean = true)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Changes the currently visible portion of the map and optionally animates the change.
Notes: mapRect: The map rectangle to make visible in the map view.
animate: Specify true if you want the map view to animate the transition to the new map rectangle or false if you want the map to center on the specified rectangle immediately.
See also:

- 19.32.50 setVisibleMapRect(mapRect as MKMapRectMBS, edgePaddingLeft as Double, edgePaddingTop as Double, edgePaddingRight as Double, edgePaddingBottom as Double, animated as boolean) 800

19.32.50 setVisibleMapRect(mapRect as MKMapRectMBS, edgePaddingLeft as Double, edgePaddingTop as Double, edgePaddingRight as Double, edgePaddingBottom as Double, animated as boolean)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Changes the currently visible portion of the map, allowing you to specify additional space around the edges.
Notes: MapRect: The map rectangle to make visible in the map view.
edgePaddingLeft, edgePaddingTop, edgePaddingRight and edgePaddingBottom: The amount of additional space (measured in screen points) to make visible around the specified rectangle.
animate: Specify true if you want the map view to animate the transition to the new map rectangle or false if you want the map to center on the specified rectangle immediately.
See also:

- 19.32.49 setVisibleMapRect(coordinate as MKMapRectMBS, Animated as boolean = true) 800

19.32.51 setZoomLevel(zoomLevel as double, animated as boolean)

Plugin Version: 19.5, Platform: macOS, Targets: Desktop & iOS.

Function: Sets zoom level.
Notes: Zoomlevel is in range 1 to 20.

19.32.52 showAddress(address as string)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Convenience method to run an address geocoding and shows position on map.
Example:

```
dim mapview as MKMapViewMBS // your map view
mapView.showAddress "Markt 15, Andernach, Deutschland"
```

Notes: Uses CLGeocoderMBS geocodeAddressString method to asynchronously find the place and show it on the map.

19.32.53 ShowAllAnnotations(withOverlays as boolean = false)

Plugin Version: 22.0, Platform: macOS, Targets: Desktop & iOS.

Function: Zooms map to show all annotations.
Notes: The plugin loops over the annotations to calculate a bounding rectangle for all annotations and zoom the map to make them all visible with some border space around.

Added withOverlays parameter in v22.4 to include overlays in the calculation of the rectangle.

19.32.54 showAnnotations(annotations() as MKAnnotationMBS, animated as boolean)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Sets the visible region so that the map displays the specified annotations.
Notes: annotations: The annotations that you want to be visible in the map.
animated: true if you want the map region change to be animated, or NO if you want the map to display the new region immediately without animations.

Calling this method updates the value in the region property and potentially other properties to reflect the

new map region.

19.32.55 viewForAnnotation(annotation as MKAnnotationMBS) as MKAnnotationViewMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the annotation view associated with the specified annotation object, if any.
Example:

```
Function viewForAnnotation(mapView as MKMapViewMBS, annotation as MKAnnotationMBS) Handles viewForAnnotation as MKAnnotationViewMBS
// return nil for default annotation view

// new annotation view
Dim v As New MKAnnotationViewMBS(annotation)

// get a picture and use it as decoration
Dim pic As Picture = LogoMBS(100)
Dim img As New NSImageMBS(pic)
img.setSize(pic.Width/2, pic.Height/2) // half size gives 2x resolution, if the picture isn't retina aware

// set image and return
v.image = img

Return v
End Function
```

Notes: annotation: The annotation object whose view you want.

Returns the annotation view or nil if the view has not yet been created. This method may also return nil if the annotation is not in the visible map region and therefore does not have an associated annotation view.

19.32.56 Properties

19.32.57 annotationVisibleRect as NSRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The visible rectangle where annotation views are currently being displayed.
Notes: (Read only property)

19.32.58 camera as MKMapCameraMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The camera used for determining the appearance of the map.
Notes: A camera object defines a point above the map,Äôs surface from which to view the map. Applying a camera to a map can have the effect of giving the map a 3D-like appearance. You can use a camera to rotate the map so that it is oriented to match the user,Äôs heading or to apply a pitch angle to tilt the plane of the map. (You can check the map,Äôs pitchEnabled property to determine whether the map can be pitched.)

Assigning a new camera to this property updates the map immediately and without animating the change. If you want to animate changes in camera position, use the setCamera method instead.

You must not set this property to nil. To restore the map to a flat appearance, apply a camera with a pitch angle of 0, which yields a camera looking straight down onto the map surface.
(Read and Write property)

19.32.59 centerCoordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The map coordinate at the center of the map view.
Example:

```
dim mapview as MKMapViewMBS // your map view
dim centerCoordinate as CLLocationCoordinate2DMBS = mapview.centerCoordinate

// show center
MsgBox str(centerCoordinate.latitude)+" "+str(centerCoordinate.longitude)
```

Notes: Changing the value in this property centers the map on the new coordinate without changing the current zoom level. It also updates the values in the region property to reflect the new center coordinate and the new span values needed to maintain the current zoom level.

Changing the value of this property updates the map view immediately. If you want to animate the change, use the setCenterCoordinate method instead.
(Read and Write property)

19.32.60 mapType as Integer

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The type of data displayed by the map view.
Example:

```
dim mapview as MKMapViewMBS // your map view
mapView.mapType = mapView.MKMapTypeHybrid
```

Notes: Changing the value in this property may cause the receiver to begin loading new map content. For example, changing from MKMapTypeStandard to MKMapTypeSatellite might cause it to begin loading the satellite imagery needed for the map. If new data is needed, however, it is loaded asynchronously and appropriate messages are sent to the receiver's delegate indicating the status of the operation.
(Read and Write property)

19.32.61 PitchEnabled as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the map camera,Äôs pitch information is used.
Notes: When this property is set to true and a valid camera is associated with the map, the camera,Äôs pitch angle is used to tilt the plane of the map. When this property is set to NO, the camera,Äôs pitch angle is ignored and the map is always displayed as if the user is looking straight down onto it.
In an app, always check the value of this property to determine whether a map can support 3D.
(Read and Write property)

19.32.62 region as MKCoordinateRegionMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The area currently displayed by the map view.
Notes: The region encompasses both the latitude and longitude point on which the map is centered and the span of coordinates to display. The span values provide an implicit zoom value for the map. The larger the displayed area, the lower the amount of zoom. Similarly, the smaller the displayed area, the greater the amount of zoom.

Changing only the center coordinate of the region can still cause the span to change implicitly. The span might change because the distances represented by a span change at different latitudes and longitudes and the map view may need to adjust the span to account for the new location. If you want to change the center coordinate without changing the zoom level, use the centerCoordinate instead.

Changing the value of this property updates the map view immediately. When setting this property, the map may adjust the new region value so that it fits the visible area of the map precisely. This is normal and is done to ensure that the value in this property always reflects the visible portion of the map. However, it does mean that if you get the value of this property right after setting it, the returned value may not match

the value you set. (You can use the regionThatFits method to determine the region that will actually be set by the map.)

If you want to animate the change in region, use the setRegion method instead.
(Read and Write property)

19.32.63 RotateEnabled as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the map camera,Äôs heading information is used.
Notes: When this property is set to true and a valid camera is associated with the map, the camera,Äôs heading angle is used to rotate the plane of the map around its center point. When this property is set to false, the camera,Äôs heading angle is ignored and the map is always oriented so that true north is situated at the top of the map view.
(Read and Write property)

19.32.64 scrollEnabled as Boolean

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value that determines whether the user may scroll around the map.
Notes: This property controls only user interactions with the map. If you set the value of this property to NO, you may still change the map location programmatically by changing the value in the region property.

The default value of this property is true.
(Read and Write property)

19.32.65 showsBuildings as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean indicating whether the map displays extruded building information.
Notes: When this property is set to YES and the camera has a pitch angle greater than zero, the map extrudes buildings so that they extend above the map plane, creating a 3D effect. The mapType property must be set to MapTypeStandard for extruded buildings to be displayed. The default value of this property is true.
(Read and Write property)

19.32.66 ShowsCompass as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean indicating whether the map displays a compass control.
Notes: Use this property to show or hide a control that lets users change the heading orientation of the map.
(Read and Write property)

19.32.67 showsPointsOfInterest as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean indicating whether the map displays point-of-interest information.
Notes: When this property is set to true, the map displays icons and labels for restaurants, schools, and other relevant points of interest. The mapType property must be set to MapTypeStandard or MapTypeHybrid for points of interest to be displayed. The default value of this property is true.
(Read and Write property)

19.32.68 showsScale as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean indicating whether the map shows scale information.
Notes: The default value of this property is false.
(Read and Write property)

19.32.69 showsTraffic as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the map displays traffic information.
Notes: The mapType property must be set to MapTypeStandard or MapTypeHybrid for traffic information to be shown. The default value of this property is false.
(Read and Write property)

19.32.70 showsUserLocation as Boolean

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the map should try to display the user's location.
Notes: This property does not indicate whether the user's position is actually visible on the map, only

whether the map view should try to display it. Setting this property to true causes the map view to use the Core Location framework to find the current location and try to display it on the map. As long as this property is true, the map view continues to track the user's location and update it periodically. The default value of this property is false.

Showing the user's location does not guarantee that the location is visible on the map. The user might have scrolled the map to a different point, causing the current location to be offscreen. To determine whether the user's current location is currently displayed on the map, use the userLocationVisible property.
(Read and Write property)

19.32.71 showsZoomControls as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop only.

Function: A Boolean indicating whether the map displays zoom controls.
Notes: In macOS, use this property to show or hide the controls that let users change the zoom level of the map.
(Read and Write property)

19.32.72 userLocation as MKUserLocationMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The annotation object representing the user's current location.
Notes: (Read only property)

19.32.73 userLocationVisible as Boolean

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the device's current location is visible in the map view.
Notes: This property tells you whether the icon used to represent the user's current location is visible in the map view. When determining whether the current location is visible, this property factors in the horizontal accuracy of the location data. Specifically, if the rectangle represented by the user's current location plus or minus minus the horizontal accuracy of that location intersects the map's visible rectangle, this property contains the value true. If that location rectangle does not intersect the map's visible rectangle, this property contains the value false.

If the user's location cannot be determined, this property contains the value false.
(Read only property)

19.32.74 visibleMapRect as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The area currently displayed by the map view.
Notes: This property represents the same basic information as the region property but specified as a map rectangle instead of a region.
Changing the value of this property updates the map view immediately. If you want to animate the change, use the setVisibleMapRect method instead.
(Read and Write property)

19.32.75 zoomEnabled as Boolean

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value that determines whether the user may use pinch gestures to zoom in and out of the map.
Notes: This property controls only user interactions with the map. If you set the value of this property to NO, you may still change the zoom level programmatically by changing the value in the region property.

The default value of this property is true.
(Read and Write property)

19.32.76 zoomLevel as Double

Plugin Version: 19.5, Platform: macOS, Targets: Desktop & iOS.

Function: Queries current zoom level.
Example:

```
dim m as MKMapViewMBS // your map view

// zoom in one level
m.zoomLevel = m.zoomLevel + 1
```

Notes: A value between 1 and 20.
(Read and Write property)

19.32.77 Constants

Errors

Constant	Value	Description
ErrorDirectionsNotFound	4	The specified directions could not be found.
ErrorLoadingThrottled	2	The data was not loaded because data throttling is in effect. This error can occur if an app makes frequent requests for data over a short period of time.
ErrorPlacemarkNotFound	3	The specified placemark could not be found.
ErrorServerFailure	1	The map server was unable to return the desired information.
ErrorUnknown	0	An unknown error occurred.

Feature visibility

Constant	Value	Description
FeatureVisibilityAdaptive	0	For features in the normal state, title text is displayed and subtitle text is hidden. When a feature is selected, the title and subtitle text are hidden when the feature requires a callout.
FeatureVisibilityHidden	1	Always hidden.
FeatureVisibilityVisible	2	Always visible.

Map Types

Constant	Value	Description
MapTypeHybrid	2	Displays a satellite image of the area with road and road name information layered on top.
MapTypeHybridFlyover	4	A hybrid satellite image with flyover data where available.
MapTypeMutedStandard	5	A street map where your data is emphasized over the underlying map details.
MapTypeSatellite	1	Displays satellite imagery of the area.
MapTypeSatelliteFlyover	3	A satellite image of the area with flyover data where available.
MapTypeStandard	0	Displays a street map that shows the position of all roads and some road names.

Overlay Levels

Constant	Value	Description
OverlayLevelAboveLabels	1	Above labels
OverlayLevelAboveRoads	0	Above roads

19.33 class MKMarkerAnnotationViewMBS

19.33.1 class MKMarkerAnnotationViewMBS

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: An annotation view that displays a balloon-shaped marker at the designated location.
Notes: Return an instance of this class from the viewForAnnotation event of your map view delegate when you want to display the same types of markers used in the Maps app.
The default displayPriority for an instance of this class is FeatureDisplayPriorityDefaultLow.

Available on macOS 11.0
Subclass of the MKAnnotationViewMBS class.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 20.4
- MBS Xojo Plugins, version 20.4pr8

Xojo Developer Magazine

- 18.6, page 10: News

19.33.2 Methods

19.33.3 available as Boolean

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: Whether this class is available.
Notes: Returns true on macOS 11.0 and newer.

19.33.4 Constructor(annotation as MKAnnotationMBS, reuseIdentifier as string = "", EnableEvents as Boolean = false)

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

- 19.33.5 Constructor(Handle as Integer)

19.33.5 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMarkerAnnotationView reference from a declare.
The object is retained.
See also:

- 19.33.4 Constructor(annotation as MKAnnotationMBS, reuseIdentifier as string = "", EnableEvents as Boolean = false) 810

19.33.6 Properties

19.33.7 animatesWhenAdded as Boolean

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean that indicates whether the marker animates into position onscreen.
Notes: The default value of this property is false.
(Read and Write property)

19.33.8 glyphImage as NSImageMBS

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: An image to display in the marker balloon.
Notes: Use this property or the glyphText property to specify the marker balloon content. If you specify both an image and text, MapKit displays the text.
MapKit displays the glyph image when the marker is in the normal state. Create glyph images as template images so that MapKit can apply the glyph tint color to the image. Normally, you set the size of this image to 20 by 20 points on iOS and 40 by 40 points on tvOS. However, if you don,Äôt provide a separate selected image in the selectedGlyphImage property, make the size of this image 40 by 40 points on iOS and 60 by 40 points on tvOS instead. MapKit scales images that are larger or smaller than those sizes.
(Read and Write property)

19.33.9 glyphText as String

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: The text to display in the marker balloon.
Notes: Use this property or the glyphText property to specify the marker balloon content. If you specify both an image and text, MapKit displays the text.
MapKit limits the amount of space available for displaying your glyph text. Specify no more than two or

three characters for any strings you assign to this property.
(Read and Write property)

19.33.10 glyphTintColor as NSColorMBS

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: The color to apply to the glyph text or image.
Notes: The default value of this property is nil, which applies the standard tint color for the current map style.
(Read and Write property)

19.33.11 markerTintColor as NSColorMBS

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: The background color of the marker balloon.
Notes: The default value of this property is nil, which applies the standard color that,Äôs appropriate for the current map style.
(Read and Write property)

19.33.12 selectedGlyphImage as NSImageMBS

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: An image to display when the user selects the marker.
Notes: MapKit displays the glyph image when the marker is in the selected state. If you specify an image for this property, you should also specify an image in the glyphImage property.
Create glyph images as template images so that MapKit can apply the glyph tint color to the image. Set the size of this image to 40 by 40 points on iOS and 60 by 40 points on tvOS. MapKit scales images that are larger or smaller than those sizes.
(Read and Write property)

19.33.13 subtitleVisibility as Integer

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: The visibility of the subtitle text rendered beneath the marker balloon.
Notes: MapKit shows the text when the user selects a marker.
(Read and Write property)

19.33.14 titleVisibility as Integer

Plugin Version: 20.4, Platform: macOS, Targets: Desktop & iOS.

Function: The visibility of the title text rendered beneath the marker balloon.
Notes: (Read and Write property)

19.33.15 Constants

Feature Visibility

Constant	Value	Description
FeatureVisibilityAdaptive	0	A constant indicating that the feature adapts to the current map state.
FeatureVisibilityHidden	1	A constant indicating that the feature is always hidden.
FeatureVisibilityVisible	2	A constant indicating that the feature is always visible.

19.34 class MKMultiPointMBS

19.34.1 class MKMultiPointMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The MKMultiPoint class is an abstract superclass used to define shapes composed of multiple points.
Notes: You should not create instances of this class directly. Instead, you should create instances of the MKPolyline or MKPolygon classes. However, you can use the method and properties of this class to access information about the specific points associated with the line or polygon.
Subclass of the MKShapeMBS class.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 19.2, page 49: Maps Part 9,ÄîPutting GPS Data on the Map, Helping out a fellow coder with the MapKitMBS plugin by Markus Winter

19.34.2 Methods

19.34.3 Constructor

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.34.4 Constructor(Handle as Integer) 814

19.34.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMultiPoint reference from a declare.
The object is retained.
See also:

- 19.34.3 Constructor 814

19.34.5 Coordinates as MKMapPointMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Queries list of coordinates for all the points.

19.34.6 points as MKMapPointMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Queries array with points.

19.34.7 Properties

19.34.8 pointCount as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Queries number of points for this multi point object.
Notes: (Read only property)

19.35 class MKMultiPolygonMBS

19.35.1 class MKMultiPolygonMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: A collection of multiple closed polygon shapes.
Notes: Use a MKMultiPolygon when you have multiple distinct polygon shapes that you intend to render using the same style.
Available on macOS 10.15 and iOS 13 or newer.
Subclass of the MKShapeMBS class.
Blog Entries

- MBS Xojo Plugins, version 23.2pr5
- News from the MBS Xojo Plugins Version 21.3
- MBS Xojo Plugins, version 21.3pr3

Interfaces: MKOverlayMBS

19.35.2 Methods

19.35.3 boundingMapRect as MKMapRectMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The projected rectangle that encompasses the overlay.
Notes: This property contains the smallest rectangle that completely encompasses the overlay. Implementers of this interface must set this area when implementing their overlay class, and after setting it, you must not change it. The rectangle should be specified using projected coordinates—that is, coordinates obtained by projecting the globe onto a two-dimensional surface.

Part of the MKOverlayMBS interface.

19.35.4 canReplaceMapContent as Boolean

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Returns a Boolean indicating whether the overlay content replaces the underlying map content.
Notes: true if the map view can skip the loading and drawing of the underlying map tiles or false if the map tiles should still be drawn.

The map view uses the return value of this method as a hint to determine whether it should load and render its tiles. If your overlay covers its designated region entirely with opaque content, and effectively replaces

the content of underlying map tiles, implement this method and return true. Doing so alleviates the need for the map to render its tiles.
If you do not implement this method, or if you return false from it, the map view continues to load and render its tiles.

Part of MKOverlayMBS interface.

19.35.5 Constructor

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.35.6 Constructor(Handle as Integer) 817
- 19.35.7 Constructor(polygons() as MKPolygonMBS) 817

19.35.6 Constructor(Handle as Integer)

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMultiPolygon reference from a declare.
The object is retained.
See also:

- 19.35.5 Constructor 817
- 19.35.7 Constructor(polygons() as MKPolygonMBS) 817

19.35.7 Constructor(polygons() as MKPolygonMBS)

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Create a multipolygon object using the provided polygons.
See also:

- 19.35.5 Constructor 817
- 19.35.6 Constructor(Handle as Integer) 817

19.35.8 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The center point of the circular area, specified as a latitude and longitude.

19.35.9 intersectsMapRect(mapRect as MKMapRectMBS) as Boolean

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Whether this overlay intersects with the given map rectangle.
Notes: Part of the MKOverlayMBS interface.

19.35.10 multiPolygon(polygons() as MKPolygonMBS) as MKMultiPolygonMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Create a multipolygon object using the provided polygons.

19.35.11 polygons as MKPolygonMBS()

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: An array containing the polygons that make up the multipolygon object.

19.36 class MKMultiPolygonRendererMBS

19.36.1 class MKMultiPolygonRendererMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The visual representation for a multipolygon overlay.
Notes: Use this renderer to provide the style for multiple polygons created using MKMultiPolygonMBS.
Available on macOS 10.15 and iOS 13 or newer.
Subclass of the MKOverlayPathRendererMBS class.
Blog Entries

- News from the MBS Xojo Plugins Version 21.3
- MBS Xojo Plugins, version 21.3pr3

19.36.2 Methods

19.36.3 Constructor(Handle as Integer)

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMultiPolygonRenderer reference from a declare.
The object is retained.
See also:

- 19.36.4 Constructor(multiPolygon as MKMultiPolygonMBS) 819

19.36.4 Constructor(multiPolygon as MKMultiPolygonMBS)

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Initializes and returns a renderer that handles drawing for the specified multipolygon overlay object.
See also:

- 19.36.3 Constructor(Handle as Integer) 819

19.36.5 Properties

19.36.6 multiPolygon as MKMultiPolygonMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The multipolygon object that the renderer uses to draw the overlay,Äôs contents.
Notes: (Read only property)

19.37 class MKMultiPolylineMBS

19.37.1 class MKMultiPolylineMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: A collection of multipolyline shapes, each consisting of one or more connected line segments.
Notes: Use a MKMultiPolyline object when you have multiple distinct polyline shapes that you intend to render using the same style.
Available on macOS 10.15 and iOS 13 or newer.
Subclass of the MKShapeMBS class.
Blog Entries

- MBS Xojo Plugins, version 23.2pr5
- News from the MBS Xojo Plugins Version 21.3
- MBS Xojo Plugins, version 21.3pr3

Interfaces: MKOverlayMBS

19.37.2 Methods

19.37.3 boundingMapRect as MKMapRectMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The projected rectangle that encompasses the overlay.
Notes: This property contains the smallest rectangle that completely encompasses the overlay. Implementers of this interface must set this area when implementing their overlay class, and after setting it, you must not change it. The rectangle should be specified using projected coordinates—that is, coordinates obtained by projecting the globe onto a two-dimensional surface.

Part of the MKOverlayMBS interface.

19.37.4 canReplaceMapContent as Boolean

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Returns a Boolean indicating whether the overlay content replaces the underlying map content.
Notes: true if the map view can skip the loading and drawing of the underlying map tiles or false if the map tiles should still be drawn.

The map view uses the return value of this method as a hint to determine whether it should load and render its tiles. If your overlay covers its designated region entirely with opaque content, and effectively replaces

the content of underlying map tiles, implement this method and return true. Doing so alleviates the need for the map to render its tiles.
If you do not implement this method, or if you return false from it, the map view continues to load and render its tiles.

Part of MKOverlayMBS interface.

19.37.5 Constructor

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.37.6 Constructor(Handle as Integer) 822
- 19.37.7 Constructor(polylines() as MKPolylineMBS) 822

19.37.6 Constructor(Handle as Integer)

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMultiPolyline reference from a declare.
The object is retained.
See also:

- 19.37.5 Constructor 822
- 19.37.7 Constructor(polylines() as MKPolylineMBS) 822

19.37.7 Constructor(polylines() as MKPolylineMBS)

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Create a multipolyline object using the provided polylines.
See also:

- 19.37.5 Constructor 822
- 19.37.6 Constructor(Handle as Integer) 822

19.37.8 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The center point of the circular area, specified as a latitude and longitude.

19.37.9 intersectsMapRect(mapRect as MKMapRectMBS) as Boolean

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Whether this overlay intersects with the given map rectangle.
Notes: Part of the MKOverlayMBS interface.

19.37.10 multiPolyline(polylines() as MKPolylineMBS) as MKMultiPolylineMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Create a multipolyline object using the provided polylines.

19.37.11 polylines as MKPolylineMBS()

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: An array containing the polyline objects that make up the multipolyline object.

19.38 class MKMultiPolylineRendererMBS

19.38.1 class MKMultiPolylineRendererMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The visual representation for a multipolygon overlay.
Notes: Use this renderer to provide the style for multiple polygons created using MKMultiPolygonMBS.
Available on macOS 10.15 and iOS 13 or newer.
Subclass of the MKOverlayPathRendererMBS class.
Blog Entries

- News from the MBS Xojo Plugins Version 21.3
- MBS Xojo Plugins, version 21.3pr3

Videos

- Apple MapView In Xojo

19.38.2 Methods

19.38.3 Constructor(Handle as Integer)

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKMultiPolylineRenderer reference from a declare.
The object is retained.
See also:

- 19.38.4 Constructor(multiPolyline as MKMultiPolylineMBS) 824

19.38.4 Constructor(multiPolyline as MKMultiPolylineMBS)

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: Initializes and returns a renderer that handles drawing for the specified multipolygon overlay object.
See also:

- 19.38.3 Constructor(Handle as Integer) 824

19.38.5 Properties

19.38.6 multiPolyline as MKMultiPolylineMBS

Plugin Version: 21.3, Platforms: macOS, iOS, Targets: Desktop & iOS.

Function: The multipolygon object that the renderer uses to draw the overlay,Äôs contents.
Notes: (Read only property)

19.39 class MKOverlayPathRendererMBS

19.39.1 class MKOverlayPathRendererMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The visual representation for a path-based overlay.
Notes: Use this renderer when your overlay's shape is defined by a CGPath object. By default, this renderer fills and strokes the path using its current attributes.
You can use this class as-is or subclass to define additional drawing behaviors. If you subclass, you should override the createPath method and use that method to build the appropriate path object. To change the path, invalidate it and recreate the path using whatever new data your subclass has obtained.
Subclass of the MKOverlayRendererMBS class.
Blog Entries

- MapKit Framework for Xojo

19.39.2 Methods

19.39.3 applyFillProperties(context as CGContextMBS, zoomScale as double)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Applies the receiver,Äôs current fill-related drawing properties to the specified graphics context.
Notes: context: The graphics context used to draw the view,Äôs contents.
zoomScale: The current zoom scale used for drawing.

This is a convenience method for applying all of the drawing properties used when filling a path. This method applies the current fill color to the specified graphics context.

19.39.4 applyStrokeProperties(context as CGContextMBS, zoomScale as double)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Applies the receiver,Äôs current stroke-related drawing properties to the specified graphics context.
Notes: context: The graphics context used to draw the view,Äôs contents.
zoomScale: The current zoom scale used for drawing.

This is a convenience method for applying all of the drawing properties used when stroking a path. This method applies the stroke color, line width, line join, line cap, miter limit, line dash phase, and line dash attributes to the specified graphics context. This method applies the scale factor in the zoomScale parameter

to the line width and line dash pattern automatically so that lines scale appropriately.
This method does not save the current graphics state before applying the new attributes. If you want to preserve the existing state, you must save it yourself and restore it later when you finish drawing.

19.39.5 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.39.6 Constructor(Handle as Integer) 827

19.39.6 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKOverlayPathRenderer reference from a declare.
The object is retained.
See also:

- 19.39.5 Constructor 827

19.39.7 createPath

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates the path for the overlay.
Notes: The default implementation of this method does nothing. Subclasses should override it and use it to create the CGPathRef data type to be used for drawing. After creating the path, your implementation should assign it to the path property.

19.39.8 fillPath(path as CGPathMBS, context as CGContextMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Fills the area enclosed by the specified path.
Notes: path: The path to fill.
context: The graphics context in which to draw the path.

You must set the current fill color before calling this method. Typically you do this by calling the applyFillProperties method prior to drawing. If the fillColor property is currently nil, this method does nothing.

19.39.9 GetLineDashPattern as Integer()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: An array of numbers specifying the dash pattern to use for the path.
Notes: The array contains one or more numbers that indicate the lengths (measured in points) of the line segments and gaps in the pattern. The values in the array alternate, starting with the first line segment length, followed by the first gap length, followed by the second line segment length, and so on.
This property is set to nil by default, which indicates no line dash pattern.

19.39.10 invalidatePath

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Updates the path associated with the overlay renderer.
Notes: Call this method when a change in the path information would require you to recreate the overlay,Äôs path. This method sets the path property to nil and tells the overlay renderer to redisplay its contents.

19.39.11 SetLineDashPattern(values() as Integer)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Sets an array of numbers specifying the dash pattern to use for the path.
Notes: The array contains one or more numbers that indicate the lengths (measured in points) of the line segments and gaps in the pattern. The values in the array alternate, starting with the first line segment length, followed by the first gap length, followed by the second line segment length, and so on.
This property is set to nil by default, which indicates no line dash pattern.

19.39.12 strokePath(path as CGPathMBS, context as CGContextMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Draws a line along the specified path.
Notes: path: The path to draw.
context: The graphics context in which to draw the path.

You must set the current stroke color before calling this method. Typically you do this by calling the applyStrokePropertiesToContext method prior to drawing. If the strokeColor property is currently nil, this

method does nothing.

19.39.13 Properties

19.39.14 fillColor as NSColorMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The fill color to use for the path.
Notes: (Read and Write property)

19.39.15 lineCap as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The line cap style to apply to the open ends of the path.
Notes: The line cap style is applied to the start and end points of any open subpaths. This property does not affect closed subpaths. The default line cap style is kCGLineCapRound.
(Read and Write property)

19.39.16 lineDashPhase as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The offset (in points) at which to start drawing the dash pattern.
Notes: Use this property to start drawing a dashed line partway through a segment or gap. For example, a phase value of 6 for the patter 5-2-3-2 would cause drawing to begin in the middle of the first gap.
The default value of this property is 0.
(Read and Write property)

19.39.17 lineJoin as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The line join style to apply to corners of the path.
Notes: The default line join style is kCGLineJoinRound.
(Read and Write property)

19.39.18 lineWidth as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The stroke width to use for the path.
Notes: The default value of this property is 0.
(Read and Write property)

19.39.19 miterLimit as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The limiting value that helps avoid spikes at junctions between connected line segments.
Notes: The miter limit helps you avoid spikes in paths that use the kCGLineJoinMiter join style. If the ratio of the miter length—that is, the diagonal length of the miter join—to the line thickness exceeds the miter limit, the joint is converted to a bevel join. The default miter limit is 10, which results in the conversion of miters whose angle at the joint is less than 11 degrees.
(Read and Write property)

19.39.20 Path as CGPathMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The path representing the overlay,Äôs shape.
Notes: Getting the value of this property causes the path to be created (using the createPath method) if it does not already exist. You can assign a path object to this property explicitly. When assigning a new path object to this property, the overlay renderer stores a strong reference to the path you provide.
(Read and Write property)

19.39.21 strokeColor as NSColorMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The stroke color to use for the path.
Notes: (Read and Write property)

19.40 class MKOverlayRendererMBS

19.40.1 class MKOverlayRendererMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The shared infrastructure used to draw overlays on the map surface.
Notes: An overlay renderer draws the visual representation of an overlay object—that is, an object that conforms to the MKOverlayMBS interface. This class defines the drawing infrastructure used by the map view. Subclasses are expected to override the drawMapRect method to draw the contents of the overlay.
The Map Kit framework provides several concrete instances of overlay renderers. Specifically, it provides renderers for each of the concrete overlay objects. You can use one of these existing renderers or define your own subclasses if you want to draw the overlay contents differently.
Blog Entries

- MapKit Framework for Xojo

19.40.2 Methods

19.40.3 canDrawMapRect(Rect as MKMapRectMBS, zoomScale as Double) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a Boolean value indicating whether the overlay view is ready to draw its content.
Notes: mapRect: The map rectangle that needs to be updated.
zoomScale: The current scale factor applied to the map.

Returns true if this overlay renderer is ready to draw its contents on the map or false if it is not.

Overlay renderers can override this method in situations where they may depend on the availability of other information to draw their contents. For example, a renderer showing traffic information might want to delay drawing until it has all of the traffic data it needs. In such a case, it can return NO from this method to indicate that it is not ready. An overlay renderer might also return NO if it does not draw content in the specified rectangle.

If you return NO from this method, your application is responsible for calling the setNeedsDisplayInMapRect method when the overlay renderer subsequently becomes ready to draw its contents.
The default implementation of this method returns true.

19.40.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKOverlayRenderer reference from a declare.
The object is retained.
See also:

- 19.40.5 Constructor(overlay as MKOverlayMBS) 832

19.40.5 Constructor(overlay as MKOverlayMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns the overlay renderer and associates it with the specified overlay object.
Notes: overlay: The overlay object to use when drawing the overlay content on the map. This object provides the data needed to draw the overlay,Äôs shape. The overlay renderer stores a strong reference to this object.
Return Value

Initially, the overlay renderer assumes that the overlay is fully opaque and that it has a content scale factor of 1.0. You can change these values as needed using the alpha and contentScaleFactor properties.
See also:

- 19.40.4 Constructor(Handle as Integer) 831

19.40.6 drawMapRect(Rect as MKMapRectMBS, zoomScale as Double, context as CGContextMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Draws the overlay,Äôs contents at the specified location on the map.
Notes: mapRect: The map rectangle that needs to be updated. Your drawing code should avoid drawing outside of this rectangle.
zoomScale: The current zoom factor applied to the map content. You can use this value for configuring the stroke width of lines or other attributes that might be affected by the scale of the map,Äôs contents.
context: The graphics context to use for drawing the overlay,Äôs contents.

The default implementation of this method does nothing. Subclasses are expected to override this method and use it to draw the overlay,Äôs contents.

When determining where to draw content, make your initial calculations relative to the map itself. In other words, compute the position and size of any overlay content using map points and map rectangles, convert those values to regular CGPoint and CGRect types using the methods of this class, and then pass the converted points to any drawing primitives.
It is recommended that you use Core Graphics to draw any content for your overlays.

To improve drawing performance, the map view may divide your overlay into multiple tiles and render each one on a separate thread. Your implementation of this method must therefore be capable of safely running from multiple threads simultaneously. In addition, you should avoid drawing the entire contents of the overlay each time this method is called. Instead, always take the mapRect parameter into consideration and avoid drawing content outside that rectangle.

19.40.7 mapPointForPoint(point as CGPointMBS) as MKMapPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the point on the map that corresponds to the specified point in the overlay renderer,Äôs drawing area.
Notes: point: The point in the overlay,Äôs drawing area that you want to convert.
Returns the point on the two-dimensional map projection corresponding to the specified point.

19.40.8 mapRectForRect(Rect as CGRectMBS) as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the rectangle on the map that corresponds to the specified rectangle in the overlay renderer,Äôs drawing area.
Notes: rect: The rectangle in the overlay,Äôs drawing area that you want to convert.

Returns the rectangle on the two-dimensional map projection corresponding to the specified rectangle.

19.40.9 pointForMapPoint(mapRect as MKMapPointMBS) as CGPointMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the point in the overlay renderer,Äôs drawing area corresponding to the specified point on the map.
Notes: mapPoint: A point on the two-dimensional map projection. If you have a coordinate value (latitude and longitude), you can use the MKMapPointForCoordinate function to convert that coordinate to a map point.

Returns the point in the overlay,Äôs drawing area that corresponds to the map point.

19.40.10 RectForMapRect(mapRect as MKMapRectMBS) as CGRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the rectangle in the overlay renderer,Äôs drawing area corresponding to the specified rectangle on the map.
Notes: mapRect: A rectangle on the two-dimensional map projection.

Returns the rectangle in the overlay,Äôs drawing area that corresponds to the map rectangle.

19.40.11 RoadWidthAtZoomScale(zoomScale as double) as double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the width (in screen points) of roads on a map at the specified zoom level.
Notes: zoomScale: The scale factor currently applied to the map view.

Returns the width of roads, measured in screen points. You can use the returned value to set the width of lines in drawing code that traces the path of a road.

19.40.12 setNeedsDisplay

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Invalidates the entire contents of the overlay for all zoom scales.
Notes: This method causes the entire contents of the overlay to be redrawn during the next update cycle. This method invalidates the overlay regardless of the current zoom scale associated with the map.

19.40.13 setNeedsDisplayInMapRect(mapRect as MKMapRectMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Invalidates the specified portion of the overlay at all zoom scales.
Notes: mapRect: The portion of the overlay to update. Specify this value using a map coordinates.

Marking a rectangle as invalid causes that portion of the overlay to be redrawn during the next update cycle. This method invalidates the overlay regardless of the current zoom scale associated with the map.
See also:

- 19.40.14 setNeedsDisplayInMapRect(mapRect as MKMapRectMBS, zoomScale as double) 835

19.40.14 setNeedsDisplayInMapRect(mapRect as MKMapRectMBS, zoomScale as double)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Invalidates the specified portion of the overlay but only at the specified zoom scale.
Notes: mapRect: The portion of the overlay to update. Specify this value using a map coordinates.
zoomScale: The zoom scale for which you want to invalidate the overlay.

Marking a rectangle as invalid causes that portion of the overlay to be redrawn during the next update cycle.
This method invalidates the overlay only at the specified zoom scale.
See also:

- 19.40.13 setNeedsDisplayInMapRect(mapRect as MKMapRectMBS) 834

19.40.15 Properties

19.40.16 alpha as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The amount of transparency to apply to the overlay.
Notes: The value in this property can be in the range 0.0 to 1.0, where 0.0 represents total transparency and 1.0 represents total opacity. The default value of this property is 1.0.
(Read and Write property)

19.40.17 contentScaleFactor as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The scale factor used to draw the overlay,Äôs content.
Notes: The scale factor determines how content is mapped from the logical coordinate space (measured in points) to the device coordinate space (measured in pixels). This value is typically either 1.0 or 2.0. Higher scale factors indicate that each point is represented by more than one pixel on the screen. For example, if the scale factor is 2.0 and the drawing rectangle size is 50 x 50 points, the size of the underlying area is 100 x 100 pixels.
When drawing the content for your overlays, you can use this value to determine how best to render your content.
(Read only property)

19.40.18 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.40.19 overlay as MKOverlayMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The overlay object containing the data for drawing.
Notes: The overlay object contains the coordinate at which to draw the overlay and other information that your app provides.
(Read only property)

19.41 class MKPinAnnotationViewMBS

19.41.1 class MKPinAnnotationViewMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The MKPinAnnotationView class provides a concrete annotation view that displays a pin icon like the ones found in the Maps application.
Notes: Using this class, you can configure the type of pin to drop and whether you want the pin to be animated into place.
Subclass of the MKAnnotationViewMBS class.
Blog Entries

- Mapview with icons in Xojo
- MBS Xojo Plugins, version 19.3pr1
- MapKit Framework for Xojo

Xojo Developer Magazine

- 18.6, page 78: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.6, pages 65 to 67: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter

19.41.2 Methods

19.41.3 Constructor

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

19.41.4 Constructor(annotation as MKAnnotationMBS, reuseIdentifier as string = "", EnableEvents as Boolean = false)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

19.41.5 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKPinAnnotationView reference from a declare.
The object is retained.
See also:

19.41.6 greenPinColor as NSColorMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the standard color for green pins.
Notes: The system uses green pins to indicate starting points on the map.

19.41.7 purplePinColor as NSColorMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the standard color for purple pins.
Notes: The system uses purple pins to indicate user-specified points on the map.

19.41.8 redPinColor as NSColorMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the standard color for red pins.
Notes: The system uses red pins to indicate destination points on the map.

19.41.9 Properties

19.41.10 animatesDrop as Boolean

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Whether to animate the dropping of the pin.
Notes: (Read and Write property)

19.41.11 pinColor as Integer

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The color of the pin head.
Notes: The Maps application uses different pin colors for different types of map annotations. Your own map annotation should use the available pin colors in the same way.
Deprecated in favor of pinTintColor.
(Read and Write property)

19.41.12 pinTintColor as NSColorMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The color of the pin head.
Notes: Use this property to specify custom a custom color for your pin. You can also specify one of the standard pin colors.
(Read and Write property)

19.41.13 Constants

Color constants

Constant	Value	Description
ColorBlue	2	The head of the pin is blue. Purple pins indicate user-specified points on the map.
ColorGreen	1	The head of the pin is green. Green pins indicate starting points on the map.
ColorRed	0	The head of the pin is red. Red pins indicate destination points on the map.

19.42 class MKPlacemarkMBS

19.42.1 class MKPlacemarkMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: A MKPlacemark object stores placemark data for a given latitude and longitude.
Notes: Placemark data includes information such as the country, state, city, and street address associated with the specified coordinate. Placemark objects are typically generated by a MKReverseGeocoderMBS object, although you can also create them explicitly yourself.

A placemark is also an annotation and conforms to the MKAnnotationMBS interface, whose properties and methods include the placemark coordinate and other information. Because they are annotations, you can add them directly to the map view.
Subclass of the CLPlacemarkMBS class.
Blog Entries

- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 18.5, pages 81 to 83: Maps (Part 6), A deep dive into Annotations by Markus Winter
- 18.4, page 73: Maps Part 5 (Finding and Displaying Addresses), Implementing Maps in Xojo desktop apps with the MapKitMBS plug-in by Markus Winter
- 18.3, page 80: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter

Interfaces: MKAnnotationMBS

19.42.2 Methods

19.42.3 Constructor(coordinate as CLLocationCoordinate2DMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a placemark object using the specified coordinate only.
See also:

- 19.42.4 Constructor(coordinate as CLLocationCoordinate2DMBS, addressDictionary as dictionary) 841

19.42.4 Constructor(coordinate as CLLocationCoordinate2DMBS, addressDictionary as dictionary)

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a placemark object using the specified coordinate and Address Book dictionary.
Notes: You can create placemark objects manually for entities for which you already have address information, such as contacts in the Address Book. Creating a placemark object explicitly avoids the need to query the reverse geocoder object for the same information.
See also:

19.42.5 Constructor(coordinate as CLLocationCoordinate2DMBS, postalAddress as Variant)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a placemark object using the specified coordinate and CNPostalAddressMBS object.
Notes: You can create placemark objects manually for entities for which you already have address information, such as contacts in the Address Book. Creating a placemark object explicitly avoids the need to query the reverse geocoder object for the same information.
See also:

19.42.6 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKPlacemark reference from a declare.

The object is retained.
See also:

- 19.42.3 Constructor(coordinate as CLLocationCoordinate2DMBS) 840
- 19.42.4 Constructor(coordinate as CLLocationCoordinate2DMBS, addressDictionary as dictionary) 841
- 19.42.5 Constructor(coordinate as CLLocationCoordinate2DMBS, postalAddress as Variant) 841

19.42.7 Coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.42.8 SetCoordinate(newCoordinate as CLLocationCoordinate2DMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Set the coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.42.9 SubTitle as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKOverlayMBS interface.

19.42.10 Title as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.42.11 Properties

19.42.12 countryCode as String

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The abbreviated country name.
Notes: This string is the standard abbreviation used to refer to the country. For example, if the placemark location was Apple's headquarters, the value for this property would be the string "US".
(Read only property)

19.43 class MKPointAnnotationMBS

19.43.1 class MKPointAnnotationMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The MKPointAnnotation class defines a concrete annotation object located at a specified point.
Example:

```
dim mapview as MKMapViewMBS // your map view

// new pin
dim pin as new MKPointAnnotationMBS

pin.coordinate = mapView.centerCoordinate
pin.title = "Hello"

// show on map
mapView.addAnnotation pin
```

Notes: You can use this class, rather than define your own, in situations where all you want to do is associate a point on the map with a title.
Subclass of the MKShapeMBS class.
Blog Entries

- Mapview with icons in Xojo
- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

Xojo Developer Magazine

- 18.5, pages 84 to 85: Maps (Part 6), A deep dive into Annotations by Markus Winter
- 18.4, page 73: Maps Part 5 (Finding and Displaying Addresses), Implementing Maps in Xojo desktop apps with the MapKitMBS plug-in by Markus Winter
- 18.3, page 79: Xojo Maps, Part 4, Finding and Displaying Addresses with the MapKitMBS plugin by Markus Winter

19.43.2 Methods

19.43.3 Constructor

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
Example:

```
dim mapview as MKMapViewMBS // your map view

// new pin
dim pin as new MKPointAnnotationMBS

pin.coordinate = mapView.centerCoordinate
pin.title = "Hello"

// show on map
mapView.addAnnotation pin
```

See also:

- 19.43.4 Constructor(Handle as Integer) 845

19.43.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKPointAnnotation reference from a declare.
The object is retained.
See also:

- 19.43.3 Constructor 845

19.43.5 Properties

19.43.6 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate point of the annotation, specified as a latitude and longitude.
Notes: (Read and Write property)

19.44 class MKPolygonMBS

19.44.1 class MKPolygonMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The MKPolygon class represents a shape consisting of one or more points that define a closed polygon.
Notes: The points are connected end-to-end in the order they are provided. The first and last points are connected to each other to create the closed shape.

When creating a polygon, you can mask out portions of the polygon by specifying one or more interior polygons. For the polygons you specify, this class uses the even-odd fill rule to determine the final occupied area. When applied to overlapping polygons, this rule can cause specific regions to be masked out (and thereby removed) from the total occupied area. For more information about how fill rules are applied to paths, see "Paths" in Quartz 2D Programming Guide.
Subclass of the MKMultiPointMBS class.
Blog Entries

- News from the MBS Xojo Plugins Version 21.3
- MapKit Framework for Xojo

Xojo Developer Magazine

- 19.2, page 49: Maps Part 9,ÄîPutting GPS Data on the Map, Helping out a fellow coder with the MapKitMBS plugin by Markus Winter

Interfaces: MKOverlayMBS

19.44.2 Methods

19.44.3 boundingMapRect as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The projected rectangle that encompasses the overlay.
Notes: This property contains the smallest rectangle that completely encompasses the overlay. Implementers of this interface must set this area when implementing their overlay class, and after setting it, you must not change it. The rectangle should be specified using projected coordinates—that is, coordinates obtained by projecting the globe onto a two-dimensional surface.

Part of the MKOverlayMBS interface.

19.44.4 canReplaceMapContent as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a Boolean indicating whether the overlay content replaces the underlying map content.
Notes: true if the map view can skip the loading and drawing of the underlying map tiles or false if the map tiles should still be drawn.

The map view uses the return value of this method as a hint to determine whether it should load and render its tiles. If your overlay covers its designated region entirely with opaque content, and effectively replaces the content of underlying map tiles, implement this method and return true. Doing so alleviates the need for the map to render its tiles.
If you do not implement this method, or if you return false from it, the map view continues to load and render its tiles.

Part of MKOverlayMBS interface.

19.44.5 Constructor

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

19.44.6 Constructor(coords() as CLLocationCoordinate2DMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolygon object from the specified set of coordinates.
Notes: coords: The array of coordinates defining the shape.
Returns a new polygon object.
See also:

19.44.7 Constructor(coords() as CLLocationCoordinate2DMBS, InteriorPolygons() as MKPolygonMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolygon object from the specified set of map points and interior polygons.
Notes: points: The array of map points defining the shape. The data in this array is copied to the new object.
interiorPolygons: An array of MKPolygon objects that define one or more cutout regions for the receiver,Äôs polygon.
See also:

19.44.8 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKPolygon reference from a declare.
The object is retained.
See also:

19.44.9 Constructor(points() as MKMapPointMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolygon object from the specified set of map points.
Notes: points: The array of map points defining the shape. The data in this array is copied to the new object.
See also:

- 19.44.5 Constructor 847
- 19.44.6 Constructor(coords() as CLLocationCoordinate2DMBS) 847
- 19.44.7 Constructor(coords() as CLLocationCoordinate2DMBS, InteriorPolygons() as MKPolygonMBS) 848
- 19.44.8 Constructor(Handle as Integer) 848
- 19.44.10 Constructor(points() as MKMapPointMBS, InteriorPolygons() as MKPolygonMBS) 849

19.44.10 Constructor(points() as MKMapPointMBS, InteriorPolygons() as MKPolygonMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolygon object from the specified set of map points and interior polygons.
Notes: points: The array of map points defining the shape. The data in this array is copied to the new object.
interiorPolygons: An array of MKPolygon objects that define one or more cutout regions for the receiver,Äôs polygon.
See also:

- 19.44.5 Constructor 847
- 19.44.6 Constructor(coords() as CLLocationCoordinate2DMBS) 847
- 19.44.7 Constructor(coords() as CLLocationCoordinate2DMBS, InteriorPolygons() as MKPolygonMBS) 848
- 19.44.8 Constructor(Handle as Integer) 848
- 19.44.9 Constructor(points() as MKMapPointMBS) 849

19.44.11 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.44.12 interiorPolygons as MKPolygonMBS()

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The array of polygons nested inside the receiver.
Notes: When a polygon is rendered on screen, the area occupied by any interior polygons is masked out and not considered part of the polygon.

19.44.13 intersectsMapRect(mapRect as MKMapRectMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Whether this overlay intersects with the given map rectangle.
Notes: Part of the MKOverlayMBS interface.

19.44.14 polygonWithCoordinates(coords() as CLLocationCoordinate2DMBS) as MKPolygonMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolygon object from the specified set of coordinates.
Notes: coords: The array of coordinates defining the shape.
Returns a new polygon object.
See also:

- 19.44.15 polygonWithCoordinates(coords() as CLLocationCoordinate2DMBS, InteriorPolygons() as MKPolygonMBS) as MKPolygonMBS 850

19.44.15 polygonWithCoordinates(coords() as CLLocationCoordinate2DMBS, InteriorPolygons() as MKPolygonMBS) as MKPolygonMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolygon object from the specified set of coordinates and interior polygons.
Notes: coords: The array of coordinates defining the shape.
interiorPolygons: An array of MKPolygon objects that define one or more cutout regions for the receiver's polygon.

Returns a new polygon object.
See also:

- 19.44.14 polygonWithCoordinates(coords() as CLLocationCoordinate2DMBS) as MKPolygonMBS 850

19.44.16 polygonWithPoints(points() as MKMapPointMBS) as MKPolygonMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolygon object from the specified set of map points.
Notes: points: The array of map points defining the shape. The data in this array is copied to the new object.
See also:

- 19.44.17 polygonWithPoints(points() as MKMapPointMBS, InteriorPolygons() as MKPolygonMBS) as MKPolygonMBS 851

19.44.17 polygonWithPoints(points() as MKMapPointMBS, InteriorPolygons() as MKPolygonMBS) as MKPolygonMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolygon object from the specified set of map points and interior polygons.
Notes: points: The array of map points defining the shape. The data in this array is copied to the new object.
interiorPolygons: An array of MKPolygon objects that define one or more cutout regions for the receiver‚Äôs polygon.
See also:

- 19.44.16 polygonWithPoints(points() as MKMapPointMBS) as MKPolygonMBS 851

19.45 class MKPolygonRendererMBS

19.45.1 class MKPolygonRendererMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The visual representation for a polygon overlay.
Notes: This renderer fills and strokes the polygon represented by first filling the shape and then stroking its outline. You can change the color and other drawing attributes of the polygon by modifying the properties inherited from the parent class. You typically use this class as is and do not subclass it.
Subclass of the MKOverlayPathRendererMBS class.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 19.2, page 49: Maps Part 9,ÄîPutting GPS Data on the Map, Helping out a fellow coder with the MapKitMBS plugin by Markus Winter

19.45.2 Methods

19.45.3 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKPolygonRenderer reference from a declare.
The object is retained.
See also:

- 19.45.4 Constructor(polygon as MKPolygonMBS) 852

19.45.4 Constructor(polygon as MKPolygonMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a new renderer that handles drawing for the specified polygon overlay object.
Notes: polygon: The polygon overlay containing information about the area to be drawn. This object must have at least three points defining the polygon to draw. This parameter must not be nil.
See also:

- 19.45.3 Constructor(Handle as Integer) 852

19.45.5 Properties

19.45.6 polygon as MKPolygonMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The polygon object that contains the information used to draw the overlay,Äôs contents.
Notes: (Read only property)

19.46 class MKPolylineMBS

19.46.1 class MKPolylineMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The MKPolyline class represents a shape consisting of one or more points that define connecting line segments.
Notes: The points are connected end-to-end in the order they are provided. The first and last points are not connected to each other.
Subclass of the MKMultiPointMBS class.
Blog Entries

- News from the MBS Xojo Plugins Version 21.3
- MapKit Framework for Xojo

Xojo Developer Magazine

- 19.4, page 55: Maps,ÄîPart 10, Mapping GPS data with the MapKitMBS plugin by Markus Winter
- 19.4, pages 47 to 49: Maps,ÄîPart 10, Mapping GPS data with the MapKitMBS plugin by Markus Winter
- 19.2, page 49: Maps Part 9,ÄîPutting GPS Data on the Map, Helping out a fellow coder with the MapKitMBS plugin by Markus Winter

Interfaces: MKOverlayMBS

19.46.2 Methods

19.46.3 boundingMapRect as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The projected rectangle that encompasses the overlay.
Notes: This property contains the smallest rectangle that completely encompasses the overlay. Implementers of this interface must set this area when implementing their overlay class, and after setting it, you must not change it. The rectangle should be specified using projected coordinates—that is, coordinates obtained by projecting the globe onto a two-dimensional surface.

Part of the MKOverlayMBS interface.

19.46.4 canReplaceMapContent as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a Boolean indicating whether the overlay content replaces the underlying map content.
Notes: true if the map view can skip the loading and drawing of the underlying map tiles or false if the map tiles should still be drawn.

The map view uses the return value of this method as a hint to determine whether it should load and render its tiles. If your overlay covers its designated region entirely with opaque content, and effectively replaces the content of underlying map tiles, implement this method and return true. Doing so alleviates the need for the map to render its tiles.
If you do not implement this method, or if you return false from it, the map view continues to load and render its tiles.

Part of MKOverlayMBS interface.

19.46.5 Constructor

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.46.6 Constructor(coords() as CLLocationCoordinate2DMBS) 855
- 19.46.7 Constructor(Handle as Integer) 856
- 19.46.8 Constructor(points() as MKMapPointMBS) 856

19.46.6 Constructor(coords() as CLLocationCoordinate2DMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolyline object from the specified set of coordinates.
Notes: coords: The array of coordinates defining the shape. The data in this array is copied to the new object.
Returns a new polyline object.
See also:

- 19.46.5 Constructor 855
- 19.46.7 Constructor(Handle as Integer) 856
- 19.46.8 Constructor(points() as MKMapPointMBS) 856

19.46.7 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKPolyline reference from a declare.
The object is retained.
See also:

- 19.46.5 Constructor 855
- 19.46.6 Constructor(coords() as CLLocationCoordinate2DMBS) 855
- 19.46.8 Constructor(points() as MKMapPointMBS) 856

19.46.8 Constructor(points() as MKMapPointMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolyline object from the specified set of map points.
Notes: points: The array of map points defining the shape. The data in this array is copied to the new object.
See also:

- 19.46.5 Constructor 855
- 19.46.6 Constructor(coords() as CLLocationCoordinate2DMBS) 855
- 19.46.7 Constructor(Handle as Integer) 856

19.46.9 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.46.10 intersectsMapRect(mapRect as MKMapRectMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Whether this overlay intersects with the given map rectangle.
Notes: Part of the MKOverlayMBS interface.

19.46.11 polylineWithCoordinates(coords() as CLLocationCoordinate2DMBS) as MKPolylineMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolyline object from the specified set of coordinates.
Notes: coords: The array of coordinates defining the shape. The data in this array is copied to the new object.
Returns a new polyline object.

19.46.12 polylineWithPoints(points() as MKMapPointMBS) as MKPolylineMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Creates and returns an MKPolyline object from the specified set of map points.
Notes: points: The array of map points defining the shape. The data in this array is copied to the new object.

19.47 class MKPolylineRendererMBS

19.47.1 class MKPolylineRendererMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The visual representation for any polyline overlay object.
Notes: This renderer strokes the line only; it does not fill it. You can change the color and other drawing attributes of the polyline by modifying the properties inherited from the parent class. You typically use this class as is and do not subclass it.
Subclass of the MKOverlayPathRendererMBS class.
Blog Entries

- MapKit Framework for Xojo

19.47.2 Methods

19.47.3 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKPolylineRenderer reference from a declare.
The object is retained.
See also:

- 19.47.4 Constructor(polyline as MKPolylineMBS) 858

19.47.4 Constructor(polyline as MKPolylineMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a new overlay view using the specified polyline overlay object
Notes: polyline: The polyline overlay containing information about the area to be drawn. This object must have at least two points defining the line segment to draw. This parameter must not be nil.
See also:

- 19.47.3 Constructor(Handle as Integer) 858

19.47.5 Properties

19.47.6 polyline as MKPolylineMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The polyline overlay object that contains the information used to draw the overlay.
Notes: (Read only property)

19.48 class MKRouteMBS

19.48.1 class MKRouteMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A single route between a requested start and end point.
Notes: An MKRouteMBS object defines the geometry for the route—that is, it contains line segments associated with specific map coordinates. A route object may also include other information, such as the name of the route, its distance, and the expected travel time.

You do not create instances of this class directly. When you use an MKDirectionsMBS object to request directions from Apple, the returned MKDirectionsResponseMBS object contains the possible routes.
Blog Entries

- MapKit Framework for Xojo

Videos

- Apple MapView In Xojo

19.48.2 Methods

19.48.3 advisoryNotices as String()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: An array of advisory notice strings for the route.
Notes: This property contains an array of strings. Each string is localized according to the user,Äôs language preferences. The strings contain additional information that is important for the user to know about the route. For example, a string might note that a portion of the route is closed during the winter or after big storms.

19.48.4 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.48.5 Constructor(Handle as Integer) 861

19.48.5 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKRoute reference from a declare.
The object is retained.
See also:

- 19.48.4 Constructor 860

19.48.6 steps as MKRouteStepMBS()

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The array of steps that comprise the overall route.
Notes: The array contains one or more MKRouteStep objects representing distinct portions of the route. Each step corresponds to a single direction that must be followed along the route.

19.48.7 Properties

19.48.8 distance as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The route distance in meters.
Notes: This property reflects the distance that the user covers while traversing the path of the route. It is not a direct distance between the start and end points of the route.
(Read only property)

19.48.9 expectedTravelTime as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The expected travel time in seconds.
Notes: This expected travel time reflects the time it takes to traverse the route under ideal conditions. The actual amount of time may vary based on conditions.
(Read only property)

19.48.10 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.48.11 name as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The name assigned to the route.
Notes: The string in this property is localized according to the user,Äôs language preferences. You can display this string to the user from your app,Äôs user interface so that the user can distinguish one route from another.
The string itself describes the route using one of the route,Äôs significant features. For example, a route that uses a major highway for a significant portion of the route might use that highway for its name.
(Read only property)

19.48.12 polyline as MKPolylineMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The detailed route geometry.
Notes: The polyline object in this property reflects the complete path of the route, including all of its steps. You can use the polyline object as an overlay in a map view.
(Read only property)

19.48.13 transportType as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The overall route transport type.
Notes: This property reflects the primary transport type used for the route. Individual steps of the route might use different transport types.
(Read only property)

19.48.14 Constants

Transport Types

Constant	Value	Description
TransportTypeAny	&h0FFFFFFF	Directions suitable for any transportation option.
TransportTypeAutomobile	1	Directions suitable for use while driving.
TransportTypeTransit	3	Directions suitable for public transportation.
TransportTypeWalking	2	Directions suitable for a pedestrian.

19.49 class MKRouteStepMBS

19.49.1 class MKRouteStepMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: One portion of an overall route.
Notes: Each MKRouteStepMBS object corresponds to a single instruction that would need to be followed by the user when navigating between two points. For example, a step might involve following a single road until a turn is required.

You do not create instances of this class directly. An MKRouteMBS object contains the MKRouteStepMBS objects associated with a route. For more information about requesting directions, see MKDirectionsMBS.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MapKit Framework for Xojo

19.49.2 Methods

19.49.3 Constructor

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.

19.49.4 Properties

19.49.5 distance as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The step distance in meters.
Notes: This property reflects the distance that the user covers while traversing the path of the step. It is not a direct distance between the start and end points of the step.
(Read only property)

19.49.6 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.

Notes: (Read and Write property)

19.49.7 instructions as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The written instructions for following the path represented by this step.
Notes: The string in this property is localized according to the user,Äôs language preferences. You can present this string to the user from your app,Äôs interface.
(Read only property)

19.49.8 notice as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Additional notices that apply to the step.
Notes: Notices may include legal information or warning notices that apply to the step. For example, if the step crosses railroad tracks, it might contain a notice that warns the user not to cross the tracks when the lights are flashing.
(Read only property)

19.49.9 polyline as MKPolylineMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The detailed step geometry.
Notes: The polyline object in this property contains the geometry for this step. You can use the polyline object as an overlay in a map view.
(Read only property)

19.49.10 transportType as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The transport type of the step.
Notes: This property reflects the transport type employed by the step and may differ from the transport type of the overall route.
(Read only property)

19.49.11 Constants

Transport Types

Constant	Value	Description
TransportTypeAny	&h0FFFFFFF	Directions suitable for any transportation option.
TransportTypeAutomobile	1	Directions suitable for use while driving.
TransportTypeTransit	3	Directions suitable for public transportation.
TransportTypeWalking	2	Directions suitable for a pedestrian.

19.50 class MKShapeMBS

19.50.1 class MKShapeMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The MKShape class is an abstract class that defines the basic properties for all shape-based annotation objects.
Notes: This class must be subclassed and cannot be used as is. Subclasses are responsible for defining the geometry of the shape and providing an appropriate value for the coordinate property inherited from the MKAnnotationMBS interface.
Blog Entries

- MapKit Framework for Xojo

Interfaces: MKAnnotationMBS

19.50.2 Methods

19.50.3 Constructor

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.50.4 Constructor(Handle as Integer) 867

19.50.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKShape reference from a declare.
The object is retained.
See also:

- 19.50.3 Constructor 867

19.50.5 Coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.50.6 SetCoordinate(newCoordinate as CLLocationCoordinate2DMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Set the coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.50.7 SubTitle as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKAnnotationMBS interface.
See also:

- 19.50.11 subtitle as String 868

19.50.8 Title as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
See also:

- 19.50.12 title as String 869

19.50.9 Properties

19.50.10 Handle as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Internal object reference.
Notes: (Read and Write property)

19.50.11 subtitle as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKAnnotationMBS interface.

(Read and Write property)
See also:

- 19.50.7 SubTitle as String 868

19.50.12 title as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
(Read and Write property)
See also:

- 19.50.8 Title as String 868

19.51 class MKTileOverlayMBS

19.51.1 class MKTileOverlayMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: MKTileOverlay represents a data source for raster image tiles in the spherical mercator projection (EPSG:3857).
Blog Entries

- MapKit Framework for Xojo

Interfaces: MKOverlayMBS, MKAnnotationMBS

19.51.2 Methods

19.51.3 boundingMapRect as MKMapRectMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The projected rectangle that encompasses the overlay.
Notes: This property contains the smallest rectangle that completely encompasses the overlay. Implementers of this interface must set this area when implementing their overlay class, and after setting it, you must not change it. The rectangle should be specified using projected coordinates—that is, coordinates obtained by projecting the globe onto a two-dimensional surface.

Part of the MKOverlayMBS interface.

19.51.4 canReplaceMapContent as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a Boolean indicating whether the overlay content replaces the underlying map content.
Notes: true if the map view can skip the loading and drawing of the underlying map tiles or false if the map tiles should still be drawn.

The map view uses the return value of this method as a hint to determine whether it should load and render its tiles. If your overlay covers its designated region entirely with opaque content, and effectively replaces the content of underlying map tiles, implement this method and return true. Doing so alleviates the need for the map to render its tiles.
If you do not implement this method, or if you return false from it, the map view continues to load and render its tiles.

Part of MKOverlayMBS interface.
See also:

- 19.51.15 canReplaceMapContent as Boolean 873

19.51.5 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKTileOverlay reference from a declare.
The object is retained.
See also:

- 19.51.6 Constructor(URL as string) 871

19.51.6 Constructor(URL as string)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a tile overlay object using the specified tile-access template.
Notes: URLTemplate: A string that can be used to build a URL to access your tile images. The string you specify can point to a local file or to an image on a remote server. To facilitate retrieving multiple tiles using the string, use the placeholder values { x } , { y } , { z } , and { scale } as stand-ins for the x and y tile indexes, the zoom level, and the resolution of the tile image. If this parameter is nil, you must provide custom implementations for the tile-loading methods of this class.

Returns an initialized tile overlay object.

The default tile overlay object uses the template string you specify to request tiles. This template string should incorporate the { x } , { y } , { z } , and { scale } placeholder strings to facilitate the creation of a URL for requesting the appropriate tile. For example, if you have a server that vends tiles when you provide a URL of the form http://myserver/tile?x=0&y=0&z=0&scale=1.0, you would specify a template string of http://myserver/tile?x= { x } &y= { y } &z= { z } &scale= { scale } . The tile overlay object substitutes actual index values in for your template,Äôs placeholders before requesting the actual tile.
See also:

- 19.51.5 Constructor(Handle as Integer) 871

19.51.7 Coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.
See also:

- 19.51.16 coordinate as CLLocationCoordinate2DMBS 874

19.51.8 intersectsMapRect(mapRect as MKMapRectMBS) as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Whether this overlay intersects with the given map rectangle.
Notes: Part of the MKOverlayMBS interface.

19.51.9 loadTileAtPath(Path as MKTileOverlayPathMBS, tag as Variant = nil)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Loads the specified tile asynchronously.
Notes: Path: The path structure that identifies the specific tile you want. This structure incorporates the tile,Äôs X-Y coordinate at a given zoom level and scale factor.

The default implementation of this method uses the URLForTilePath method to retrieve the URL for the specified tile and then loads that tile into memory asynchronously using an NSURLConnectionMBS object. The specified tile may be located either on the local file system or on a remote server. Subclasses may override this method and implement their own custom tile-loading behavior.

When a tile overlay renderer (that is, an instance of MKTileOverlayRendererMBS) needs to display tiles, it uses this method to request the data for each tile.

19.51.10 SetCoordinate(newCoordinate as CLLocationCoordinate2DMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Set the coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.51.11 SubTitle as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKOverlayMBS interface.
See also:

- 19.51.22 subtitle as String 875

19.51.12 Title as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
See also:

- 19.51.24 title as String 876

19.51.13 URLForTilePath(Path as MKTileOverlayPathMBS) as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the URL to use to access the specified tile.
Notes: path: The path structure that identifies the specific tile you want. This structure incorporates the tile,Äôs X-Y coordinate at a given zoom level and scale factor.

Returns the URL to use to retrieve the tile.

The default implementation of this method uses the template string you provided at initialization time to build a URL to the specified tile image. Subclasses can override this method and use a different scheme to provide URLs for tiles. Tiles can be located either on a local file system or on a remote server.

19.51.14 Properties

19.51.15 canReplaceMapContent as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value that indicates whether the tile content is fully opaque.
Notes: If the tile content you provide can cover the entire drawing area with opaque content, set this property to true. Doing so serves as a hint to the map view that it does not need to draw any additional content underneath your tiles. Set this property to false if your tiles contain any transparency.
The default value for this property is false.
(Read and Write property)
See also:

19.51.16 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.
(Read only property)
See also:

19.51.17 geometryFlipped as Boolean

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value that indicates the orientation of tile indexes along the y axis.
Notes: When set to NO, tile indexes start in the upper-left corner of the map and proceed down and to the right. Thus, the tile at (0, 0) is in the upper-left corner of the map, the tile at (1, 0) is to its immediate right and the tile at (0, 1) is immediately below it. Setting this property to true causes the map to start indexes at the lower-left corner of the map and proceed up and to the right.
The default value of this property is false.
(Read and Write property)

19.51.18 latitude as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The latitude of the coordinates.
Notes: (Read only property)

19.51.19 longitude as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The longitude of the coordinates.
Notes: (Read only property)

19.51.20 maximumZ as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The maximum zoom level supported by the tiles of this overlay object.
Notes: If you use different overlay objects to represent different tiles at different zoom levels, use this property to specify the maximum zoom level supported by this overlay,Äôs tiles. At zoom level 0, tiles cover the entire world map; at zoom level 1, tiles cover 1/4 of the world; at zoom level 2, tiles cover 1/16 of the world, and so on. The map never tries to load tiles for a zoom level greater than the value specified by this property.
The default value of this property is 21. Setting the value of this property to a number greater than the default does not guarantee the use of those extra zoom levels.
(Read and Write property)

19.51.21 minimumZ as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The minimum zoom level supported by the tiles of this overlay object.
Notes: If you use different overlay objects to represent different tiles at different zoom levels, use this property to specify the minimum zoom level supported by this overlay,Äôs tiles. At zoom level 0, tiles cover the entire world map; at zoom level 1, tiles cover 1/4 of the world; at zoom level 2, tiles cover 1/16 of the world, and so on. The map never tries to load tiles for a zoom level less than the value specified by this property.

The default value of this property is 0.
(Read and Write property)

19.51.22 subtitle as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKOverlayMBS interface.
(Read only property)
See also:

- 19.51.11 SubTitle as String 872

19.51.23 TileSize as CGSizeMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The size (in pixels) of your tile images.
Notes: On Retina displays, the images are rendered pixel for pixel and are not scaled. This means that if

the tile size is 256 x 256 pixels and the scale factor is 2.0, the image would be rendered as if it were 128 x 128 points in size. This behavior causes the tile to appear smaller but preserves the original image data. The default tile size is set to 256 x 256 pixels.
(Read and Write property)

19.51.24 title as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.
(Read only property)
See also:

- 19.51.12 Title as String 873

19.51.25 URLTemplate as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The template for generating tile image URLs.
Notes: You specify this string at initialization time.
(Read only property)

19.51.26 Events

19.51.27 TileLoaded(path as MKTileOverlayPathMBS, tileData as MemoryBlock, error as NSErrorMBS, tag as Variant)

Plugin Version: 19.0, Platform: macOS, Targets: .

Function: Called by loadTileAtPath when loading finished.
Notes: The tileData parameter contains the raw data loaded from the corresponding image file. You can use this data to initialize an image object. If an error occurred, this parameter is nil.

The error parameter contains an error object if there was a problem loading the tile image. If no errors occurred, this parameter is nil.

19.52 class MKTileOverlayPathMBS

19.52.1 class MKTileOverlayPathMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Use this class to specify the index values for a single tile.
Blog Entries

- MapKit Framework for Xojo

19.52.2 Methods

19.52.3 Constructor(other as MKTileOverlayPathMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The copy constructor.
See also:

- 19.52.4 Constructor(x as Integer, y as Integer, z as Integer, ContentScaleFactor as double) 877

19.52.4 Constructor(x as Integer, y as Integer, z as Integer, ContentScaleFactor as double)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The constructor.
See also:

- 19.52.3 Constructor(other as MKTileOverlayPathMBS) 877

19.52.5 Properties

19.52.6 ContentScaleFactor as Double

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The screen scale factor for which the tile is intended.
Notes: (Read and Write property)

19.52.7 X as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The index of the tile along the x axis of the map.
Notes: (Read and Write property)

19.52.8 Y as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The index of the tile along the y axis of the map.
Notes: (Read and Write property)

19.52.9 Z as Integer

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The zoom level number for the tile.
Notes: (Read and Write property)

19.53 class MKTileOverlayRendererMBS

19.53.1 class MKTileOverlayRendererMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The renderer for a tile overlay that handles the drawing of bitmap images on the map surface.
Notes: You create instances of this class when tile overlays become visible on the map view. A renderer works closely with its associated tile overlay object to coordinate the loading and drawing of tiles at appropriate times.
For information about how to specify the tiles to display on the map, see MKTileOverlayMBS.
Subclass of the MKOverlayRendererMBS class.
Blog Entries

- MapKit Framework for Xojo

19.53.2 Methods

19.53.3 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKTileOverlayRenderer reference from a declare.
The object is retained.
See also:

- 19.53.4 Constructor(TileOverlay as MKTileOverlayMBS) 879

19.53.4 Constructor(TileOverlay as MKTileOverlayMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes and returns a tile renderer with the specified overlay object.
Notes: overlay: The tile overlay object whose contents you want to draw.
See also:

- 19.53.3 Constructor(Handle as Integer) 879

19.53.5 reloadData

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Forces tiles to be reloaded and displayed.
Notes: Use this method to remove the overlay,Äôs existing tile images and reload them from the original

source. This method automatically causes the renderer to redraw the new tiles as soon as they are loaded into memory.

19.54 class MKUserLocationMBS

19.54.1 class MKUserLocationMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The MKUserLocation class defines a specific type of annotation that identifies the user's current location.
Notes: You do not create instances of this class directly. Instead, you retrieve an existing MKUserLocation object from the userLocation property of the map view displayed in your application.
Blog Entries

- MapKit Framework for Xojo

Xojo Developer Magazine

- 18.6, page 79: MapKit Part 7, Implementing Maps in Xojo desktop apps with the MapKitMBS plugin by Markus Winter
- 18.5, page 88: Maps (Part 6), A deep dive into Annotations by Markus Winter

Interfaces: MKAnnotationMBS

19.54.2 Methods

19.54.3 Constructor

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.
See also:

- 19.54.4 Constructor(Handle as Integer) 881

19.54.4 Constructor(Handle as Integer)

Plugin Version: 21.3, Platform: macOS, Targets: Desktop & iOS.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a MKUserLocation reference from a declare.
The object is retained.
See also:

- 19.54.3 Constructor 881

19.54.5 Coordinate as CLLocationCoordinate2DMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.54.6 SetCoordinate(newCoordinate as CLLocationCoordinate2DMBS)

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: Set the coordinate of the annotation.
Notes: Part of the MKAnnotationMBS interface.
Do not use.

19.54.7 SubTitle as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The subtitle of the item.
Notes: Part of the MKOverlayMBS interface.

19.54.8 Title as String

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The title of the annotation.
Notes: Part of the MKAnnotationMBS interface.

19.54.9 Properties

19.54.10 heading as CLHeadingMBS

Plugin Version: 19.0, Platform: macOS, Targets: Desktop & iOS.

Function: The heading for the user location.
Notes: Returns nil if not in MKUserTrackingModeFollowWithHeading is used.
(Read only property)

19.54.11 location as CLLocationMBS

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: The current location of the device.
Notes: This property contains nil if the map view is not currently showing the user location or if the user's location has not yet been determined.
(Read only property)

19.54.12 updating as Boolean

Plugin Version: 14.1, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value indicating whether the user's location is currently being updated.
Notes: (Read only property)

Chapter 20

Media Keys

20.1 class MediaKeysMBS

20.1.1 class MediaKeysMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Catch some special keys with this class.
Example:

```
dim m as MediaKeysMBS // global property!

// app initialization
m = new MediaKeysMBS

// set which keys to watch for
m.Keys(MediaKeysMBS.kMediaKeyEject) = MediaKeysMBS.kModeEventAndBlock

// and start
m.startWatchingMediaKeys
```

Notes: First written to catch play, fast and rewind keys from Apple keyboards.
Later extended to also catch other keys.
Still not all keys are available on all keyboards.

Please have only instance of this class running your application.
Blog Entries

- MBS Real Studio Plugins, version 11.2pr12

- MBS Real Studio Plugins, version 11.2pr11
- MBS Real Studio Plugins, version 11.2pr9
- MBS Real Studio Plugins, version 11.2pr9

20.1.2 Methods

20.1.3 Constructor

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Initializes the key watcher.

20.1.4 startWatchingMediaKeys

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Starts watching for keys.
Example:

```
dim m as MediaKeysMBS // global property!

// app initialization
m = new MediaKeysMBS

m.Keys(MediaKeysMBS.kMediaKeyEject) = MediaKeysMBS.kModeEventAndBlock
m.startWatchingMediaKeys
```

20.1.5 stopWatchingMediaKeys

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Stops watching for keys.
Example:

```
dim m as MediaKeysMBS // global property

// when closing media window
m.stopWatchingMediaKeys
```

Notes: The destructor calls this for cleanup.

20.1.6 Properties

20.1.7 Keys(keyCode as Integer) as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Which keys should be intercepted and handled by your application.
Example:

```
dim m as new MediaKeysMBS // your MediaKeys object

// watch for this key
m.Keys(MediaKeysMBS.kMediaKeyEject) = MediaKeysMBS.kModeEventAndBlock
```

Notes: (Read and Write computed property)

20.1.8 Events

20.1.9 receivedMediaKeyEvent(e as NSEventMBS, keyCode as Integer, keyFlags as Integer, keyState as Integer, keyRepeat as Integer)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: The event called when the user uses one of the special keys we listen for.
Notes: If you don't get the event, did you make sure all conditions are right?

- Requires Mac OS X 10.5
- Keys(x) set to kModeEventAndBlock or kModeEventAndPass for the keys you need?
- startWatchingMediaKeys called?
- your object is still alive in your application?

20.1.10 Constants

Key Constants

Constant	Value	Description
kMediaKeyBrightnessDown	3	
kMediaKeyBrightnessUp	2	
kMediaKeyCapsLock	4	Caps Lock
kMediaKeyContrastDown	12	
kMediaKeyContrastUp	11	
kMediaKeyDownArrow	9	
kMediaKeyEject	14	Eject key
kMediaKeyFast	19	Fast key. On by default.
kMediaKeyHelp	5	
kMediaKeyIlluminationDown	22	
kMediaKeyIlluminationToggle	23	
kMediaKeyIlluminationUp	21	
kMediaKeyLaunchPanel	13	
kMediaKeyMute	7	Sound Mute
kMediaKeyNext	17	
kMediaKeyNumLock	10	Num Lock key
kMediaKeyPlay	16	Play key. On by default.
kMediaKeyPower	6	Power Key
kMediaKeyPrevious	18	Previous key
kMediaKeyRewind	20	Rewind Key. On by default.
kMediaKeySoundDown	1	Sound down
kMediaKeySoundUp	0	Sound up
kMediaKeyUpArrow	8	
kMediaKeyVideoMirror	15	

Mode Constants

Constant	Value	Description
kModeBlock	1	Block the event.
kModeEventAndBlock	2	Call the receivedMediaKeyEvent event and block the event.
kModeEventAndPass	3	Call the receivedMediaKeyEvent event and pass the event to other applications.
kModePass	0	Pass event to other applications.

Chapter 21

MediaLibrary

21.1 class NSMediaLibraryBrowserControllerMBS

21.1.1 class NSMediaLibraryBrowserControllerMBS

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: An instance of an NSMediaLibraryBrowserController configures and displays a Media Library Browser Panel.
Notes: A User can drag and drop media files from the Media Library Browser into views in their application. Requires Mac OS X 10.9.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 17.1pr1
- MBS Xojo / Real Studio Plugins, version 13.5pr1

21.1.2 Methods

21.1.3 available as boolean

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: Whether this class is available.
Notes: Returns true on Mac OS X 10.9 and false on other platforms.

21.1.4 Constructor

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: Creates a new object for the shared library browser.

21.1.5 orderFront

Plugin Version: 17.1, Platform: macOS, Targets: Desktop only.

Function: Orders window to front.

21.1.6 orderOut

Plugin Version: 17.1, Platform: macOS, Targets: Desktop only.

Function: Orders window out.
Notes: Hides window.

21.1.7 sharedMediaLibraryBrowserController as NSMediaLibraryBrowserControllerMBS

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: Returns a new object for the shared library browser.

21.1.8 togglePanel

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: Toggles the panel to hide/show.

21.1.9 Properties

21.1.10 Frame as NSRectMBS

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: The bounds of the panel.
Notes: (Read and Write property)

21.1.11 Handle as Integer

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

21.1.12 mediaLibraries as Integer

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: Which media library to show: audio, video or image.
Notes: (Read and Write property)

21.1.13 Visible as Boolean

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: The visible state of the browser panel.
Notes: (Read and Write property)

21.1.14 Constants

Library Types

Constant	Value	Description
NSMediaLibraryAudio	1	Audio
NSMediaLibraryImage	2	Image
NSMediaLibraryMovie	4	Movie

Chapter 22

Network

22.1 class CWChannelMBS

22.1.1 class CWChannelMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The CoreWLAN class for a channel.
Notes: Encapsulates an IEEE 802.11 channel.

Available on Mac OS X 10.7 or later.
Please also check the documentation from Apple for the CWChannel class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

22.1.2 Methods

22.1.3 Constructor

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The private constructor.

22.1.4 copy as CWChannelMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a copy of the object.

22.1.5 isEqualToChannel(channel as CWChannelMBS) as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Compares two channels.
Notes: Returns true if both are equal.

22.1.6 Operator_Compare(channel as CWChannelMBS) as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Compares two channels.

22.1.7 Properties

22.1.8 channelBand as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The channel band.
Notes: (Read only property)

22.1.9 channelNumber as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The channel number.
Notes: (Read only property)

22.1.10 channelWidth as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The channel width.
Notes: (Read only property)

22.1.11 Handle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal reference for this object.
Notes: (Read and Write property)

22.2 class CWConfigurationMBS

22.2.1 class CWConfigurationMBS

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN configuration.
Notes: Encapsulates a static configuration for a given IEEE 802.11 wireless interface.

Requires Mac OS X 10.6 or newer.

22.2.2 Methods

22.2.3 configuration as CWConfigurationMBS

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Convenience method for getting an CWConfiguration object.
Notes: dim c as CWConfigurationMBS = CWConfigurationMBS.configuration
MsgBox hex(c.Handle)
See also:

- 22.2.4 configuration(config as CWConfigurationMBS) as CWConfigurationMBS 896

22.2.4 configuration(config as CWConfigurationMBS) as CWConfigurationMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Convenience method for getting a CWConfiguration object initialized with the given CWConfiguration object.
Notes: Available on Mac OS X 10.7 or later.
See also:

- 22.2.3 configuration as CWConfigurationMBS 896

22.2.5 Constructor

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates an CWConfiguration.
See also:

- 22.2.6 Constructor(configuration as CWConfigurationMBS) 897

22.2.6 Constructor(configuration as CWConfigurationMBS)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a CWConfigurationMBS object initialized with the given CWConfigurationMBS object.
Notes: Available on Mac OS X 10.7 or later.
See also:

- 22.2.5 Constructor 896

22.2.7 copy as CWConfigurationMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a copy of this object.

22.2.8 isEqualToConfiguration(configuration as CWConfigurationMBS) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Test whether two configurations are equal.
Notes: Two CWConfiguration objects are considered equal if all their corresponding properties are equal.

22.2.9 mutableCopy as CWMutableConfigurationMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a mutable copy of this object.
Notes: Available on Mac OS X 10.7 or later.

22.2.10 networkProfiles as CWNetworkProfileMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: An array of remembered CWNetworkProfileMBS objects.
Notes: The order of this array corresponds to the order in which the the CWNetworkProfile objects participate in the auto-join process.

Available on Mac OS X 10.7 or later.

22.2.11 Operator_Compare(configuration as CWConfigurationMBS) as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Compares two profiles.

22.2.12 Properties

22.2.13 Handle as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.
Notes: (Read and Write property)

22.2.14 rememberJoinedNetworks as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: AirPort client will remember all joined networks.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.2.15 requireAdministratorForAssociation as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Require an administrator password to change networks.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.2.16 requireAdministratorForIBSSMode as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Require an administrator password to create a computer-to-computer network.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.2.17 requireAdministratorForPower as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Require an administrator password to change the interface power state.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.3 module CWGlobalsMBS

22.3.1 module CWGlobalsMBS

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The module for the global constants.
Notes: Please note that MBS Plugin implements all methods from 10.6 to 10.9 in CoreWLAN. But Apple changes things often, so some methods are only for older system, some only for newer. e.g. kCWErrorDomain is for 10.6 and CWErrorDomain for 10.7 and newer.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.4pr2

22.3.2 Methods

22.3.3 CWBSSIDDidChangeNotification as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the notification names for CoreWLAN.
Notes: Please use with NSNotificationObserverMBS class.
Posted when the BSSID of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

22.3.4 CWCountryCodeDidChangeNotification as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the notification names for CoreWLAN.
Notes: Please use with NSNotificationObserverMBS class.
Posted when the country code of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

22.3.5 CWErrorDomain as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN Error Domain.

22.3.6 CWLinkDidChangeNotification as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the notification names for CoreWLAN.
Notes: Please use with NSNotificationObserverMBS class.
Posted when the link state of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

22.3.7 CWLinkQualityDidChangeNotification as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the notification names for CoreWLAN.
Notes: Please use with NSNotificationObserverMBS class.
Posted when the link quality for any WLAN interface changes. The object for this notification is the corresponding BSD interface name. The userInfo dictionary for this notification contains the current RSSI and current transmit rate for the given CoreWLAN interface.

22.3.8 CWLinkQualityNotificationRSSIKey as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Dictionary key for link quality change details.
Notes: Number containing the current RSSI value for the WLAN interface. Found in the userInfo dictionary for the CWLinkQualityChangedNotification.

22.3.9 CWLinkQualityNotificationTransmitRateKey as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Dictionary key for link quality change details.
Notes: Number containing the current transmit rate value for the WLAN interface. Found in the userInfo dictionary for the CWLinkQualityChangedNotification.

22.3.10 CWModeDidChangeNotification as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the notification names for CoreWLAN.
Notes: Please use with NSNotificationObserverMBS class.

Posted when the mode of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

22.3.11 CWPowerDidChangeNotification as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the notification names for CoreWLAN.
Notes: Please use with NSNotificationObserverMBS class.
Posted when the power state of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

22.3.12 CWScanCacheDidUpdateNotification as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the notification names for CoreWLAN.
Notes: Please use with NSNotificationObserverMBS class.
Posted when new entries are added to the scan cache, or existing entries are updated with more current information. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

22.3.13 CWSSIDDidChangeNotification as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the notification names for CoreWLAN.
Notes: Please use with NSNotificationObserverMBS class.
Posted when the SSID of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

22.3.14 KeychainDeleteEAPUsernameAndPassword(ssidData as memoryblock) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Deletes the 802.1X username and password for the specified SSID.
Notes: ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainDeleteWiFiEAPUsernameAndPassword instead.

22.3.15 KeychainDeletePassword(ssidData as memoryblock) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Deletes the password for the specified SSID and keychain domain.
Notes: ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainDeleteWiFiPassword instead.

22.3.16 KeychainDeleteWiFiEAPUsernameAndPassword(KeychainDomain as Integer, ssidData as memoryblock) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Deletes the 802.1X username and password for the specified SSID and keychain domain.
Notes: domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

22.3.17 KeychainDeleteWiFiPassword(KeychainDomain as Integer, ssidData as memoryblock) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Deletes the password for the specified SSID and keychain domain.

Notes: domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

22.3.18 KeychainFindWiFiEAPUsernameAndPassword(KeychainDomain as Integer, ssidData as memoryblock, byref username as string, byref password as string) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Finds and returns the 802.1X username and password stored for the specified SSID and keychain domain.
Notes: domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
username: a string passed by reference, which upon return will contain the 802.1X username for the specified SSID.
password: a string passed by reference, which upon return will contain the 802.1X password for the specified SSID.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

22.3.19 KeychainFindWiFiPassword(KeychainDomain as Integer, ssidData as memoryblock, byref password as string) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Finds and returns (by reference) the password for the specified SSID and keychain domain.
Notes: domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
password: An string passed by reference, which upon return will contain the Wi-Fi keychain password for the specified SSID. This parameter is optional.

Returns an error code indicating whether or not a failure occurred. errSecSuccess indicates no error occurred.
Available on Mac OS X 10.9 or newer.

22.3.20 KeychainGetEAPIdentity(ssidData as memoryblock, byref SecIdentityRef as Integer) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Finds and returns the identity stored for the specified SSID and keychain domain.
Notes: ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
identity: An Integer passed by reference, which upon return will contain the SecIdentityRef associated with the specified SSID.
The returned value must be released by the caller.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainGetWiFiEAPIdentity instead.

22.3.21 KeychainGetEAPIdentityList(byref ListSecIdentityRef() as Integer) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Finds and returns all available identities.
Notes: ListSecIdentityRef: An array passed by reference, which upon return will be populated with a list of integers (SecIdentityRef).

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

22.3.22 KeychainGetEAPUsernameAndPassword(ssidData as memoryblock, byref username as string, byref password as string) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Finds and returns the 802.1X username and password stored for the specified SSID.
Notes: ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
username: A string passed by reference, which upon return will contain the 802.1X username for the specified SSID.

password: A string passed by reference, which upon return will contain the 802.1X password for the specified SSID.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain.

Available in Mac OS X 10.7, deprecated in 10.9. Please use FindWiFiEAPUsernameAndPassword instead.

22.3.23 KeychainGetPassword(ssidData as memoryblock, byref password as string) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Finds and returns (by reference) the password for the specified SSID.
Notes: ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
password: A string passed by reference, which upon return will contain the Wi-Fi keychain password for the specified SSID.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainFindWiFiPassword instead.

22.3.24 KeychainGetWiFiEAPIdentity(KeychainDomain as Integer, ssidData as memoryblock, byref SecIdentityRef as Integer) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Finds and returns the identity stored for the specified SSID and keychain domain.
Notes: domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
identity: An Integer passed by reference, which upon return will contain the SecIdentityRef associated with the specified SSID.
The returned value must be released by the caller.

Returns an OSStatus error code indicating whether or not a failure occurred.

errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

22.3.25 KeychainSetEAPIdentity(ssidData as memoryblock, SecIdentityRef as Integer) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Associates an identity to the specified SSID.
Notes: ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
identity: The identity containing the certificate to use for 802.1X authentication.
Passing 0 clears any identity association for the specified SSID.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainSetWiFiEAPIdentity instead.

22.3.26 KeychainSetEAPUsernameAndPassword(ssidData as memoryblock, username as string, password as string) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the 802.1X username and password for the specified SSID.
Notes: ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
username: The 802.1X username.
password: The 802.1X password. This parameter is optional.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use SetWiFiEAPUsernameAndPassword instead.

22.3.27 KeychainSetPassword(ssidData as memoryblock, password as string) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the Wi-Fi network keychain password for the specified SSID.
Notes: ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
password: The Wi-Fi network password.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainSetWiFiPassword instead.

22.3.28 KeychainSetWiFiEAPIdentity(KeychainDomain as Integer, ssidData as memoryblock, SecIdentityRef as Integer) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Associates an identity to the specified SSID and keychain domain.
Notes: domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
identity: The identity containing the certificate to use for 802.1X authentication. a SecIdentityRef passed as Integer.

Passing 0 clears any identity association for the specified SSID.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

22.3.29 KeychainSetWiFiEAPUsernameAndPassword(KeychainDomain as Integer, ssidData as memoryblock, Username as string, Password as string) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the 802.1X username and password for the specified SSID and keychain domain.

Notes: domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
username: The 802.1X username.
password: The 802.1X password. This parameter is optional.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

22.3.30 KeychainSetWiFiPassword(KeychainDomain as Integer, ssidData as memoryblock, password as string) as Integer

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the Wi-Fi network keychain password for the specified SSID and keychain domain.
Notes: domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
password: The Wi-Fi network password.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.
Available on Mac OS X 10.9 or newer.

22.3.31 MergeNetworks(networks() as CWNetworkMBS) as CWNetworkMBS()

Plugin Version: 14.4, Platform: macOS, Targets: Desktop, Console & Web.

Function: Merges the specified set of CWNetwork objects.
Notes: networks: The set of networks to merge.

Duplicate networks are defined as networks with the same SSID, security type, and BSS type (IBSS or Infrastructure).
When duplicate networks exist, the network with the best RSSI value will be chosen.

22.3.32 Constants

Constants

Constant	Value	Description
kCWError	-3931	One of the error constants in CoreWLAN. Generic error.
kCWHTFeaturesNotSupported	-3926	One of the error constants in CoreWLAN. Association was denied because the requesting station does not supp features.
kCWInterfaceStateAssociating	3	One of the interface state constants in CoreWLAN. CoreWLAN interface is associating.
kCWInterfaceStateAuthenticating	2	One of the interface state constants in CoreWLAN. CoreWLAN interface is authenticating.
kCWInterfaceStateInactive	0	One of the interface state constants in CoreWLAN. CoreWLAN interface is in the initial, inactive state.
kCWInterfaceStateRunning	4	One of the interface state constants in CoreWLAN. CoreWLAN interface is running.
kCWInterfaceStateScanning	1	One of the interface state constants in CoreWLAN. CoreWLAN interface is scanning.
kCWIPCError	-3929	One of the error constants in CoreWLAN. Error communicating with a separate process.
kCWOpModeHostAP	3	One of the interface operation mode constants in CoreWLAN. Interface is participating in an infrastructure network as an access poi
kCWOpModeIBSS	1	One of the interface operation mode constants in CoreWLAN. Interface is participating in an IBSS network.
kCWOpModeMonitorMode	2	One of the interface operation mode constants in CoreWLAN. Interface is in 802.11 monitor mode.
kCWOpModeStation	0	One of the interface operation mode constants in CoreWLAN. Interface is participating in an infrastructure network as a non-AP sta
kCWOpNotPermitted	-3930	One of the error constants in CoreWLAN. Calling process does not have permission to perform this operation.
kCWPCOTransitionTimeNotSupported	-3927	One of the error constants in CoreWLAN. Association was denied because the requesting station does not supp PCO transition time required by the AP.
kCWScanTypeActive	0	One of the scan type constants in CoreWLAN. In accordance with the supported channels for the active country co interface will transmit probe request frames and listen for probe respo
kCWScanTypeFast	2	One of the scan type constants in CoreWLAN. The scan will return cached scan results.
kCWScanTypePassive	1	One of the scan type constants in CoreWLAN. The interface will listen for beacon frames on each channel irrespective o try code.
kCWSecurityModeDynamicWEP	7	One of the security mode constants in CoreWLAN. Dynamic WEP 802.1X authentication.
kCWSecurityModeOpen	0	One of the security mode constants in CoreWLAN. Open System authentication.
kCWSecurityModeWEP	1	One of the security mode constants in CoreWLAN. WEP authentication.
kCWSecurityModeWPA2_Enterprise	5	One of the security mode constants in CoreWLAN. WPA2 Enterprise authentication.
kCWSecurityModeWPA2_PSK	3	One of the security mode constants in CoreWLAN. WPA2 Personal authentication.
kCWSecurityModeWPA_Enterprise	4	One of the security mode constants in CoreWLAN. WPA Enterprise authentication.
kCWSecurityModeWPA_PSK	2	One of the security mode constants in CoreWLAN. WPA Personal authentication.
kCWSecurityModeWPS	6	One of the security mode constants in CoreWLAN. WiFi Protected Setup authentication.
kOldCWPHYMode11A	0	One of the physical layer mode constants in CoreWLAN. IEEE 802.11a
kOldCWPHYMode11B	1	One of the physical layer mode constants in CoreWLAN. IEEE 802.11b

Error Codes

Constant	Value	Description
kCWAPFullErr	-3913	Access point is unable to handle another associated station.
kCWAssociationDeniedErr	-3909	Association was denied for an unspecified reason.
kCWAuthAlgUnsupportedErr	-3910	Specified authentication algorithm is not supported.
kCWAuthenticationAlgorithmUnsupportedErr	-3910	Specified authentication algorithm is not supported.
kCWChallengeFailureErr	-3912	Authentication was rejected because of a challenge failure.
kCWCipherSuiteRejectedErr	-3923	Cipher suite rejected due to network security policy.
kCWDSSSOFDMUnsupportedErr	-3916	Association denied because DSSS-OFDM is not supported by tion.
kCWEAPOLErr	1	EAPOL-related error.
kCWErr	-3931	Generic error, no specific error code exists to describe the error
kCWFormatErr	-3904	Invalid protocol element field detected.
kCWHTFeaturesNotSupportedErr	-3926	Association was denied because the requesting station does n features.
kCWInvalidAKMPErr	-3920	Invalid authentication selector requested.
kCWInvalidAuthenticationSequenceNumberErr	-3911	Authentication frame received with an authentication sequence expected sequence.
kCWInvalidAuthSeqNumErr	-3911	Authentication frame received with an authentication sequence expected sequence.
kCWInvalidFormatErr	-3904	Invalid protocol element field detected.
kCWInvalidGroupCipherErr	-3918	Invalid group cipher requested.
kCWInvalidInfoElementErr	-3917	Invalid information element included in association request.
kCWInvalidInformationElementErr	-3917	Invalid information element included in association request.
kCWInvalidPairwiseCipherErr	-3919	Invalid pairwise cipher requested.
kCWInvalidParameterErr	-3900	Parameter error.
kCWInvalidPMKErr	-3924	PMK rejected by the access point.
kCWInvalidRSNCapabilitiesErr	-3922	Invalid RSN capabilities specified in association request.
kCWIPCFailureErr	-3929	Error communicating with a separate process.
kCWNoErr	0	Success.
kCWNoMemErr	-3901	Memory allocation failed.
kCWNoMemoryErr	-3901	Memory allocation failed.
kCWNotSupportedErr	-3903	Operation not supported.
kCWOperationNotPermittedErr	-3930	Calling process does not have permission to perform this opera
kCWParamErr	-3900	Parameter error.
kCWPCOTransitionTimeNotSupportedErr	-3927	Association was denied because the requesting station does n PCO transition time required by the AP.
kCWReassociationDeniedErr	-3908	Reassociation was denied because the access point was unabl that an association exists.
kCWReferenceNotBoundErr	-3928	No interface is bound to the CWInterface.
kCWRefNotBoundErr	-3928	No interface is bound to the CWInterface.
kCWShortSlotUnsupportedErr	-3915	Association denied because short slot time option is not suppor ing station.
kCWSupplicantTimeoutErr	-3925	WPA/WPA2 handshake timed out.
kCWTimeoutErr	-3905	Authentication/Association timed out.
kCWUknownErr	-3902	Unexpected error condition encountered for which no error cod
kCWUnknownErr	-3902	Unexpected error condition encountered for which no error cod
kCWUnspecifiedFailureErr	-3906	Access point did not specify a reason for authentication/associa
kCWUnsupportedCapabilitiesErr	-3907	Access point cannot support all requested capabilities.
kCWUnsupportedRateSetErr	-3914	Interface does not support all of the rates in the access point's
kCWUnsupportedRSNVersionErr	-3921	Invalid WPA/WPA2 version specified.

Channel bands

Constant	Value	Description
kCWChannelBand2GHz	1	2 GHz channel band.
kCWChannelBand5GHz	2	5 GHz channel band.
kCWChannelBandUnknown	0	Unknown channel band.

Channel Widths

Constant	Value	Description
kCWChannelWidth160MHz	4	160MHz channel width.
kCWChannelWidth20MHz	1	20MHz channel width.
kCWChannelWidth40MHz	2	40MHz channel width.
kCWChannelWidth80MHz	3	80MHz channel width.
kCWChannelWidthUnknown	0	Unknown channel width.

Chipher Key Flahs

Constant	Value	Description
kCWCipherKeyFlagsMulticast	4	Cipher key will be used for multicast packets.
kCWCipherKeyFlagsNone	0	Open System authentication.
kCWCipherKeyFlagsRx	16	Cipher key will be used for packets received by the interface.
kCWCipherKeyFlagsTx	8	Cipher key will be used for packets sent from the interface.
kCWCipherKeyFlagsUnicast	2	Cipher key will be used for unicast packets.

IBSS mode security types

Constant	Value	Description
kCWIBSSModeSecurityNone	0	Open System authentication.
kCWIBSSModeSecurityWEP104	2	WPA Personal authentication.
kCWIBSSModeSecurityWEP40	1	WEP security.

Interface operation modes

Constant	Value	Description
kCWInterfaceModeHostAP	3	Interface is participating in an infrastructure network as an access point.
kCWInterfaceModeIBSS	2	Interface is participating in an IBSS network.
kCWInterfaceModeNone	0	Interface is not in any mode.
kCWInterfaceModeStation	1	Interface is participating in an infrastructure network as a non-AP station.

Keychain Domains

Constant	Value	Description
kCWKeychainDomainNone	0	No keychain domain specified.
kCWKeychainDomainSystem	2	The system keychain domain.
kCWKeychainDomainUser	1	The login (user) keychain domain.

Physical Layer Modes

Constant	Value	Description
kCWPHYMode11a	1	IEEE 802.11a PHY.
kCWPHYMode11ac	5	IEEE 802.11ac PHY.
kCWPHYMode11b	2	IEEE 802.11b PHY.
kCWPHYMode11g	3	IEEE 802.11g PHY.
kCWPHYMode11n	4	IEEE 802.11n PHY.
kCWPHYModeNone	0	No PHY mode.

Security types

Constant	Value	Description
kCWSecurityDynamicWEP	6	Dynamic WEP security.
kCWSecurityEnterprise	10	Enterprise authentication.
kCWSecurityNone	0	Open System authentication.
kCWSecurityPersonal	5	Personal authentication.
kCWSecurityUnknown	&h7FFFFFFF	Unknown security type.
kCWSecurityWEP	1	WEP security.
kCWSecurityWPA2Enterprise	9	WPA2 Enterprise authentication.
kCWSecurityWPA2Personal	4	WPA2 Personal authentication.
kCWSecurityWPAEnterprise	7	WPA Enterprise authentication.
kCWSecurityWPAEnterpriseMixed	8	WPA/WPA2 Enterprise authentication.
kCWSecurityWPAPersonal	2	WPA Personal authentication.
kCWSecurityWPAPersonalMixed	3	WPA/WPA2 Personal authentication.

22.4 class CWInterfaceMBS

22.4.1 class CWInterfaceMBS

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface.
Notes: Encapsulates an CoreWLAN interface providing controlled access to various interface operations such as scanning, assocation, and IBSS creation, and providing a means to query and manipulate interface parameters.

Requires Mac OS X 10.6 or newer.

Please note that MBS Plugin implements all methods from 10.6 to 10.9 in CoreWLAN. But Apple changes things often, so some methods are only for older system, some only for newer. e.g. kCWErrorDomain is for 10.6 and CWErrorDomain for 10.7 and newer.

22.4.2 Methods

22.4.3 associateToEnterpriseNetwork(network as CWNetworkMBS, SecIdentityRef as Integer, username as string, password as string, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Connects to the given enterprise network.
Notes: network: The network to which the interface will associate.
username: The username to use for IEEE 802.1X authentication.
password: The password to use for IEEE 802.1X authentication.
identity: The identity to use for IEEE 802.1X authentication. Holds the corresponding client certificate.
error: An NSError object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method.

Returns a Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

This method will block for the duration of the association. This operation may require an administrator password.

22.4.4 associateToNetwork(network as CWNetworkMBS, parameters as dictionary, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Attempts to associate to the given CWNetworkMBS, with the given association parameters.
Notes: parameters: A dicitonary object containing association parameters.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the association parameters defined in CWGlobalsMBS for more information. Certain networks will require specific authentication credentials for association (i.e. a network using WPA2 Personal authentication will require a passphrase). This method will block for the duration of the association. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

- 22.4.5 associateToNetwork(network as CWNetworkMBS, password as string, byref error as NSErrorMBS) as boolean 916

22.4.5 associateToNetwork(network as CWNetworkMBS, password as string, byref error as NSErrorMBS) as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Associates to a given network using the given network passphrase.
Notes: network: The network to which the interface will associate.
password: The network passphrase or key. Required for association to WEP, WPA Personal, and WPA2 Personal networks.
error: An NSErrorMBS object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method. This parameter is optional and can be passed as nil.

Returns a boolean value which will indicate whether or not a failure occurred during execution. true indicates no error occurred.

This method will block for the duration of the association. This operation may require an administrator password.

Available on Mac OS X 10.7 or later.
See also:

- 22.4.4 associateToNetwork(network as CWNetworkMBS, parameters as dictionary, byref error as NSEr-

22.4.6 cachedScanResults as CWNetworkMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The networks currently in the scan cache for the WLAN interface.
Notes: Returns empty array in the case of an error.
Available on Mac OS X 10.7 or later.

22.4.7 commitConfiguration(config as CWConfigurationMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Changing the interface configuration.
Notes: config: An CWConfiguration object containing the desired changes to the current CW configuration preferences.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

This method uses the SFAuthorization property of the given CWInterface object to commit the given configuration. The SFAuthorization property must be authorized with administrative privileges.
See also:

22.4.8 commitConfiguration(config as CWConfigurationMBS, SFAuthorizationRef as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Commit a configuration for the given WLAN interface.
Notes: configuration: The configuration to commit.
authorization: An SFAuthorization object to use for authorizing the commit. This parameter is optional and can be passed as 0.
error: An NSError object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method.

Returns a Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

This method requires the caller have root privileges or obtain administrator privileges with the authorization parameter.
See also:

- 22.4.7 commitConfiguration(config as CWConfigurationMBS, byref error as NSErrorMBS) as boolean 917

22.4.9 Constructor

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates an CWInterface for the primary interface.
Example:

```
dim c as new CWInterfaceMBS

MsgBox c.description
```

See also:

- 22.4.10 Constructor(name as string) 918

22.4.10 Constructor(name as string)

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates an interface object linked to the interface of the given name.
Example:

```
dim c as new CWInterfaceMBS("en0")

MsgBox c.description
```

See also:

- 22.4.9 Constructor 918

22.4.11 disassociate

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Disassociates the CoreWLAN interface from the currently associated network.
Notes: This method is a no-op if the given CoreWLAN interface is not associated to a network. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.

22.4.12 enableIBSSWithParameters as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Attempts to create a computer-to-computer network with the given parameters.
Notes: parameters: A dictionary object containing optional parameters for creating an IBSS network. This parameter is optional and may be passed as nil.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional and can be passed as nil.

Return a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the IBSS creation parameters defined in CWGlobals.h for more information. If no IBSS creation parameters are present, the default behavior is to create an open authentication computer-to-computer network using the machine name as the network name. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

- 22.4.13 enableIBSSWithParameters(byref error as NSErrorMBS) as boolean 919
- 22.4.14 enableIBSSWithParameters(parameters as dictionary) as boolean 920
- 22.4.15 enableIBSSWithParameters(parameters as dictionary, byref error as NSErrorMBS) as boolean 920

22.4.13 enableIBSSWithParameters(byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Attempts to create a computer-to-computer network with the given parameters.
Notes: parameters: A dictionary object containing optional parameters for creating an IBSS network. This parameter is optional and may be passed as nil.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional and can be passed as nil.

Return a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the IBSS creation parameters defined in CWGlobals.h for more information. If no IBSS creation parameters are present, the default behavior is to create an open authentication computer-to-computer network

using the machine name as the network name. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

- 22.4.12 enableIBSSWithParameters as boolean 919
- 22.4.14 enableIBSSWithParameters(parameters as dictionary) as boolean 920
- 22.4.15 enableIBSSWithParameters(parameters as dictionary, byref error as NSErrorMBS) as boolean 920

22.4.14 enableIBSSWithParameters(parameters as dictionary) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Attempts to create a computer-to-computer network with the given parameters.
Notes: parameters: A dictionary object containing optional parameters for creating an IBSS network. This parameter is optional and may be passed as nil.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional and can be passed as nil.

Return a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the IBSS creation parameters defined in CWGlobals.h for more information. If no IBSS creation parameters are present, the default behavior is to create an open authentication computer-to-computer network using the machine name as the network name. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

- 22.4.12 enableIBSSWithParameters as boolean 919
- 22.4.13 enableIBSSWithParameters(byref error as NSErrorMBS) as boolean 919
- 22.4.15 enableIBSSWithParameters(parameters as dictionary, byref error as NSErrorMBS) as boolean 920

22.4.15 enableIBSSWithParameters(parameters as dictionary, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Attempts to create a computer-to-computer network with the given parameters.
Notes: parameters: A dictionary object containing optional parameters for creating an IBSS network. This parameter is optional and may be passed as nil.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional and can be passed as nil.

Return a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the IBSS creation parameters defined in CWGlobals.h for more information. If no IBSS creation parameters are present, the default behavior is to create an open authentication computer-to-computer network using the machine name as the network name. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

22.4.16 interfaceNames as String()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the list of BSD names for WLAN interfaces available on the current system.
Example:

```
dim names() as string = CWInterfaceMBS.interfaceNames
MsgBox Join(names,EndOfLine)
```

Notes: Returns an array of strings representing the supported WLAN BSD interface names avaliable on the current system (i.e. "en1", "en2"). If there are no supported interfaces for the current system, then this method will return an empty NSArray object.
Returns empty array in the case of an error.

Available on Mac OS X 10.7 or later.

22.4.17 interfaceWithName(name as string) as CWInterfaceMBS

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Queries the interface with the given name.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")

MsgBox c.description
```

Notes: name: A string representing the name of an Airport interface.

22.4.18 isEqualToInterface(otherInterface as CWInterfaceMBS) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Comparing interfaces.
Notes: Two CWInterface objects are considered equal if their corresponding nameand capabilities properties are equal.

Returns true if both interfaces are equal.

22.4.19 primaryInterface as CWInterfaceMBS

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Convenience method for getting an CWInterface object for the primary interface.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.primaryInterface

MsgBox c.name
```

22.4.20 scanForNetworksWithName(networkName as string, byref error as NSErrorMBS) as CWNetworkMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Scans for networks.
Notes: networkName: The name (SSID) of the network for which to scan.
error: An NSErrorMBS object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method. This parameter is optional and can be passed as nil.

Returns an array of CWNetworkMBS objects.

If ssid parameter is present, a directed scan will be performed by the interface, otherwise a broadcast scan will be performed. This method will block for the duration of the scan.

Available on Mac OS X 10.7 or later.

22.4.21 scanForNetworksWithParameters as CWNetworkMBS()

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Performs a scan with the given CoreWLAN interface, returning any found networks.
Notes: parameters: A dicitonary object containing optional scan parameters which can be used to control the behavior of the scan. This parameter is optional.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns an array containing CWNetworkMBS objects representing the networks found in the scan.

See the scan parameters defined in CWGlobalsMBS for controlling scan behavior. If no scan parameters are present, the default behavior is to perform a broadcast scan on active channels, for all supported PHY modes. This method will block for the duration of the scan.
See also:

22.4.22 scanForNetworksWithParameters(byref error as NSErrorMBS) as CWNetworkMBS()

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Performs a scan with the given CoreWLAN interface, returning any found networks.
Notes: parameters: A dicitonary object containing optional scan parameters which can be used to control the behavior of the scan. This parameter is optional.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns an array containing CWNetworkMBS objects representing the networks found in the scan.

See the scan parameters defined in CWGlobalsMBS for controlling scan behavior. If no scan parameters are present, the default behavior is to perform a broadcast scan on active channels, for all supported PHY

modes. This method will block for the duration of the scan.
See also:

- 22.4.21 scanForNetworksWithParameters as CWNetworkMBS() 923
- 22.4.23 scanForNetworksWithParameters(parameters as dictionary) as CWNetworkMBS() 924
- 22.4.24 scanForNetworksWithParameters(parameters as dictionary, byref error as NSErrorMBS) as CWNetworkMBS() 924

22.4.23 scanForNetworksWithParameters(parameters as dictionary) as CWNetworkMBS()

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Performs a scan with the given CoreWLAN interface, returning any found networks.
Notes: parameters: A dicitonary object containing optional scan parameters which can be used to control the behavior of the scan. This parameter is optional.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns an array containing CWNetworkMBS objects representing the networks found in the scan.

See the scan parameters defined in CWGlobalsMBS for controlling scan behavior. If no scan parameters are present, the default behavior is to perform a broadcast scan on active channels, for all supported PHY modes. This method will block for the duration of the scan.
See also:

- 22.4.21 scanForNetworksWithParameters as CWNetworkMBS() 923
- 22.4.22 scanForNetworksWithParameters(byref error as NSErrorMBS) as CWNetworkMBS() 923
- 22.4.24 scanForNetworksWithParameters(parameters as dictionary, byref error as NSErrorMBS) as CWNetworkMBS() 924

22.4.24 scanForNetworksWithParameters(parameters as dictionary, byref error as NSErrorMBS) as CWNetworkMBS()

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Performs a scan with the given CoreWLAN interface, returning any found networks.
Notes: parameters: A dicitonary object containing optional scan parameters which can be used to control the behavior of the scan. This parameter is optional.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns an array containing CWNetworkMBS objects representing the networks found in the scan.

See the scan parameters defined in CWGlobalsMBS for controlling scan behavior. If no scan parameters are present, the default behavior is to perform a broadcast scan on active channels, for all supported PHY modes. This method will block for the duration of the scan.
See also:

- 22.4.21 scanForNetworksWithParameters as CWNetworkMBS() 923
- 22.4.22 scanForNetworksWithParameters(byref error as NSErrorMBS) as CWNetworkMBS() 923
- 22.4.23 scanForNetworksWithParameters(parameters as dictionary) as CWNetworkMBS() 924

22.4.25 scanForNetworksWithSSID(ssid as memoryblock, byref error as NSErrorMBS) as CWNetworkMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Scans for networks.
Notes: ssid The SSID for which to scan.
error: An NSErrorMBS object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method. This parameter is optional and can be passed as nil.

Returns an array of CWNetworkMBS objects.

If ssid parameter is present, a directed scan will be performed by the interface, otherwise a broadcast scan will be performed. This method will block for the duration of the scan.

Available on Mac OS X 10.7 or later.

22.4.26 setChannel(channel as UInt32) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the channel for the given CoreWLAN interface.
Notes: channel: An integer representing the channel to which the CoreWLAN interface should be tuned.
error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

The current channel cannot be changed if the CoreWLAN interface is associated to a network. channel must be supported by the given interface.
See also:

- 22.4.27 setChannel(channel as UInt32, byref error as NSErrorMBS) as boolean 926

22.4.27 setChannel(channel as UInt32, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the channel for the given CoreWLAN interface.
Notes: channel: An integer representing the channel to which the CoreWLAN interface should be tuned.
error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

The current channel cannot be changed if the CoreWLAN interface is associated to a network. channel must be supported by the given interface.
See also:

- 22.4.26 setChannel(channel as UInt32) as boolean 925

22.4.28 setPairwiseMasterKey(key as Memoryblock, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the interface pairwise master key (PMK).
Notes: key: A memoryblock containing the pairwise master key (PMK).
error: An NSError object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method.
Returns a Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

Key must be 32 octets. If key is nil, this method clears the PMK for the interface.

22.4.29 setPower(p as boolean) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the power state for the given CoreWLAN interface.
Notes: power: A boolean value indicating the power state to which the CoreWLAN interface should be set. False indicates the "OFF" state.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

- 22.4.30 setPower(p as boolean, byref error as NSErrorMBS) as boolean 927

22.4.30 setPower(p as boolean, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the power state for the given CoreWLAN interface.
Notes: power: A boolean value indicating the power state to which the CoreWLAN interface should be set. False indicates the "OFF" state.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

- 22.4.29 setPower(p as boolean) as boolean 926

22.4.31 setWEPKey(key as Memoryblock, flags as Integer, index as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the interface WEP key.
Notes: key: A memoryblock containing the WEP key.
flags: The cipher key flags to use for the specified key. Combination of kCWCipherKeyFlagsNone, kCWCipherKeyFlagsUnicast, kCWCipherKeyFlagsMulticast, kCWCipherKeyFlagsTx or kCWCipherKeyFlagsRx.

index: Integer which default key index to use for the specified key.
error An NSError object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method.

Returns a boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

Key must be 5 octets for WEP-40 or 13 octets for WEP-104. if key is nil, this method clears the WEP key for the interface. index must correspond to default key index 1-4.

22.4.32 setWLANChannel(channel as CWChannelMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the interface channel.
Notes: channel: A CWChannel object corresponding to the channel.
error: An NSErrorMBS object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method. This parameter is optional and can be passed as nil.

A Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

The channel cannot be changed if the interface is associated to a network.

Available on Mac OS X 10.7 or later.

22.4.33 startIBSSModeWithSSID(ssidData as MemoryBlock, security as Integer, channel as Integer, password as string, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a computer-to-computer (ad-hoc) network with the given network name, security type, and password on the specified channel.
Notes: security: The security type to be used. kCWIBSSModeSecurityNone, kCWIBSSModeSecurityWEP40 or kCWIBSSModeSecurityWEP104.
channel: The channel on which the network will be created.
password: The password to be used. This paramter is not applicable to open system authentication.

Returns a Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

This operation may require an administrator password.

22.4.34 supportedChannels as Integer()

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Array of channels supported by the CoreWLAN interface for the active country code.
Notes: Dynamically queries the interface for the supported channels.

22.4.35 supportedInterfaces as String()

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Getting all supported interfaces
Notes: Returns an array containing strings representing the supported CoreWLAN interface names available on the current system (i.e. "en1", "en2"). If there are no supported interfaces for the current system, then this method will return an empty array.

22.4.36 supportedPHYModes as Integer()

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Array of PHY modes supported by the CoreWLAN interface.
Notes: Dynamically queries the interface for the supported PHY modes.

22.4.37 supportedWLANChannels as CWChannelMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: An array of channels supported by the interface for the active country code.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
dim channels() as CWChannelMBS = c.supportedWLANChannels
dim lines() as string
for each ch as CWChannelMBS in channels
lines.append str(ch.channelNumber) + ": "+ str(ch.channelBand)
next
```

```
MsgBox join(lines,", ")
```

Notes: Dynamically queries the interface for the supported channels. Returns an array of CWChannel objects, or nil in the case of an error.

Available on Mac OS X 10.7 or later.

22.4.38 Properties

22.4.39 activePHYMode as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The current active PHY modes for the interface.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.activePHYMode)
```

Notes: Dynamically queries the interface for the current active PHY mode.
Returns kCWPHYModeNone in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

22.4.40 bssid as string

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current BSSID of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current BSSID.
(Read only property)

22.4.41 bssidData as Memoryblock

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current BSSID of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current BSSID.

(Read only property)

22.4.42 channel as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current channel of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current channel.
(Read only property)

22.4.43 configuration as CWConfigurationMBS

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current stored configuration for the CoreWLAN interface.
Notes: (Read only property)

22.4.44 countryCode as string

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Country code (ISO/IEC 3166-1:1997) of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current country code.
(Read only property)

22.4.45 description as string

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The object description.
Notes: (Read only property)

22.4.46 deviceAttached as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The interface has its corresponding hardware attached.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.deviceAttached)
```

Notes: Returns false in the case of an error.
Available on Mac OS X 10.7 or later.
(Read only property)

22.4.47 Handle as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.
Notes: (Read and Write property)

22.4.48 hardwareAddress as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The hardware media access control (MAC) address for the interface, returned as a UTF-8 string.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox c.hardwareAddress
```

Notes: The standard format for printing a MAC-48 address <00:00:00:00:00:00>is used to represent the MAC address as a string. Returns "" in the case of an error.

Available on Mac OS X 10.7 or later.
(Read only property)

22.4.49 interfaceMode as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The current mode for the interface.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.interfaceMode)
```

Notes: Dynamically queries the interface for the current mode. Returns kCWInterfaceModeNone in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

22.4.50 interfaceName as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The BSD name of the interface.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox c.interfaceName
MsgBox str(c.noiseMeasurement)
```

Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.4.51 interfaceState as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current state of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current interface state.
(Read only property)

22.4.52 name as string

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: BSD name for the CoreWLAN interface.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.primaryInterface

MsgBox c.name
```

Notes: (Read only property)

22.4.53 noise as Double

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current aggregate noise measurement (dBm) of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current aggregate noise measurement.
(Read only property)

22.4.54 noiseMeasurement as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The current aggregate noise measurement (dBm) for the interface.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.noiseMeasurement)
```

Notes: Dynamically queries the interface for the current aggregate noise measurement.
Returns 0 in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

22.4.55 opMode as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current operation mode of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current operation mode.
(Read only property)

22.4.56 phyMode as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current active PHY mode of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current active PHY mode.
(Read only property)

22.4.57 power as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current power state for the CoreWLAN interface.
Notes: Dynamically queries the interface for the current power state.
(Read only property)

22.4.58 powerOn as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The interface power state is set to ”ON”.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName(”en0”)
MsgBox str(c.rssiValue)
```

Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.4.59 powerSave as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current power save state for the CoreWLAN interface.
Notes: Dynamically queries the interface for the current power save state.
Introduced in 10.6, deprecated in 10.7 and gone in 10.9.
(Read only property)

22.4.60 rssi as Double

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current aggregate RSSI measurement (dBm) of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current aggregate RSSI measurement.

(Read only property)

22.4.61 rssiValue as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The current aggregate received signal strength indication (RSSI) measurement (dBm) for the interface.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.rssiValue)
```

Notes: Dynamically queries the interface for the current aggregate RSSI measurement.
Returns 0 in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

22.4.62 security as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The current security mode for the interface.
Notes: Dynamically queries the interface for the security mode. Returns kCWSecurityUnknown in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

22.4.63 securityMode as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current security mode of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current security mode.
(Read only property)

22.4.64 serviceActive as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The interface has its corresponding network service enabled.
Example:

```
dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.serviceActive)
```

Notes: Returns false in the case of an error.

Available on Mac OS X 10.7 or later.
(Read only property)

22.4.65 ssid as string

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current SSID of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current SSID.
(Read only property)

22.4.66 ssidData as Memoryblock

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The current service set identifier (SSID) for the interface, returned as data.
Notes: Dynamically queries the interface for the current SSID. The SSID is 1-32 octets.
Returns nil in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

22.4.67 supportsAES_CCM as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports AES-CCM (IEEE 802.11i Advanced Encryption Standard - Counter Mode with Cipher-Block Chaining Message Authentication Code).

Notes: (Read only property)

22.4.68 supportsHostAP as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports host access point mode.
Notes: (Read only property)

22.4.69 supportsIBSS as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports IBSS networks (IEEE 802.11 Independent Basic Service Set).
Notes: (Read only property)

22.4.70 supportsMonitorMode as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports monitor mode.
Notes: (Read only property)

22.4.71 supportsPMGT as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports power save modes.
Notes: (Read only property)

22.4.72 supportsShortGI20MHz as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports short guard interval in 20MHz channels.
Notes: (Read only property)

22.4.73 supportsShortGI40MHz as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports short guard interval in 40MHz channels.
Notes: (Read only property)

22.4.74 supportsTKIP as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports TKIP (IEEE 802.11i Temporal Key Integrity Protocol).
Notes: (Read only property)

22.4.75 supportsTSN as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports TSN authentication (Transitional Security Network).
Notes: (Read only property)

22.4.76 supportsWEP as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports WEP authentication (IEEE 802.11 Wired Equivalent Privacy).
Notes: (Read only property)

22.4.77 supportsWME as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports WME (IEEE 802.11e Wireless Multimedia Extensions).
Notes: (Read only property)

22.4.78 supportsWoW as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports wake on wireless capability.
Notes: (Read only property)

22.4.79 supportsWPA as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports WPA (Wi-Fi Alliance Wi-Fi Protected Access).
Notes: (Read only property)

22.4.80 supportsWPA2 as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN interface supports WPA2 (Wi-Fi Alliance Wi-Fi Protected Access 2).
Notes: (Read only property)

22.4.81 transmitPower as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The current transmit power (mW) for the interface.
Notes: Dynamically queries the interface for the current transmit power.
Returns 0 in the case of an error.

Available on Mac OS X 10.7 or later.
(Read only property)

22.4.82 transmitRate as Double

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The current transmit rate (Mbps) for the interface.
Notes: Dynamically queries the interface for the current transmit rate.
Returns 0 in the case of an error, or if the interface is not participating in a network.
Available on Mac OS X 10.7 or later.
(Read only property)

22.4.83 txPower as Double

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current target transmit power (mW) of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current transmit power.
(Read only property)

22.4.84 txRate as Double

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Current transmit rate (Mbps) of the CoreWLAN interface.
Notes: Dynamically queries the interface for the current transmit rate.
(Read only property)

22.4.85 wlanChannel as CWChannelMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The current channel for the interface.
Notes: Dynamically queries the interface for the current channel. Returns nil in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

22.5 class CWMutableConfigurationMBS

22.5.1 class CWMutableConfigurationMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Encapsulates a mutable configuration for an AirPort WLAN interface.
Notes: Available on Mac OS X 10.7 or later.
Please also check the documentation from Apple for the CWMutableConfiguration class.
Subclass of the CWConfigurationMBS class.

22.5.2 Methods

22.5.3 Constructor

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new mutable configuration.

22.5.4 setNetworkProfiles(values() as CWNetworkProfileMBS)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: An array of remembered CWNetworkProfileMBS objects.
Notes: The order of this array corresponds to the order in which the the CWNetworkProfileMBS objects participate in the auto-join process.

22.5.5 setRememberJoinedNetworks(value as boolean)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: AirPort client will remember all joined networks.

22.5.6 setRequireAdministratorForAssociation(value as boolean)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Require an administrator password to change networks.

22.5.7 setRequireAdministratorForIBSSMode(value as boolean)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Require an administrator password to create a computer-to-computer network.

22.5.8 setRequireAdministratorForPower(value as boolean)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Require an administrator password to change the interface power state.

22.6 class CWMutableNetworkProfileMBS

22.6.1 class CWMutableNetworkProfileMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Encapsulates a mutable network profile entry.
Notes: Available on Mac OS X 10.7 or later.
Please also check the documentation from Apple for the CWMutableNetworkProfile class.
Subclass of the CWNetworkProfileMBS class.

22.6.2 Methods

22.6.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor.

22.6.4 setSecurity(value as Integer)

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the security mode for the network profile.
Notes: See kCWSecurity* constants.

22.6.5 setSsidData(data as Memoryblock)

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: Sets the service set identifier (SSID) for the network profile, returned as data.
Notes: The SSID is 1-32 octets.

22.7 class CWNetworkMBS

22.7.1 class CWNetworkMBS

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: CoreWLAN wireless (IEEE 802.11) network.
Notes: Encapsulates a wireless network providing read-only accessors to various properties of the network.

Requires Mac OS X 10.6 or newer.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

22.7.2 Methods

22.7.3 Constructor

Plugin Version: 13.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: The private constructor.

22.7.4 copy as CWNetworkMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a copy of this object.

22.7.5 isEqualToNetwork(network as CWNetworkMBS) as boolean

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Comparing wireless networks.
Notes: Returns true if the network objects are equal.

Two CWNetworkMBS objects are considered equal if their corresponding ssid, securityMode, and isIBSS properties are equal.

22.7.6 Operator_Compare(profile as CWNetworkMBS) as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Compares two networks.

22.7.7 supportsPHYMode(phyMode as Integer) as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Method for determining which PHY modes a network supports.
Notes: True if the network supports the specified PHY mode.

Available on Mac OS X 10.7 or later.

22.7.8 supportsSecurity(security as Integer) as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Getting supported security types
Notes: True if the network supports the specified security type.

Method for determining which security types a network supports.

Available on Mac OS X 10.7 or later.

22.7.9 Properties

22.7.10 beaconInterval as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The beacon interval (ms) for the network.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.7.11 bssid as string

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Basic service set identifier for the given CWNetworkMBS.
Notes: (Read only property)

22.7.12 countryCode as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The country code (ISO/IEC 3166-1:1997) for the network.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.7.13 description as string

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The object description.
Notes: (Read only property)

22.7.14 Handle as Integer

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.
Notes: (Read and Write property)

22.7.15 ibss as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The network is an IBSS network.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.7.16 informationElementData as Memoryblock

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Information element data included in beacon or probe response frames.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.7.17 noiseMeasurement as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The aggregate noise measurement (dBm) for the network.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.7.18 rssiValue as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The aggregate received signal strength indication (RSSI) measurement (dBm) for the network.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.7.19 ssid as string

Plugin Version: 11.0, Platform: macOS, Targets: Desktop, Console & Web.

Function: Service set identifier for the given CWNetworkMBS.
Notes: (Read only property)

22.7.20 ssidData as Memoryblock

Plugin Version: 13.5, Platform: macOS, Targets: Desktop, Console & Web.

Function: The service set identifier (SSID) for the network, returned as data.
Notes: The SSID is defined as 1-32 octets.
(Read only property)

22.7.21 wlanChannel as CWChannelMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The channel for the network.
Notes: Available on Mac OS X 10.7 or later.
(Read only property)

22.8 class CWNetworkProfileMBS

22.8.1 class CWNetworkProfileMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class for a network profile.
Notes: Encapsulates an immutable network profile entry.

Available on Mac OS X 10.7 or later.
Please also check the documentation from Apple for the CWNetworkProfile class.

22.8.2 Methods

22.8.3 Constructor

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Convenience method for getting a CWNetworkProfile object.
See also:

- 22.8.4 Constructor(networkProfile as CWNetworkProfileMBS) 949

22.8.4 Constructor(networkProfile as CWNetworkProfileMBS)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Convenience method for getting a CWNetworkProfile object initialized with the given CWNetworkProfile object.
See also:

- 22.8.3 Constructor 949

22.8.5 copy as CWNetworkProfileMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a copy of the object.

22.8.6 isEqualToNetworkProfile(networkProfile as CWNetworkProfileMBS) as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Comparing network profiles.
Notes: networkProfile: The CWNetworkProfile object with which to compare the receiver.

CWNetworkMBS objects are considered equal if their corresponding ssidData and securityType properties are equal.

22.8.7 mutableCopy as CWMutableNetworkProfileMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a mutable copy of the object.

22.8.8 networkProfile as CWNetworkProfileMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Convenience method for getting a CWNetworkProfile object.

22.8.9 networkProfileWithNetworkProfile(networkProfile as CWNetworkProfileMBS) as CWNetworkProfileMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Convenience method for getting a CWNetworkProfile object initialized with the given CWNetworkProfile object.
Notes: networkProfile: The CWNetworkProfile object to use to initialize a new CWNetworkProfile object.

22.8.10 Operator_Compare(networkProfile as CWNetworkProfileMBS) as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Compares two network profiles.

22.8.11 Properties

22.8.12 Handle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.
Notes: (Read and Write property)

22.8.13 security as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The security mode for the network profile.
Notes: See kCWSecurity* constants.
(Read only property)

22.8.14 ssid as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The service set identifier (SSID) for the network profile, encoded as a string.
Notes: If the SSID can not be encoded as a valid UTF-8 or WinLatin1 string, this method returns "".
(Read only property)

22.8.15 ssidData as Memoryblock

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The service set identifier (SSID) for the network profile, returned as data.
Notes: The SSID is 1-32 octets.
(Read only property)

22.9 class CWWiFiClientMBS

22.9.1 class CWWiFiClientMBS

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The interface to the Wi-Fi subsystem on OS X.
Notes: Provides access to all Wi-Fi interfaces and allows Wi-Fi clients to setup event notifications.

CWWiFiClientMBS objects are heavy objects, therefore, clients of the CoreWLAN framework should use a single, long-running instance rather than creating several short-lived instances.

The CWWiFiClientMBS object should be used to instantiate CWInterfaceMBS objects rather than using a CWInterfaceMBS initializer directly.

MBS Plugin make sure that all events are routed to main thread.

Available on MacOS 10.10 or newer.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 18.2
- MBS Xojo Plugins, version 18.2pr6

Videos

- Presentation from Xojo Developer Conference 2019 in Miami.

Xojo Developer Magazine

- 17.5, page 40: What's New in the MBS Plugins, With the Plugins growing every year, here are new capabilities you may have missed by Stefanie Juchmes

22.9.2 Methods

22.9.3 available as boolean

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether this class is available.
Notes: Returnes true on MacOS 10.10 or newer.

22.9.4 Constructor

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Initializes a CWWiFiClient object.
Notes: Available on MacOS 10.10 or newer.

22.9.5 Destructor

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The destructor.

22.9.6 interfaceNames as String()

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the list of available Wi-Fi interface names (e.g. ”en0”).
Notes: An Array of string corresponding to Wi-Fi interface names.
If no Wi-Fi interfaces are available, this method will return an empty array.
Returns nil if an error occurs.

22.9.7 interfaces as CWInterfaceMBS()

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns all available Wi-Fi interfaces.
Notes: If no Wi-Fi interfaces are available, this method will return an empty array.
Returns nil if an error occurs.

22.9.8 interfaceWithName(name as string) as CWInterfaceMBS

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Get the CWInterface object bound to the Wi-Fi interface with a specific interface name.
Notes: interfaceName: The name of an available Wi-Fi interface.

Use interfaceNames function to get a list of available Wi-Fi interface names.
Returns a CWInterface object for the default Wi-Fi interface if no interface name is specified.

22.9.9 startMonitoring(EventType as integer, byref error as NSErrorMBS) as boolean

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Register for specific Wi-Fi event notifications.
Notes: type: A CWEventType value.
error: An NSError object passed by reference, which upon return will contain the error if an error occurs.

Return a boolean value indicating whether or not an error occurred. True indicates no error occurred.

22.9.10 stopMonitoring(EventType as integer, byref error as NSErrorMBS) as boolean

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Unregister for specific Wi-Fi event notifications.
Notes: type: A CWEventType value.

error: An NSError object passed by reference, which upon return will contain the error if an error occurs.

Returns a boolean value indicating whether or not an error occurred. true indicates no error occurred.

22.9.11 stopMonitoringAllEvents(byref error as NSErrorMBS) as boolean

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Unregister for all Wi-Fi event notifications.
Notes: error: An NSError object passed by reference, which upon return will contain the error if an error occurs.

Returns a boolean value indicating whether or not an error occurred. true indicates no error occurred.

22.9.12 Properties

22.9.13 CWInterface as CWInterfaceMBS

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the CWInterface object for the default Wi-Fi interface.

Notes: This method is named CWInterface as the name interface would cause an error in Xojo.
(Read only property)

22.9.14 Handle as Integer

Plugin Version: 18.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.
Notes: (Read and Write property)

22.9.15 Events

22.9.16 bssidDidChangeForWiFiInterfaceWithName(interfaceName as String)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when the current BSSID changes.
Notes: interfaceName: The name of the Wi-Fi interface.

Use startMonitoring with the CWEventTypeBSSIDDidChange event type to register for BSSID event notifications.
Use CWInterfaceMBS.bssid to query the current BSSID.

22.9.17 clientConnectionInterrupted

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked if the connection to the Wi-Fi subsystem is temporarily interrupted.
Notes: All event notifications for which the Wi-Fi client has registered will be automatically re-registered if the connection is interrupted.
The Wi-Fi client should re-sync any local state which is updated as a result of Wi-Fi event notifications.

22.9.18 clientConnectionInvalidated

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked if the connection to the Wi-Fi subsystem is permanently invalidated.

22.9.19 countryCodeDidChangeForWiFiInterfaceWithName(interfaceName as String)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when the currently adopted country code changes.
Notes: interfaceName: The name of the Wi-Fi interface.

Use startMonitoring with the CWEventTypeCountryCodeDidChange event type to register for country code event notifications.
Use CWInterfaceMBS.countryCode to query the currently adopted country code.

22.9.20 linkDidChangeForWiFiInterfaceWithName(interfaceName as String)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when the Wi-Fi link state changes.
Notes: interfaceName: The name of the Wi-Fi interface.

Use startMonitoring with the CWEventTypeLinkDidChange event type to register for link event notifications.

22.9.21 linkQualityDidChangeForWiFiInterfaceWithName(interfaceName as String, rssi as Integer, transmitRate as double)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when the Wi-Fi link quality changes.
Notes: interfaceName: The name of the Wi-Fi interface.
rssi: The RSSI value for the currently associated network on the Wi-Fi interface.
transmitRate: The transmit rate for the currently associated network on the Wi-Fi interface.

Use startMonitoring with the CWEventTypeLinkQualityDidChange event type to register for link quality event notifications.
Use CWInterfaceMBS.rssiValue and CWInterfaceMBS.transmitRate to query the current RSSI and transmit rate, respectively.

22.9.22 modeDidChangeForWiFiInterfaceWithName(interfaceName as String)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when the Wi-Fi operating mode changes.
Notes: interfaceName: The name of the Wi-Fi interface.

Use startMonitoring with the CWEventTypeModeDidChange event type to register for interface mode event notifications.
Use CWInterfaceMBS.interfaceMode to query the current operating mode.

22.9.23 powerStateDidChangeForWiFiInterfaceWithName(interfaceName as String)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when the Wi-Fi power state changes.
Notes: interfaceName: The name of the Wi-Fi interface.

Use startMonitoring with the CWEventTypePowerDidChange event type to register for power event notifications.
Use CWInterfaceMBS.powerOn to query the current Wi-Fi power state.

22.9.24 rangingReportEventForWiFiInterfaceWithName(interfaceName as String, rangingData() as Dictionary, error as NSErrorMBS)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when WiFi ranging measurement completed.
Notes: interfaceName: The name of the Wi-Fi interface.
rangingData: Dictionary containing distance measurement data.

Use startMonitoring with the CWEventTypeRangingReportEvent event type to register for ranging event notifications.

22.9.25 scanCacheUpdatedForWiFiInterfaceWithName(interfaceName as String)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when the Wi-Fi interface scan cache is updated with new scan results.
Notes: interfaceName: The name of the Wi-Fi interface.

Use startMonitoring with the CWEventTypeScanCacheUpdated event type to register for scan cache event notifications.
Use CWInterfaceMBS.cachedScanResults to query scan cache results from the last scan.

22.9.26 ssidDidChangeForWiFiInterfaceWithName(interfaceName as String)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when the current SSID changes.
Notes: interfaceName: The name of the Wi-Fi interface.

Use startMonitoring with the CWEventTypeSSIDDidChange event type to register for SSID event notifications.
Use CWInterfaceMBS.ssidData or CWInterfaceMBS.ssid to query the current SSID.

22.9.27 virtualInterfaceStateChangedForWiFiInterfaceWithName(interfaceName as String)

Plugin Version: 18.2, Platform: macOS, Targets: .

Function: Invoked when any state of WiFi virtual interface changes.
Notes: interfaceName: The name of the Wi-Fi interface.

Use startMonitoring with the CWEventTypeVirtualInterfaceStateChanged event type to register for virtual interface state changed notifications.

22.9.28 Constants

Event Types

Constant	Value	Description
CWEventTypeBSSIDDidChange	3	Posted when the current BSSID of any Wi-Fi interface changes.
CWEventTypeCountryCodeDidChange	4	Posted when the adopted country code of any Wi-Fi interface cha
CWEventTypeLinkDidChange	5	Posted when the link state for any Wi-Fi interface changes.
CWEventTypeLinkQualityDidChange	6	Posted when the RSSI or transmit rate for any Wi-Fi interface ch
CWEventTypeModeDidChange	7	Posted when the operating mode of any Wi-Fi interface changes.
CWEventTypeNone	0	No event type specified.
CWEventTypePowerDidChange	1	Posted when the power state of any Wi-Fi interface changes.
CWEventTypeRangingReportEvent	10	Posted when WiFi ranging measurement completed.
CWEventTypeScanCacheUpdated	8	Posted when the scan cache of any Wi-Fi interface is updated wi results.
CWEventTypeSSIDDidChange	2	Posted when the current SSID of any Wi-Fi interface changes.
CWEventTypeVirtualInterfaceStateChanged	9	Posted when any state of any Wi-Fi virtual interface changes.

Chapter 23

Open Directory

23.1 class ODNodeMBS

23.1.1 class ODNodeMBS

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: An Open Directory node.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 19.3
- MBS Xojo Plugins, version 19.3pr2
- OpenDirectory Framework for Xojo

Xojo Developer Magazine

- 17.5, page 9: News

23.1.2 Methods

23.1.3 Constructor

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The private constructor.

23.1.4 nodeDetails(byref error as NSErrorMBS) as Dictionary

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a dictionary containing details about a node.
Notes: Error: An error reference for error details. Can be nil.

Returns a dictionary containing details.

23.1.5 nodeDetailsForKeys(keys() as string, byref error as NSErrorMBS) as Dictionary

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a dictionary containing details about a node.
Notes: Keys: An array of keys corresponding to the values returned in the dictionary.
Error: An error reference for error details. Can be nil.

Returns a dictionary containing details about the node corresponding to keys specified by Keys.

23.1.6 nodeWithName(session as ODSessionMBS, name as string, byref error as NSErrorMBS) as ODNodeMBS

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a node object with a specified session and name.
Notes: Session: The session.
Name: The name of the node.
Error: An error reference for error details. Can be nil.

Returns the created node object.

23.1.7 nodeWithType(session as ODSessionMBS, type as integer, byref error as NSErrorMBS) as ODNodeMBS

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a node object with a specified session and type.
Notes: Session: The session.
Type: The node type.

Error: An error reference for error details.

Returns the created node object.

23.1.8 subnodeNames(byref error as NSErrorMBS) as String()

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the names of subnodes for the node.

23.1.9 supportedAttributesForRecordType(RecordType as String, byref error as NSErrorMBS) as String()

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns an array of attribute types supported by the node,Äôs records.
Notes: RecordType: The record type to list supported attribute types for. Can be nil.
Error: An error reference for error details. Can be nil.

Returns an array of supported attribute types.

23.1.10 supportedRecordTypes(byref error as NSErrorMBS) as String()

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns an array of the record types supported by the node.
Notes: If the node does not support checking for supported record types, all possible record types are returned.

23.1.11 unreachableSubnodeNames(byref error as NSErrorMBS) as String()

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns an array of the subnodes of a given node that are currently unreachable.

23.1.12 Properties

23.1.13 Handle as Integer

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.
Notes: (Read and Write property)

23.1.14 nodeName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The node,Äôs name.
Notes: (Read only property)

23.1.15 Constants

Node Types

Constant	Value	Description
kODNodeTypeAuthentication	&h2201	A node used for authentication or record lookups.
kODNodeTypeConfigure	&h2202	A node that specifically refers to the Directory Services configuration.
kODNodeTypeContacts	&h2204	A node used for applications that handle contact data.
kODNodeTypeLocalNodes	&h2200	A node that specifically looks at the local directory.
kODNodeTypeNetwork	&h2205	A node used for looking up network resource type data.

23.2 class ODQueryMBS

23.2.1 class ODQueryMBS

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: An Open Directory query.
Notes: Currently only partially implemented for Xojo for reading values. If you need more, please contact Monkeybread Software.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 19.3
- MBS Xojo Plugins, version 19.3pr2
- OpenDirectory Framework for Xojo

Xojo Developer Magazine

- 18.3, page 50: Happy Birthday MonkeyBread Software, What is new in the MBS Xojo Plugins by Stefanie Juchmes
- 17.5, page 9: News

23.2.2 Methods

23.2.3 Constructor(node as ODNodeMBS, inRecordTypeOrList as Variant, inAttribute as String, matchType as Integer, inQueryValueOrList as Variant, inReturnAttributeOrList as Variant, maximumResults as Integer, byref error as NSErrorMBS)

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns an query object created with provided parameters.
Notes: Node: The node to query.
in RecordTypeOrList: The type or types of record to query. Can be an NSString object for a single type or an NSArray object containing NSString objects for multiple types.
inAttribute: The name of the attribute to query.
MatchType: The type of query.
inQueryValueOrList: The value or values to query in the attribute. Can be a string or a memoryblock object for a single value, or an array containing string and memoryblock objects for multiple values.
inReturnAttributeOrList: The attribute or attributes to be returned from the query. Can be a string for a single attribute or an array object containing strings for multiple attributes. Passing nil is equivalent to passing kODAttributeTypeStandardOnly.
maximumResults: The maximum number of values to be returned.
Error: An error reference for error details.

23.2.4 Destructor

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The destructor.

23.2.5 queryWithNode(node as ODNodeMBS, inRecordTypeOrList as Variant, inAttribute as String, matchType as Integer, inQueryValueOrList as Variant, inReturnAttributeOrList as Variant, maximumResults as Integer, byref error as NSErrorMBS) as ODQueryMBS

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns an query object created with provided parameters.
Notes: Node: The node to query.
in RecordTypeOrList: The type or types of record to query. Can be an NSString object for a single type or an NSArray object containing NSString objects for multiple types.
inAttribute: The name of the attribute to query.
MatchType: The type of query.
inQueryValueOrList: The value or values to query in the attribute. Can be a string or a memoryblock object for a single value, or an array containing string and memoryblock objects for multiple values.
inReturnAttributeOrList: The attribute or attributes to be returned from the query. Can be a string for a single attribute or an array object containing strings for multiple attributes. Passing nil is equivalent to passing kODAttributeTypeStandardOnly.
maximumResults: The maximum number of values to be returned.
Error: An error reference for error details.

23.2.6 resultsAllowingPartial(AllowPartialResults as Boolean, byref error as NSErrorMBS) as ODRecordMBS()

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns results from a query synchronously.
Notes: AllowPartialResults: If true, only immediately available results are returned; otherwise, the function waits until all results are available.
Error: An error reference for error details. Can be nil.

Returns the results of the query in an array of ODRecordMBS objects.

23.2.7 start

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Starts asynchronous search.

23.2.8 synchronize

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Restarts a query, disposing of any results it has obtained.
Notes: If the query was originally started asynchronously, the event is called with inResults set to nil, error.code set to kODErrorQuerySynchronize, and error.domain set to kODErrorDomainFramework.

23.2.9 Properties

23.2.10 Handle as Integer

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.
Notes: (Read and Write property)

23.2.11 Constants

Match Types

Constant	Value	Description
kODMatchAny	1	is used to search for any records (typically passed with nil search value)
kODMatchBeginsWith	&h2002	is searching values that begin with the provided value
kODMatchContains	&h2004	is searching values that contain the provided value
kODMatchEndsWith	&h2003	is searching values that end with the provided value
kODMatchEqualTo	&h2001	is searching values that are equal to the provided value
kODMatchGreaterThan	&h2006	is searching values greater than the provided value
kODMatchLessThan	&h2007	is searching values less than the provided value

23.3 class ODRecordMBS

23.3.1 class ODRecordMBS

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: An Open Directory record.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 19.3
- MBS Xojo Plugins, version 19.3pr2
- OpenDirectory Framework for Xojo

Xojo Developer Magazine

- 17.5, page 9: News

23.3.2 Methods

23.3.3 Constructor

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The private constructor.

23.3.4 kODAttributeTypeAccessControlEntry as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type which stores directory access control directives.

23.3.5 kODAttributeTypeAddressLine1 as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Line one of multiple lines of address data for a user.

23.3.6 kODAttributeTypeAddressLine2 as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Line two of multiple lines of address data for a user.

23.3.7 kODAttributeTypeAddressLine3 as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Line three of multiple lines of address data for a user.

23.3.8 kODAttributeTypeAdminLimits as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: XML plist indicating what an admin user can edit. Found in kODRecordTypeUsers records.

23.3.9 kODAttributeTypeAdvertisedServices as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.

23.3.10 kODAttributeTypeAlias as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Alias attribute, contain pointer to another node/record/attribute.

23.3.11 kODAttributeTypeAllAttributes as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used in requesting all attribute types in a search.

23.3.12 kODAttributeTypeAllTypes as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to indicated recommended attribute types for a record type in the Config node.

23.3.13 kODAttributeTypeAltSecurityIdentities as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to store alternate identities for the record. Values will have standardized form as specified by Microsoft LDAP schema (1.2.840.113556.1.4.867).

Kerberos:user\@REALM

23.3.14 kODAttributeTypeAreaCode as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Area code of a user's phone number.

23.3.15 kODAttributeTypeAttrListRefCount as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute List reference count for a process.

23.3.16 kODAttributeTypeAttrListRefs as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: All the attribute list references for a process.

23.3.17 kODAttributeTypeAttrListValueRefCount as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attr List Value reference count for a process.

23.3.18 kODAttributeTypeAttrListValueRefs as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: All the attribute list value references for a process.

23.3.19 kODAttributeTypeAuthCredential as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: An authentication credential, to be used to authenticate to a Directory.

23.3.20 kODAttributeTypeAuthenticationAuthority as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Determines what mechanism is used to verify or set a user's password.
If multiple values are present, the first attributes returned take precedence.
Typically found in User records (kODRecordTypeUsers).

Authentication authorities are a multi-part string separated by semi-colons.
One component is the "type" of authority, such as those listed below:

"basic"	- is a crypt password
"ShadowHash"	- is a hashed password stored in a secure location
"ApplePasswordServer"	- is a password server-based account
"Kerberosv5"	- is a Kerberosv5 based
"LocalCachedUser"	- is a cached account based on an account from another node, using a ShadowHash password
"DisabledUser"	- is an account that has been disabled

23.3.21 kODAttributeTypeAuthenticationHint as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to identify the authentication hint phrase.

23.3.22 kODAttributeTypeAuthMethod as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Authentication method for an authentication capable record.

23.3.23 kODAttributeTypeAuthorityRevocationList as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute containing the binary of the authority revocation list.
A certificate revocation list that defines certificate authority certificates which are no longer trusted. No user certificates are included in this list.
Usually found in kODRecordTypeCertificateAuthorities records.

23.3.24 kODAttributeTypeAutomaticSearchPath as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Automatic search path defined by the search node.

23.3.25 kODAttributeTypeAutomountInformation as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: xDetermines what mechanism is used to verify or set a user's password.
If multiple values are present, the first attributes returned take precedence.
Typically found in User records (kODRecordTypeUsers).

23.3.26 kODAttributeTypeBirthday as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Single-valued attribute that defines the user's birthday.
Format is x.208 standard YYYYMMDDHHMMSSZ which we will require as GMT time.

23.3.27 kODAttributeTypeBootParams as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type in host or machine records for storing boot params.

23.3.28 kODAttributeTypeBuilding as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the building name for a user or person record.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.29 kODAttributeTypeBuildVersion as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Build version for reference.

23.3.30 kODAttributeTypeCACertificate as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute containing the binary of the certificate of a certificate authority.
Its corresponding private key is used to sign certificates.
Usually found in kODRecordTypeCertificateAuthority records.

23.3.31 kODAttributeTypeCapacity as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type for the capacity of a resource.
found in resource records (kODRecordTypeResources).
Example: 50

23.3.32 kODAttributeTypeCertificateRevocationList as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute containing the binary of the certificate revocation list.
This is a list of certificates which are no longer trusted.
Usually found in kODRecordTypeCertificateAuthority records.

23.3.33 kODAttributeTypeCity as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Usually, city for a user or person record.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.34 kODAttributeTypeComment as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute used for unformatted comment.

23.3.35 kODAttributeTypeCompany as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: attribute that defines the user's company.
Example: Apple Inc.

23.3.36 kODAttributeTypeComputers as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: List of computers.

23.3.37 kODAttributeTypeConfigAvailable as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Config avail tag.

23.3.38 kODAttributeTypeConfigFile as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Config file name.

23.3.39 kODAttributeTypeContactGUID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type for the contact GUID of a group.
Usually found in group records (kODRecordTypeGroups)

23.3.40 kODAttributeTypeContactPerson as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type for the contact person of the machine.
Found in host or machine records.

23.3.41 kODAttributeTypeCopyTimestamp as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Timestamp used in local account caching.

23.3.42 kODAttributeTypeCoreFWVersion as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Core FW version for reference.

23.3.43 kODAttributeTypeCountry as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents country of a record entry.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.44 kODAttributeTypeCreationTimestamp as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute showing date/time of record creation.
Format is x.208 standard YYYYMMDDHHMMSSZ which should be GMT time.

23.3.45 kODAttributeTypeCrossCertificatePair as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute containing the binary of a pair of certificates which verify each other. Both certificates have the same level of authority.
Usually found in kODRecordTypeCertificateAuthority records.

23.3.46 kODAttributeTypeCustomSearchPath as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Admin user configured custom search path defined by the search node.

23.3.47 kODAttributeTypeDataStamp as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute for checksum/meta data

23.3.48 kODAttributeTypeDateRecordCreated as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Date of record creation.

23.3.49 kODAttributeTypeDepartment as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the department name of a user or person.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.50 kODAttributeTypeDirRefCount as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Directory reference count for a process.

23.3.51 kODAttributeTypeDirRefs as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: All the directory references for a process.

23.3.52 kODAttributeTypeDNSDomain as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: DNS Resolver domain attribute.

23.3.53 kODAttributeTypeDNSName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: DNS Resolver nameserver attribute.

23.3.54 kODAttributeTypeDNSNameServer as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: DNS Resolver nameserver attribute.

23.3.55 kODAttributeTypeEMailAddress as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Email address of usually a user record.

23.3.56 kODAttributeTypeEMailContacts as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute that defines a record's custom email addresses.
found in user records (kODRecordTypeUsers).
Example: home:johndoe\@mymail.com

23.3.57 kODAttributeTypeENetAddress as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute for hardware Ethernet address (MAC address).
Found in computer records (kODRecordTypeComputers).

23.3.58 kODAttributeTypeExpire as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used for expiration date or time depending on association.

23.3.59 kODAttributeTypeFaxNumber as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the FAX numbers of a user or person.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.60 kODAttributeTypeFirstName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used for first name of user or person record.

23.3.61 kODAttributeTypeFullName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Full name of a record (e.g., "John Doe", "John Doe's Computer")

23.3.62 kODAttributeTypeFunctionalState as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Functional state of plugin for example.

23.3.63 kODAttributeTypeFWVersion as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Framework version for reference.

23.3.64 kODAttributeTypeGroup as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: List of groups.

23.3.65 kODAttributeTypeGroupMembers as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type in group records containing lists of GUID values for members other than groups.

23.3.66 kODAttributeTypeGroupMembership as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Usually a list of users that below to a given group record.

23.3.67 kODAttributeTypeGroupServices as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: xml-plist attribute that defines a group's services.
Found in group records (kODRecordTypeGroups).

23.3.68 kODAttributeTypeGUID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used for 36 character (128 bit) unique ID. An example value is "A579E95E-CDFE-4EBC-B7E7-F2158562170F". The standard format contains 32 uppercase hex characters and four hyphen characters.

23.3.69 kODAttributeTypeHardwareUUID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to store hardware UUID in string form for a record. Typically found in kODRecordTypeComputers.

23.3.70 kODAttributeTypeHomeDirectory as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Network home directory URL.

23.3.71 kODAttributeTypeHomeDirectoryQuota as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the allowed usage for a user's home directory in bytes.
Found in user records (kODRecordTypeUsers).

23.3.72 kODAttributeTypeHomeDirectorySoftQuota as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to define home directory size limit in bytes when user is notified that the hard limit is approaching.

23.3.73 kODAttributeTypeHomeLocOwner as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the owner of a workgroup's shared home directory.
Typically found in kODRecordTypeGroups records.

23.3.74 kODAttributeTypeHomePhoneNumber as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Home telephone number of a user or person.

23.3.75 kODAttributeTypeHTML as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: HTML location.

23.3.76 kODAttributeTypeIMHandle as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the Instant Messaging handles of a user.
Values should be prefixed with the appropriate IM type
(i.e., AIM:, Jabber:, MSN:, Yahoo:, or ICQ:).
Usually found in user records (kODRecordTypeUsers).

23.3.77 kODAttributeTypeInternetAlias as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to track internet alias.

23.3.78 kODAttributeTypeIPAddress as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: IP address expressed either as domain or IP notation.

23.3.79 kODAttributeTypeIPAddressAndENetAddress as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: A pairing of IPv4 or IPv6 addresses with Ethernet addresses (e.g., "10.1.1.1/00:16:cb:92:56:41"). Usually found on kODRecordTypeComputers for use by services that need specific pairing of the two values. This should be in addition to kODAttributeTypeIPAddress, kODAttributeTypeIPv6Address and kODAttributeTypeENetAddress. This is necessary because not all directories return attribute values in a guaranteed order.

23.3.80 kODAttributeTypeIPv6Address as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: IPv6 address expressed in the standard notation (e.g., "fe80::236:caff:fcc2:5641")
Usually found on kODRecordTypeComputers and kODRecordTypeHosts.

23.3.81 kODAttributeTypeJobTitle as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the job title of a user.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.82 kODAttributeTypeJPEGPhoto as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to store binary picture data in JPEG format.
Usually found in user, people or group records (kODRecordTypeUsers, kODRecordTypePeople, kODRecord-

TypeGroups).

23.3.83 kODAttributeTypeKDCAuthKey as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: KDC master key RSA encrypted with realm public key.

23.3.84 kODAttributeTypeKDCConfigData as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Contents of the kdc.conf file.

23.3.85 kODAttributeTypeKerberosRealm as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Supports Kerberized SMB Server services.

23.3.86 kODAttributeTypeKerberosServices as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: This is used to store the principals in host records (i.e., ”host”, ”vnc”, etc.)

23.3.87 kODAttributeTypeKeywords as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Keywords using for searching capability.

23.3.88 kODAttributeTypeLastName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used for the last name of user or person record.

23.3.89 kODAttributeTypeLDAPReadReplicas as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: List of LDAP server URLs which can each be used to read directory data.

23.3.90 kODAttributeTypeLDAPSearchBaseSuffix as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Search base suffix for a LDAP server.

23.3.91 kODAttributeTypeLDAPWriteReplicas as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: List of LDAP server URLs which can each be used to write directory data.

23.3.92 kODAttributeTypeLocaleRelay as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.

23.3.93 kODAttributeTypeLocaleSubnets as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.

23.3.94 kODAttributeTypeLocalOnlySearchPath as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Local only search path defined by the search node.

23.3.95 kODAttributeTypeLocation as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the location a service is available from (usually domain name).
Typically found in service record types including kODRecordTypeAFPServer, kODRecordTypeLDAPServer, and kODRecordTypeWebServer.

23.3.96 kODAttributeTypeMailAttribute as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Holds the mail account config data.

23.3.97 kODAttributeTypeMapCoordinates as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: attribute that defines coordinates for a user's location.
found in user records (kODRecordTypeUsers) and resource records (kODRecordTypeResources).
Example: 7.7,10.6

23.3.98 kODAttributeTypeMapGUID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the GUID for a record's map.

23.3.99 kODAttributeTypeMapURI as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: attribute that defines the URI of a user's location.
Usually found in user records (kODRecordTypeUsers).
Example: http://example.com/bldg1

23.3.100 kODAttributeTypeMCXFlags as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used by ManagedClient.

23.3.101 kODAttributeTypeMCXSettings as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used by ManagedClient.

23.3.102 kODAttributeTypeMetaAmbiguousName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Searches a configured list of attributes; by default: RecordName, FullName, EMailAddress.

23.3.103 kODAttributeTypeMetaAugmentedAttributes as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attributes that have been augmented.

23.3.104 kODAttributeTypeMetaAutomountMap as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to query for kODRecordTypeAutomount entries associated with a specific kODRecordTypeAutomountMap.

23.3.105 kODAttributeTypeMetaNodeLocation as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Meta attribute returning registered node name by directory node plugin.

23.3.106 kODAttributeTypeMetaRecordName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Native record name, e.g. LDAP DN

23.3.107 kODAttributeTypeMiddleName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used for the middle name of user or person record.

23.3.108 kODAttributeTypeMIME as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Data contained in this attribute type is a fully qualified MIME Type.

23.3.109 kODAttributeTypeMobileNumber as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the mobile numbers of a user or person.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.110 kODAttributeTypeModificationTimestamp as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute showing date/time of record modification.
Format is x.208 standard YYYYMMDDHHMMSSZ which is required as GMT time.

23.3.111 kODAttributeTypeNamePrefix as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the title prefix of a user or person. ie. Mr., Ms., Mrs., Dr., etc.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.112 kODAttributeTypeNameSuffix as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the name suffix of a user or person.
i.e., Jr., Sr., etc.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.113 kODAttributeTypeNativeOnly as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used in requesting all native attribute types in a search.

23.3.114 kODAttributeTypeNestedGroups as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type in group records for the list of GUID values for nested groups.

23.3.115 kODAttributeTypeNetGroups as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type that indicates which netgroups its record is a member of.
Found in user and host records.

23.3.116 kODAttributeTypeNetGroupTriplet as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute that defines the host, user and domain triplet combinations to support NetGroups. Each attribute value is comma separated string to maintain the triplet (e.g., host,user,domain).

23.3.117 kODAttributeTypeNetworkInterfaces as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.

23.3.118 kODAttributeTypeNetworkNumber as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute that defines a network number. Usually found in network records (kODRecordTypeNetworks)

23.3.119 kODAttributeTypeNFSHomeDirectory as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Defines a user's home directory mount point on the local machine.

23.3.120 kODAttributeTypeNickName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the nickname of a user or person.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.121 kODAttributeTypeNodeOptions as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Any extended options supported by the node during creation

23.3.122 kODAttributeTypeNodePath as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type in Neighborhood records describing the DS Node to search while looking up aliases in this neighborhood.

23.3.123 kODAttributeTypeNodeRefCount as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Node reference count for a process.

23.3.124 kODAttributeTypeNodeRefs as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: All the node references for a process.

23.3.125 kODAttributeTypeNodeSASLRealm as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Contains the SASL realm associated with this node (if any)

23.3.126 kODAttributeTypeNote as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Note attribute.

23.3.127 kODAttributeTypeNTDomainComputerAccount as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Supports Kerberized SMB Server services.

23.3.128 kODAttributeTypeNumTableList as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Summary of the reference table entries presented as attribute values from the Configure node.

23.3.129 kODAttributeTypeOperatingSystem as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Returns the operating system type where the daemon is running, e.g., Mac OS X or Mac OS X Server

23.3.130 kODAttributeTypeOperatingSystemVersion as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Returns the operating system version where the daemon is running, e.g., 10.6

23.3.131 kODAttributeTypeOrganizationInfo as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Usually the organization info of a user.

23.3.132 kODAttributeTypeOrganizationName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Usually the organization of a user.

23.3.133 kODAttributeTypeOriginalHomeDirectory as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Home directory URL used in local account caching.

23.3.134 kODAttributeTypeOriginalNFSHomeDirectory as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: NFS home directory used in local account caching.

23.3.135 kODAttributeTypeOriginalNodeName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Nodename used in local account caching.

23.3.136 kODAttributeTypeOwner as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type for the owner of a record.
Typically the value is a LDAP distinguished name.

23.3.137 kODAttributeTypeOwnerGUID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type for the owner GUID of a group.
Found in group records (kODRecordTypeGroups).

23.3.138 kODAttributeTypePagerNumber as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the pager numbers of a user or person.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.139 kODAttributeTypeParentLocales as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.

23.3.140 kODAttributeTypePassword as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Holds the password or credential value.

23.3.141 kODAttributeTypePasswordPlus as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Holds marker data to indicate possible authentication redirection.

23.3.142 kODAttributeTypePasswordPolicyOptions as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Collection of password policy options in single attribute.
Used in user presets record.

23.3.143 kODAttributeTypePasswordServerList as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the attribute for storing the password server's replication information.

23.3.144 kODAttributeTypePasswordServerLocation as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Specifies the IP address or domain name of the Password Server associated with a given directory node. Found in a config record named PasswordServer.

23.3.145 kODAttributeTypePGPPublicKey as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Pretty Good Privacy public encryption key.

23.3.146 kODAttributeTypePhoneContacts as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: attribute that defines a record's custom phone numbers.
found in user or people records.
Example: home fax:408-555-4444

23.3.147 kODAttributeTypePhoneNumber as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Telephone number of a user.

23.3.148 kODAttributeTypePicture as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the path of the picture for each user displayed in the login window.
Found in user records (kODRecordTypeUsers).

23.3.149 kODAttributeTypePIDValue as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: PID value.

23.3.150 kODAttributeTypePluginIndex as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Plugin index for reference.

23.3.151 kODAttributeTypePlugInInfo as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Information (version, signature, about, credits, etc.) about the plug-in that is actually servicing a

particular directory node.
Has never been supported.

23.3.152 kODAttributeTypePort as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the port number a service is available on.
Typically found in service record types including kODRecordTypeAFPServer, kODRecordTypeLDAPServer, and kODRecordTypeWebServer.

23.3.153 kODAttributeTypePostalAddress as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: The postal address usually excluding postal code.

23.3.154 kODAttributeTypePostalAddressContacts as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: attribute that defines a record's alternate postal addresses.
Found in user records (kODRecordTypeUsers) and resource records (kODRecordTypeResources).

23.3.155 kODAttributeTypePostalCode as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: The postal code such as zip code in the USA.

23.3.156 kODAttributeTypePresetUserIsAdmin as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Flag to indicate whether users created from this preset are administrators by default. Found in

kODRecordTypePresetUsers records.

23.3.157 kODAttributeTypePrimaryComputerGUID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: An attribute that defines a primary computer of the computer group.
Added to computer group record type (kODRecordTypeComputerGroups)

23.3.158 kODAttributeTypePrimaryComputerList as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: The GUID of the computer list with which this computer record is associated.

23.3.159 kODAttributeTypePrimaryGroupID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: This is the 32 bit unique ID that represents the primary group a user is part of, or the ID of a group. Format is a signed 32 bit integer represented as a string.

23.3.160 kODAttributeTypePrimaryLocale as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.

23.3.161 kODAttributeTypePrimaryNTDomain as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Supports Kerberized SMB Server services.

23.3.162 kODAttributeTypePrinter1284DeviceID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute that defines the IEEE 1284 DeviceID of a printer.
This is used when configuring a printer.

23.3.163 kODAttributeTypePrinterLPRHost as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Standard attribute type for kODRecordTypePrinters.

23.3.164 kODAttributeTypePrinterLPRQueue as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Standard attribute type for kODRecordTypePrinters.

23.3.165 kODAttributeTypePrinterMakeAndModel as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute for definition of the Printer Make and Model. An example value would be ”HP LaserJet 2200”. This would be used to determine the proper PPD file to be used when configuring a printer from the Directory. This attribute is based on the IPP Printing Specification RFC and IETF IPP-LDAP Printer Record.

23.3.166 kODAttributeTypePrinterType as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Standard attribute type for kODRecordTypePrinters.

23.3.167 kODAttributeTypePrinterURI as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute that defines the URI of a printer "ipp://address" or "smb://server/queue". This is used when configuring a printer. This attribute is based on the IPP Printing Specification RFC and IETF IPP-LDAP Printer Record.

23.3.168 kODAttributeTypePrinterXRISupported as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: attribute that defines additional URIs supported by a printer.
This is used when configuring a printer. This attribute is based on the IPP Printing Specification RFC and IETF IPP-LDAP Printer Record.

23.3.169 kODAttributeTypePrintServiceInfoText as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Standard attribute type for kODRecordTypePrinters.

23.3.170 kODAttributeTypePrintServiceInfoXML as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Standard attribute type for kODRecordTypePrinters.

23.3.171 kODAttributeTypePrintServiceUserData as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute for print quota configuration or statistics (XML data).
Found in user records (kODRecordTypeUsers) or print service statistics records (kODRecordTypePrintServiceUser).

23.3.172 kODAttributeTypeProcessName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Process Name.

23.3.173 kODAttributeTypeProfiles as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Profiles associated with the record.

23.3.174 kODAttributeTypeProfilesTimestamp as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Timestamp for the profiles associated with the record.

23.3.175 kODAttributeTypeProtocolNumber as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute that defines a protocol number. Usually found in protocol records (kODRecordTypeProtocols)

23.3.176 kODAttributeTypeProtocols as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: List of protocols.

23.3.177 kODAttributeTypePwdAgingPolicy as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Contains the password aging policy data for an authentication capable record.

23.3.178 kODAttributeTypeReadOnlyNode as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Can be found using dsGetDirNodeInfo and will return one of
ReadOnly, ReadWrite, or WriteOnly strings.
Note that ReadWrite does not imply fully readable or writable

23.3.179 kODAttributeTypeRealUserID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used by Managed Client

23.3.180 kODAttributeTypeRecordName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: List of names/keys for this record.

23.3.181 kODAttributeTypeRecordType as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute for a Record or a Directory Node.

23.3.182 kODAttributeTypeRecRefCount as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Record reference count for a process.

23.3.183 kODAttributeTypeRecRefs as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: All the record references for a process.

23.3.184 kODAttributeTypeRelationships as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: attribute that defines the relationship to the record type.
found in user records (kODRecordTypeUsers).
Example: brother:John

23.3.185 kODAttributeTypeRelativeDNPrefix as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to map the first native LDAP attribute type required in the building of the Relative Distinguished Name for LDAP record creation.

23.3.186 kODAttributeTypeResourceInfo as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: attribute that defines a resource record's info.

23.3.187 kODAttributeTypeResourceType as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute type for the kind of resource.
found in resource records (kODRecordTypeResources).
Example: ConferenceRoom

23.3.188 kODAttributeTypeRPCNumber as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute that defines an RPC number. Usually found in RPC records (kODRecordTypeRPC)

23.3.189 kODAttributeTypeSchema as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: List of attribute types.

23.3.190 kODAttributeTypeSearchPath as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Search path used by the search node.

23.3.191 kODAttributeTypeSearchPolicy as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Search policy for the search node.

23.3.192 kODAttributeTypeServicesLocator as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: the URI for a record's calendar

23.3.193 kODAttributeTypeServiceType as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the service type for the service. This is the raw service type of the service. For example a service record type of kODRecordTypeWebServer might have a service type of ”http” or ”https”.

23.3.194 kODAttributeTypeSetupAdvertising as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used for Setup Assistant automatic population.

23.3.195 kODAttributeTypeSetupAutoRegister as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used for Setup Assistant automatic population.

23.3.196 kODAttributeTypeSetupLocation as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used for Setup Assistant automatic population.

23.3.197 kODAttributeTypeSetupOccupation as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used for Setup Assistant automatic population.

23.3.198 kODAttributeTypeSMBAcctFlags as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Account control flag.

23.3.199 kODAttributeTypeSMBGroupRID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Constant for supporting PDC SMB interaction with DirectoryService.

23.3.200 kODAttributeTypeSMBHome as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: UNC address of Windows homedirectory mount point (\server\sharepoint).

23.3.201 kODAttributeTypeSMBHomeDrive as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Drive letter for homedirectory mount point.

23.3.202 kODAttributeTypeSMBKickoffTime as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute in support of SMB interaction.

23.3.203 kODAttributeTypeSMBLogoffTime as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute in support of SMB interaction.

23.3.204 kODAttributeTypeSMBLogonTime as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: SMB Primary Group Security ID, stored as a string attribute of up to 64 bytes. Found in user, group, and computer records (kODRecordTypeUsers, kODRecordTypeGroups, kODRecordTypeComputers).

23.3.205 kODAttributeTypeSMBPrimaryGroupSID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.

23.3.206 kODAttributeTypeSMBProfilePath as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Desktop management info (dock, desktop links, etc).

23.3.207 kODAttributeTypeSMBPWDLastSet as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute in support of SMB interaction.

23.3.208 kODAttributeTypeSMBRID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute in support of SMB interaction.

23.3.209 kODAttributeTypeSMBScriptPath as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Login script path.

23.3.210 kODAttributeTypeSMBSID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: SMB Security ID, stored as a string attribute of up to 64 bytes.
Found in user, group, and computer records (kODRecordTypeUsers, kODRecordTypeGroups, kODRecordTypeComputers).

23.3.211 kODAttributeTypeSMBUserWorkstations as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: List of workstations user can login from (machine account names).

23.3.212 kODAttributeTypeStandardOnly as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used in requesting all standard attribute types in a query.

23.3.213 kODAttributeTypeState as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: The state or province of a country.

23.3.214 kODAttributeTypeStreet as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Represents the street address of a user or person.
Usually found in user or people records (kODRecordTypeUsers or kODRecordTypePeople).

23.3.215 kODAttributeTypeSubNodes as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute of a node which lists the available subnodes of that node.

23.3.216 kODAttributeTypeTimePackage as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Data of Create, Modify, Backup time in UTC.

23.3.217 kODAttributeTypeTimeToLive as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute recommending how long to cache the record's attribute values.
Format is an unsigned 32 bit representing seconds. ie. 300 is 5 minutes.

23.3.218 kODAttributeTypeTotalRefCount as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Total count of references for a process.

23.3.219 kODAttributeTypeTotalSize as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: checksum/meta data.

23.3.220 kODAttributeTypeTrustInformation as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to describe a node's trust information.

23.3.221 kODAttributeTypeUniqueID as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: This is the 32 bit unique ID that represents the user in the legacy manner.
Format is a signed integer represented as a string.

23.3.222 kODAttributeTypeURL as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: List of URLs.

23.3.223 kODAttributeTypeUserCertificate as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute containing the binary of the user's certificate.
Usually found in user records. The certificate is data which identifies a user.
This data is attested to by a known party, and can be independently verified by a third party.

23.3.224 kODAttributeTypeUserPKCS12Data as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute containing binary data in PKCS #12 format.

Usually found in user records. The value can contain keys, certificates, and other related information and is encrypted with a passphrase.

23.3.225 kODAttributeTypeUserShell as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used to represent the user's shell setting.

23.3.226 kODAttributeTypeUserSMIMECertificate as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute containing the binary of the user's SMIME certificate.
Usually found in user records. The certificate is data which identifies a user.
This data is attested to by a known party, and can be independently verified by a third party. SMIME certificates are often used for signed or encrypted emails.

23.3.227 kODAttributeTypeVersion as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Version label.

23.3.228 kODAttributeTypeVFSDumpFreq as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute used to support mount records.

23.3.229 kODAttributeTypeVFSLinkDir as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute used to support mount records.

23.3.230 kODAttributeTypeVFSOpts as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Used in support of mount records.

23.3.231 kODAttributeTypeVFSPassNo as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute used to support mount records.

23.3.232 kODAttributeTypeVFSType as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: Attribute used to support mount records.

23.3.233 kODAttributeTypeWeblogURI as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: attribute that defines the URI of a user's weblog.
Usually found in user records (kODRecordTypeUsers).
Example: http://example.com/blog/jsmith

23.3.234 kODAttributeTypeXMLPlist as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the attribute type constants.
Notes: XML plist used.

23.3.235 kODRecordTypeAFPServer as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Record type of AFP server records.

23.3.236 kODRecordTypeAliases as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Used to represent alias records.

23.3.237 kODRecordTypeAttributeTypes as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies records that represent each possible attribute type.

23.3.238 kODRecordTypeAugments as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Used to store augmented record data.

23.3.239 kODRecordTypeAutomount as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Used to store automount record data.

23.3.240 kODRecordTypeAutomountMap as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Used to store automountMap record data.

23.3.241 kODRecordTypeAutoServerSetup as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Used to discover automated server setup information.

23.3.242 kODRecordTypeBootp as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Record in the local node for storing bootp info.

23.3.243 kODRecordTypeCertificateAuthorities as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Record type that contains certificate authority informatio

23.3.244 kODRecordTypeComputerGroups as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies computer group records.

23.3.245 kODRecordTypeComputerLists as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies computer list records.

23.3.246 kODRecordTypeComputers as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies computer records.

23.3.247 kODRecordTypeConfiguration as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies configuration records.

23.3.248 kODRecordTypeEthernets as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Record in the node for storing ethernets.

23.3.249 kODRecordTypeFileMakerServers as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: FileMaker servers record type that describes available FileMaker servers, used for service discovery.

23.3.250 kODRecordTypeFTPServer as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies ftp server records.

23.3.251 kODRecordTypeGroups as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies group records.

23.3.252 kODRecordTypeHosts as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies host records.

23.3.253 kODRecordTypeHostServices as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Record in the local node for storing host services.

23.3.254 kODRecordTypeLDAPServer as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies LDAP server records.

23.3.255 kODRecordTypeLocations as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Location record type.

23.3.256 kODRecordTypeMounts as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies mount records.

23.3.257 kODRecordTypeNetDomains as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Record in the local node for storing net domains.

23.3.258 kODRecordTypeNetGroups as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Record in the local node for storing net groups.

23.3.259 kODRecordTypeNetworks as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies network records.

23.3.260 kODRecordTypeNFS as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies NFS records.

23.3.261 kODRecordTypePeople as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Record type that contains ”People” records used for contact information.

23.3.262 kODRecordTypePresetComputerGroups as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: The computer group record type used for presets in record creation.

23.3.263 kODRecordTypePresetComputerLists as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: The computer list record type used for presets in record creation.

23.3.264 kODRecordTypePresetComputers as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: The computer record type used for presets in record creation.

23.3.265 kODRecordTypePresetGroups as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: The group record type used for presets in record creation.

23.3.266 kODRecordTypePresetUsers as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: The user record type used for presets in record creation.

23.3.267 kODRecordTypePrinters as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies printer records.

23.3.268 kODRecordTypePrintService as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies print service records.

23.3.269 kODRecordTypePrintServiceUser as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Record in the local node for storing quota usage for a user.

23.3.270 kODRecordTypeProtocols as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies protocol records.

23.3.271 kODRecordTypeQTSServer as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies quicktime streaming server records.

23.3.272 kODRecordTypeQueryInformation as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Specifically to return query information inline such as skipped nodes

23.3.273 kODRecordTypeRecordTypes as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies records that represent each possible record type.

23.3.274 kODRecordTypeResources as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies resources used in group services.

23.3.275 kODRecordTypeRPC as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies remote procedure call records.

23.3.276 kODRecordTypeServer as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies generic server records.

23.3.277 kODRecordTypeServices as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies directory based service records.

23.3.278 kODRecordTypeSharePoints as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Share point record type.

23.3.279 kODRecordTypeSMBServer as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies SMB server records.

23.3.280 kODRecordTypeUsers as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies user records.

23.3.281 kODRecordTypeWebServer as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the record type constants.
Notes: Identifies web server records.

23.3.282 recordDetails(byref error as NSErrorMBS) as Dictionary

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a dictionary of attributes with their respective values.
Notes: Error: An error reference for error details.

Returns a dictionary of the attributes in inAttributes with their respective values.

23.3.283 recordDetailsForAttributes(inAttributes() as string, byref error as NSErrorMBS) as Dictionary

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a dictionary of attributes with their respective values.
Notes: inAttributes: An array of attributes. Can be nil.
Error: An error reference for error details.

Returns a dictionary of the attributes in inAttributes with their respective values.

If inAttributes is nil, all currently retrieved attributes are returned.

23.3.284 synchronize(byref error as NSErrorMBS) as Boolean

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Synchronizes the record from the directory to get current data and commit changes.
Notes: Returns true if the record successfully synchronizes; otherwise, false.

This method only fetches those attributes that have been fetched before.

23.3.285 valuesForAttribute(inAttribute as String, byref error as NSErrorMBS) as Variant()

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the values of an attribute of the record.
Notes: inAttribute: The attribute.
Error: An error reference for error details. Can be nil.

Returns an array of attribute values. Elements are of type String or MemoryBlock.

23.3.286 Properties

23.3.287 Handle as Integer

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The internal object reference.
Notes: (Read and Write property)

23.3.288 recordName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The official name of the record.
Notes: (Read only property)

23.3.289 recordType as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The record,Äôs type.
Notes: (Read only property)

23.4 class ODSessionMBS

23.4.1 class ODSessionMBS

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The class for an Open Directory session.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 19.3
- MBS Xojo Plugins, version 19.3pr2
- OpenDirectory Framework for Xojo

Xojo Developer Magazine

- 18.3, page 50: Happy Birthday MonkeyBread Software, What is new in the MBS Xojo Plugins by Stefanie Juchmes
- 17.5, page 9: News

23.4.2 Methods

23.4.3 Constructor

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The constructor.
Notes: gets default session.

23.4.4 defaultSession as ODSessionMBS

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a shared instance of the local session.

23.4.5 nodeNames(byref error as NSErrorMBS) as String()

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns the node names that are registered with this session.

23.4.6 ODSessionProxyAddress as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the options dictionary.
Notes: The address to connect to via proxy. The value is of type string.

23.4.7 ODSessionProxyPassword as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the options dictionary.
Notes: The password to connect with via proxy. The value is of type string.

23.4.8 ODSessionProxyPort as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the options dictionary.
Notes: The port to connect to via proxy. The value is of type integer.

23.4.9 ODSessionProxyUsername as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the keys for the options dictionary.
Notes: The username to connect with via proxy. The value is of type string.

23.4.10 session(options as dictionary, byref Error as NSErrorMBS) as ODSessionMBS

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns a session object directed over proxy to another host.
Notes: Options: A dictionary of options to associate with the session. Can be nil.
Error: An error reference for error details. Can be nil.

Returns the initialized session object.

23.4.11 UserName as String

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Queries user name.
Notes: Convenience function to query user name of current user.

23.4.12 Properties

23.4.13 Handle as Integer

Plugin Version: 19.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Internal object reference.
Notes: (Read and Write property)

Chapter 24

OpenCL

24.1 class CLCommandQueueMBS

24.1.1 class CLCommandQueueMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for an OpenCL command queue.
Example:

```
dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)

// Create a command queue
dim queue as new CLCommandQueueMBS(context, device, 0)
```

Blog Entries

- OpenCL support in our plugins

24.1.2 Methods

24.1.3 Constructor(context as CLContextMBS, device as CLDeviceMBS, flags as Integer = 0)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Create a command-queue on a specific device.
Example:

```
dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)

// Create a command queue
dim queue as new CLCommandQueueMBS(context, device, 0)
```

Notes: context: Must be a valid OpenCL context.
device: Must be a device associated with context. It can either be in the list of devices specified when context is created using CLContextMBS Constructor or have the same device type as the device type specified when the context is created.
flags: Specifies a list of properties for the command-queue. This is a bit-field. Only command-queue properties specified in the table below can be set in properties; otherwise the value specified in properties is considered to be not valid.

Command-Queue Properties	Description
kQueueOutOfOrderExecModeEnable	Determines whether the commands queued in the command-queue are executed in-order or out-of-order. If set, the commands in the command-queue are executed out-of-order. Otherwise, commands are executed in-order.
kQueueProfilingEnable	Enable or disable profiling of commands in the command-queue. If set, the profiling of commands is enabled. Otherwise profiling of commands is disabled. See clGetEventProfilingInfo for more information.

The OpenCL functions that are submitted to a command-queue are enqueued in the order the calls are made but can be configured to execute in-order or out-of-order. The properties argument in clCreateCommandQueue can be used to specify the execution order.

If the kQueueOutOfOrderExecModeEnable property of a command-queue is not set, the commands enqueued to a command-queue execute in order. For example, if an application calls EnqueueNDRangeKernel to execute kernel A followed by a EnqueueNDRangeKernel to execute kernel B, the application can assume that kernel A finishes first and then kernel B is executed. If the memory objects output by kernel A are inputs to kernel B then kernel B will see the correct data in memory objects produced by execution of kernel A. If the kQueueOutOfOrderExecModeEnable property of a commandqueue is set, then there is no

guarantee that kernel A will finish before kernel B starts execution.

Applications can configure the commands enqueued to a command-queue to execute out-of-order by setting the kQueueOutOfOrderExecModeEnable property of the command-queue. This can be specified when the command-queue is created or can be changed dynamically using this Constructor. In out-of-order execution mode there is no guarantee that the enqueued commands will finish execution in the order they were queued. As there is no guarantee that kernels will be executed in order, i.e. based on when the EnqueueNDRangeKernel calls are made within a command-queue, it is therefore possible that an earlier EnqueueNDRangeKernel call to execute kernel A identified by event A may execute and/or finish later than a EnqueueNDRangeKernel call to execute kernel B which was called by the application at a later point in time. To guarantee a specific order of execution of kernels, a wait on a particular event (in this case event A) can be used. The wait for event A can be specified in the event_wait_list argument to EnqueueNDRangeKernel for kernel B.

In addition, a wait for events or a barrier command can be enqueued to the command-queue. The wait for events command ensures that previously enqueued commands identified by the list of events to wait for have finished before the next batch of commands is executed. The barrier command ensures that all previously enqueued commands in a command-queue have finished execution before the next batch of commands is executed.

Similarly, commands to read, write, copy or map memory objects that are enqueued after EnqueueNDRangeKernel, EnqueueTask or EnqueueNativeKernel commands are not guaranteed to wait for kernels scheduled for execution to have completed (if the kQueueOutOfOrderExecModeEnable property is set). To ensure correct ordering of commands, the event object returned by EnqueueNDRangeKernel, EnqueueTask or EnqueueNativeKernel can be used to enqueue a wait for event or a barrier command can be enqueued that must complete before reads or writes to the memory object(s) occur.

Lasterror is set.

24.1.4 Context as CLContextMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the context specified when the command-queue is created.
Notes: Lasterror is set.

24.1.5 Device as CLDeviceMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the device specified when the command-queue is created.
Notes: Lasterror is set.

24.1.6 EnqueueBarrier

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: A synchronization point that enqueues a barrier operation.
Notes: EnqueueBarrier is a synchronization point that ensures that all queued commands in command_queue have finished execution before the next batch of commands can begin execution.

Lasterror is set.

24.1.7 EnqueueCopyBuffer(sourceBuffer as CLMemMBS, destBuffer as CLMemMBS, sourceOffset as Integer, destOffset as Integer, size as Integer)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to copy a buffer object to another buffer object.
Notes: sourceBuffer: the source memory object.
destBuffer: the destination memory object.
sourceOffset: The offset where to begin copying data from sourceBuffer.
destOffset: The offset where to begin copying data into destBuffer.
size: Refers to the size in bytes to copy.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in event_wait_list act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.
Lasterror is set.
See also:

- 24.1.8 EnqueueCopyBuffer(sourceBuffer as CLMemMBS, destBuffer as CLMemMBS, sourceOffset as Integer, destOffset as Integer, size as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 1028

24.1.8 EnqueueCopyBuffer(sourceBuffer as CLMemMBS, destBuffer as CLMemMBS, sourceOffset as Integer, destOffset as Integer, size as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to copy a buffer object to another buffer object.
Notes: sourceBuffer: the source memory object.
destBuffer: the destination memory object.
sourceOffset: The offset where to begin copying data from sourceBuffer.
destOffset: The offset where to begin copying data into destBuffer.

size: Refers to the size in bytes to copy.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in event_wait_list act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.
Lasterror is set.
See also:

- 24.1.7 EnqueueCopyBuffer(sourceBuffer as CLMemMBS, destBuffer as CLMemMBS, sourceOffset as Integer, destOffset as Integer, size as Integer) 1028

24.1.9 EnqueueCopyBufferToImage(SourceBuffer as CLMemMBS, destImage as CLMemMBS, sourceOffset as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to copy a buffer object to an image object.
Notes: SourceBuffer: A valid buffer object.
destImage: A valid image object.

sourceOffset: The offset where to begin copying data from SourceBuffer.

destOrigin: The (x, y, z) offset in pixels where to begin copying data to destImage. If destImage is a 2D image object, the z value given by destOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If destImage is a 2D image object, the depth value given by RegionDepth must be 1.

The size in bytes of the region to be copied from SourceBuffer referred to as src_cb is computed as width * height * depth * bytes/image element if destImage is a 3D image object and is computed as width * height * bytes/image element if destImage is a 2D image object.

EventWaitList: Optionally, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional. Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Lasterror is set.
See also:

- 24.1.10 EnqueueCopyBufferToImage(SourceBuffer as CLMemMBS, destImage as CLMemMBS, sourceOffset as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 1030

24.1.10 EnqueueCopyBufferToImage(SourceBuffer as CLMemMBS, destImage as CLMemMBS, sourceOffset as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to copy a buffer object to an image object.
Notes: SourceBuffer: A valid buffer object.
destImage: A valid image object.

sourceOffset: The offset where to begin copying data from SourceBuffer.

destOrigin: The (x, y, z) offset in pixels where to begin copying data to destImage. If destImage is a 2D image object, the z value given by destOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If destImage is a 2D image object, the depth value given by RegionDepth must be 1.

The size in bytes of the region to be copied from SourceBuffer referred to as src_cb is computed as width * height * depth * bytes/image element if destImage is a 3D image object and is computed as width * height * bytes/image element if destImage is a 2D image object.

EventWaitList: Optionally, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional. Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Lasterror is set.
See also:

24.1.11 EnqueueCopyImage(sourceImage as CLMemMBS, destImage as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to copy image objects.
Notes: sourceImage: Source image.
destImage: Dest image.

sourceOrigin: Defines the starting (x, y, z) location in pixels in src_image from where to start the data copy. If src_image is a 2D image object, the z value given by sourceOriginZ must be 0.

sourceOrigin: Defines the starting (x, y, z) location in pixels in dst_image from where to start the data copy. If dst_image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If src_image or dst_image is a 2D image object, the depth value given by RegionDepth must be 1.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CommandQueue must be the same.

outEvent: Optional, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

It is currently a requirement that the sourceImage and destImage image memory objects for EnqueueCopyImage must have the exact same image format (i.e. the cl_image_format descriptor specified when sourceImage and destImage are created must match).

sourceImage and destImage can be 2D or 3D image objects allowing us to perform the following actions:

- Copy a 2D image object to a 2D image object.
- Copy a 2D image object to a 2D slice of a 3D image object.

- Copy a 2D slice of a 3D image object to a 2D image object.
- Copy a 3D image object to a 3D image object.

Lasterror is set.
See also:

- 24.1.12 EnqueueCopyImage(sourceImage as CLMemMBS, destImage as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 1032

24.1.12 EnqueueCopyImage(sourceImage as CLMemMBS, destImage as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to copy image objects.
Notes: sourceImage: Source image.
destImage: Dest image.

sourceOrigin: Defines the starting (x, y, z) location in pixels in src_image from where to start the data copy. If src_image is a 2D image object, the z value given by sourceOriginZ must be 0.

sourceOrigin: Defines the starting (x, y, z) location in pixels in dst_image from where to start the data copy. If dst_image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If src_image or dst_image is a 2D image object, the depth value given by RegionDepth must be 1.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CommandQueue must be the same.

outEvent: Optional, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

It is currently a requirement that the sourceImage and destImage image memory objects for EnqueueCopyImage must have the exact same image format (i.e. the cl_image_format descriptor specified when

sourceImage and destImage are created must match).

sourceImage and destImage can be 2D or 3D image objects allowing us to perform the following actions:

- Copy a 2D image object to a 2D image object.
- Copy a 2D image object to a 2D slice of a 3D image object.
- Copy a 2D slice of a 3D image object to a 2D image object.
- Copy a 3D image object to a 3D image object.

Lasterror is set.
See also:

- 24.1.11 EnqueueCopyImage(sourceImage as CLMemMBS, destImage as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer) 1031

24.1.13 EnqueueCopyImageToBuffer(sourceImage as CLMemMBS, destBuffer as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, destOffset as Integer)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to copy an image object to a buffer object.
Notes: sourceImage: A valid image object.
destBuffer: A valid buffer object.

sourceOrigin: Defines the (x, y, z) offset in pixels in the image from where to copy. If sourceImage is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If sourceImage is a 2D image object, the depth value given by RegionDepth must be 1.

destOffset: The offset where to begin copying data into destBuffer. The size in bytes of the region to be copied referred to as dst_cb is computed as width * height * depth * bytes/image element if sourceImage is a 3D image object and is computed as width * height * bytes/image element if sourceImage is a 2D image object.

EventWaitList: Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in

event_wait_list and command_queue must be the same.

outEvent: Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Lasterror is set.
See also:

- 24.1.14 EnqueueCopyImageToBuffer(sourceImage as CLMemMBS, destBuffer as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, destOffset as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 1034

24.1.14 EnqueueCopyImageToBuffer(sourceImage as CLMemMBS, destBuffer as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, destOffset as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to copy an image object to a buffer object.
Notes: sourceImage: A valid image object.
destBuffer: A valid buffer object.

sourceOrigin: Defines the (x, y, z) offset in pixels in the image from where to copy. If sourceImage is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If sourceImage is a 2D image object, the depth value given by RegionDepth must be 1.

destOffset: The offset where to begin copying data into destBuffer. The size in bytes of the region to be copied referred to as dst_cb is computed as width * height * depth * bytes/image element if sourceImage is a 3D image object and is computed as width * height * bytes/image element if sourceImage is a 2D image object.

EventWaitList: Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Lasterror is set.
See also:

- 24.1.13 EnqueueCopyImageToBuffer(sourceImage as CLMemMBS, destBuffer as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, destOffset as Integer) 1033

24.1.15 EnqueueMapBuffer(buffer as CLMemMBS, BlockingMap as boolean, MapFlags as Integer, offset as Integer, size as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) as memoryblock

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to map a region of the buffer object given by buffer into the host address space and returns a pointer to this mapped region.
Notes: BlockingMap: Optional, Indicates if the map operation is blocking or non-blocking. If BlockingMap is true, EnqueueMapBuffer does not return until the specified region in buffer can be mapped. If BlockingMap is false i.e. map operation is non-blocking, the pointer to the mapped region returned by clEnqueueMapBuffer cannot be used until the map command has completed. The event argument returns an event object which can be used to query the execution status of the map command. When the map command is completed, the application can access the contents of the mapped region using the pointer returned by EnqueueMapBuffer.
MapFlags: Is a bit-field and can be set to kMapRead to indicate that the region specified by (offset, size) in the buffer object is being mapped for reading, and/or kMapWrite to indicate that the region specified by (offset, size) in the buffer object is being mapped for writing.
buffer: A valid buffer object. The OpenCL context associated with CLCommandQueueMBS and buffer must be the same.
offset, size: The offset in bytes and the size of the region in the buffer object that is being mapped.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in EventWaitList act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.
outEvent: Returns an event object that identifies this particular copy command and can be used toquery or queue a wait for this particular command to complete.

Lasterror is set.

The contents of the regions of a memory object mapped for writing (i.e. kMapWrite is set in map_flags argument to EnqueueMapBuffer or EnqueueMapImage) are considered to be undefined until this region is unmapped. Reads and writes by a kernel executing on a device to a memory region(s) mapped for writing are undefined.

Multiple command-queues can map a region or overlapping regions of a memory object for reading (i.e. MapFlags = kMapRead). The contents of the regions of a memory object mapped for reading can also be read by kernels executing on a device(s). The behavior of writes by a kernel executing on a device to a

mapped region of a memory object is undefined. Mapping (and unmapping) overlapped regions of a buffer or image memory object for writing is undefined.

The behavior of OpenCL function calls that enqueue commands that write or copy to regions of a memory object that are mapped is undefined.

Lasterror is set.
See also:

- 24.1.16 EnqueueMapBuffer(buffer as CLMemMBS, MapFlags as Integer, offset as Integer, size as Integer) as memoryblock 1036

24.1.16 EnqueueMapBuffer(buffer as CLMemMBS, MapFlags as Integer, offset as Integer, size as Integer) as memoryblock

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to map a region of the buffer object given by buffer into the host address space and returns a pointer to this mapped region.
Notes: BlockingMap: Optional, Indicates if the map operation is blocking or non-blocking. If BlockingMap is true, EnqueueMapBuffer does not return until the specified region in buffer can be mapped. If BlockingMap is false i.e. map operation is non-blocking, the pointer to the mapped region returned by clEnqueueMapBuffer cannot be used until the map command has completed. The event argument returns an event object which can be used to query the execution status of the map command. When the map command is completed, the application can access the contents of the mapped region using the pointer returned by EnqueueMapBuffer.
MapFlags: Is a bit-field and can be set to kMapRead to indicate that the region specified by (offset, size) in the buffer object is being mapped for reading, and/or kMapWrite to indicate that the region specified by (offset, size) in the buffer object is being mapped for writing.
buffer: A valid buffer object. The OpenCL context associated with CLCommandQueueMBS and buffer must be the same.
offset, size: The offset in bytes and the size of the region in the buffer object that is being mapped.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in EventWaitList act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.
outEvent: Returns an event object that identifies this particular copy command and can be used toquery or queue a wait for this particular command to complete.

Lasterror is set.

The contents of the regions of a memory object mapped for writing (i.e. kMapWrite is set in map_flags argument to EnqueueMapBuffer or EnqueueMapImage) are considered to be undefined until this region is unmapped. Reads and writes by a kernel executing on a device to a memory region(s) mapped for writing are undefined.

Multiple command-queues can map a region or overlapping regions of a memory object for reading (i.e. MapFlags = kMapRead). The contents of the regions of a memory object mapped for reading can also be read by kernels executing on a device(s). The behavior of writes by a kernel executing on a device to a mapped region of a memory object is undefined. Mapping (and unmapping) overlapped regions of a buffer or image memory object for writing is undefined.

The behavior of OpenCL function calls that enqueue commands that write or copy to regions of a memory object that are mapped is undefined.

Lasterror is set.
See also:

- 24.1.15 EnqueueMapBuffer(buffer as CLMemMBS, BlockingMap as boolean, MapFlags as Integer, offset as Integer, size as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) as memoryblock 1035

24.1.17 EnqueueMapImage(image as CLMemMBS, BlockingMap as boolean, MapFlags as Integer, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, byref RowPitch as Integer, byref SlicePitch as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) as memoryblock

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to map a region of an image object into the host address space and returns a pointer to this mapped region.
Notes: image: A valid image object. The OpenCL context associated with CLCommandQueueMBS and image must be the same.

BlockingMap: Optional, Indicates if the map operation is blocking or non-blocking. If BlockingMap is true, EnqueueMapImage does not return until the specified region in image can be mapped. If BlockingMap is false i.e. map operation is non-blocking, the pointer to the mapped region returned by EnqueueMapImage cannot be used until the map command has completed. The event argument returns an event object which can be used to query the execution status of the map command. When the map command is completed, the application can access the contents of the mapped region using the pointer returned by EnqueueMapImage.

MapFlags: Is a bit-field and can be set to kMapRead to indicate that the region specified by (origin, region) in the image object is being mapped for reading, and/or kMapWrite to indicate that the region specified by (origin, region) in the image object is being mapped for writing.
origin, region: Define the (x, y, z) offset in pixels and (width, height, depth) in pixels of the 2D or 3D rectangle region that is to be mapped. If image is a 2D image object, the z value given by originZ must be 0 and the depth value given by regionDepth must be 1.

RowPitch: Returns the scan-line pitch in bytes for the mapped region. This must be a non-nil value.
SlicePitch: Returns the size in bytes of each 2D slice for the mapped region. For a 2D image, zero is returned if this argument is not nil. For a 3D image, image_slice_pitch must be a non-nil value.

EventWaitList: Optional, Specify events that need to complete before EnqueueMapImage can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and CLCommandQueueMBS must be the same.

outEvent: Optional, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete. event can be nil in which case it will not be possible for the application to query the status of this command or queue a wait for this command to complete.

Lasterror is set.

If the buffer or image object is created with kMemoryUseHostPtr set in mem_flags, the following will be true:

The HostPtr specified in Constructor is guaranteed to contain the latest bits in the region being mapped when the EnqueueMapBuffer or EnqueueMapImage command has completed.
The pointer value returned by EnqueueMapBuffer or EnqueueMapImage will be derived from the HostPtr specified when the buffer or image object is created.
The contents of the regions of a memory object mapped for writing (i.e. kMapWrite is set in MapFlags argument to EnqueueMapBuffer or EnqueueMapImage) are considered to be undefined until this region is unmapped. Reads and writes by a kernel executing on a device to a memory region(s) mapped for writing are undefined.

Multiple command-queues can map a region or overlapping regions of a memory object for reading (i.e. MapFlags = kMapRead). The contents of the regions of a memory object mapped for reading can also be read by kernels executing on a device(s). The behavior of writes by a kernel executing on a device to a mapped region of a memory object is undefined. Mapping (and unmapping) overlapped regions of a buffer or image memory object for writing is undefined.

The behavior of OpenCL function calls that enqueue commands that write or copy to regions of a memory object that are mapped is undefined.
See also:

- 24.1.18 EnqueueMapImage(image as CLMemMBS, MapFlags as Integer, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, byref RowPitch as Integer, byref SlicePitch as Integer) as memoryblock 1039

24.1.18 EnqueueMapImage(image as CLMemMBS, MapFlags as Integer, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, byref RowPitch as Integer, byref SlicePitch as Integer) as memoryblock

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to map a region of an image object into the host address space and returns a pointer to this mapped region.
Notes: image: A valid image object. The OpenCL context associated with CLCommandQueueMBS and image must be the same.

BlockingMap: Optional, Indicates if the map operation is blocking or non-blocking. If BlockingMap is true, EnqueueMapImage does not return until the specified region in image can be mapped. If BlockingMap is false i.e. map operation is non-blocking, the pointer to the mapped region returned by EnqueueMapImage cannot be used until the map command has completed. The event argument returns an event object which can be used to query the execution status of the map command. When the map command is completed, the application can access the contents of the mapped region using the pointer returned by EnqueueMapImage.

MapFlags: Is a bit-field and can be set to kMapRead to indicate that the region specified by (origin, region) in the image object is being mapped for reading, and/or kMapWrite to indicate that the region specified by (origin, region) in the image object is being mapped for writing.
origin, region: Define the (x, y, z) offset in pixels and (width, height, depth) in pixels of the 2D or 3D rectangle region that is to be mapped. If image is a 2D image object, the z value given by originZ must be 0 and the depth value given by regionDepth must be 1.

RowPitch: Returns the scan-line pitch in bytes for the mapped region. This must be a non-nil value.
SlicePitch: Returns the size in bytes of each 2D slice for the mapped region. For a 2D image, zero is returned if this argument is not nil. For a 3D image, image_slice_pitch must be a non-nil value.

EventWaitList: Optional, Specify events that need to complete before EnqueueMapImage can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and CLCommandQueueMBS must be the same.

outEvent: Optional, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete. event can be nil in which case it will not be possible for the application to query the status of this command or queue a wait for this command to complete.

Lasterror is set.

If the buffer or image object is created with kMemoryUseHostPtr set in mem_flags, the following will be true:

The HostPtr specified in Constructor is guaranteed to contain the latest bits in the region being mapped when the EnqueueMapBuffer or EnqueueMapImage command has completed.
The pointer value returned by EnqueueMapBuffer or EnqueueMapImage will be derived from the HostPtr specified when the buffer or image object is created.
The contents of the regions of a memory object mapped for writing (i.e. kMapWrite is set in MapFlags argument to EnqueueMapBuffer or EnqueueMapImage) are considered to be undefined until this region is unmapped. Reads and writes by a kernel executing on a device to a memory region(s) mapped for writing are undefined.

Multiple command-queues can map a region or overlapping regions of a memory object for reading (i.e. MapFlags = kMapRead). The contents of the regions of a memory object mapped for reading can also be read by kernels executing on a device(s). The behavior of writes by a kernel executing on a device to a mapped region of a memory object is undefined. Mapping (and unmapping) overlapped regions of a buffer or image memory object for writing is undefined.

The behavior of OpenCL function calls that enqueue commands that write or copy to regions of a memory object that are mapped is undefined.
See also:

- 24.1.17 EnqueueMapImage(image as CLMemMBS, BlockingMap as boolean, MapFlags as Integer, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, byref RowPitch as Integer, byref SlicePitch as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) as memoryblock 1037

24.1.19 EnqueueMarker(byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a marker command.
Notes: Enqueues a marker command to the command queue. The marker command returns an event which can be used to queue a wait on this marker event i.e. wait for all commands queued before the marker command to complete.

Lasterror is set.

24.1.20 EnqueueNativeKernel(FunctionPtr as ptr, args as memoryblock, argsSize as Integer, NumberOfMemoryObjects as Integer, MemList as memoryblock, ArgsMemoryLocations as memoryblock)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to execute a native C/C++ function not compiled using the OpenCL

compiler.
Notes: First a warning: Don't use this with Xojo methods. You can point to a function written in C which you made thread safe.

self: A valid command-queue. A native user function can only be executed on a command-queue created on a device that has kExceNativeKernel capability set in ExecutionCapabilities property.

FunctionPtr: A pointer to a host-callable user function.

args: A pointer to the args list that FunctionPtr should be called with.
argsSize: The size in bytes of the args list that args points to.

The data pointed to by args and argsSize bytes in size will be copied and a pointer to this copied region will be passed to FunctionPtr. The copy needs to be done because the memory objects (CLMemMBS.handle values) that args may contain need to be modified and replaced by appropriate pointers to global memory. When EnqueueNativeKernel returns, the memory region pointed to by args can be reused by the application.

NumberOfMemoryObjects: The number of buffer objects that are passed in args.

MemList: A list of valid buffer objects, if NumberOfMemoryObjects is greater than 0. The buffer object values specified in MemList are memory object handles (CLMemMBS.handle values) or nil.

ArgsMemoryLocations: A pointer to appropriate locations that args points to where memory object handles (CLMemMBS.handle values) are stored. Before the user function is executed, the memory object handles are replaced by pointers to global memory.

EventWaitList: Optionally, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optionally, Returns an event object that identifies this particular kernel execution instance.

The data pointed to by args and argsSize bytes in size will be copied and a pointer to this copied region will be passed to FunctionPtr. The copy needs to be done because the memory objects (CLMemMBS.handle values) that args may contain need to be modified and replaced by appropriate pointers to global memory. When EnqueueNativeKernel returns, the memory region pointed to by args can be reused by the application.

Lasterror is set.
See also:

- 24.1.21 EnqueueNativeKernel(FunctionPtr as ptr, args as memoryblock, argsSize as Integer, Num-

24.1.21 EnqueueNativeKernel(FunctionPtr as ptr, args as memoryblock, argsSize as Integer, NumberOfMemoryObjects as Integer, MemList as memoryblock, ArgsMemoryLocations as memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to execute a native C/C++ function not compiled using the OpenCL compiler.
Notes: First a warning: Don't use this with Xojo methods. You can point to a function written in C which you made thread safe.

self: A valid command-queue. A native user function can only be executed on a command-queue created on a device that has kExceNativeKernel capability set in ExecutionCapabilities property.

FunctionPtr: A pointer to a host-callable user function.

args: A pointer to the args list that FunctionPtr should be called with.
argsSize: The size in bytes of the args list that args points to.

The data pointed to by args and argsSize bytes in size will be copied and a pointer to this copied region will be passed to FunctionPtr. The copy needs to be done because the memory objects (CLMemMBS.handle values) that args may contain need to be modified and replaced by appropriate pointers to global memory. When EnqueueNativeKernel returns, the memory region pointed to by args can be reused by the application.

NumberOfMemoryObjects: The number of buffer objects that are passed in args.

MemList: A list of valid buffer objects, if NumberOfMemoryObjects is greater than 0. The buffer object values specified in MemList are memory object handles (CLMemMBS.handle values) or nil.

ArgsMemoryLocations: A pointer to appropriate locations that args points to where memory object handles (CLMemMBS.handle values) are stored. Before the user function is executed, the memory object handles are replaced by pointers to global memory.

EventWaitList: Optionally, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optionally, Returns an event object that identifies this particular kernel execution instance.

The data pointed to by args and argsSize bytes in size will be copied and a pointer to this copied region will be passed to FunctionPtr. The copy needs to be done because the memory objects (CLMemMBS.handle values) that args may contain need to be modified and replaced by appropriate pointers to global memory. When EnqueueNativeKernel returns, the memory region pointed to by args can be reused by the application.

Lasterror is set.
See also:

- 24.1.20 EnqueueNativeKernel(FunctionPtr as ptr, args as memoryblock, argsSize as Integer, NumberOfMemoryObjects as Integer, MemList as memoryblock, ArgsMemoryLocations as memoryblock) 1040

24.1.22 EnqueueNDRangeKernel(kernel as CLKernelMBS, GlobalWorkSize as Integer, LocalWorkSize as Integer)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to execute a kernel on a device.
Notes: kernel: A valid kernel object. The OpenCL context associated with kernel and command_queue must be the same.
GlobalWorkSize: The number of global work-items.
LocalWorkSize: The number of work-items that make up a work-group (also referred to as the size of the work-group) that will execute the kernel specified by kernel.

The work-group size to be used for kernel can also be specified in the program source using the ___attribute___((reqd_work_group_size(X, Y, Z)))qualifier. In this case the size of work group specified by local_work_size must match the value specified by the reqd_work_group_size ___attribute___ qualifier.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Optional, Returns an event object that identifies this particular kernel execution instance. Event objects are unique and can be used to identify a particular kernel execution instance later on.

Work-group instances are executed in parallel across multiple compute units or concurrently on the same compute unit.

Each work-item is uniquely identified by a global identifier. The global ID, which can be read inside the kernel, is computed using the value given by GlobalWorkSize and global_work_offset. In OpenCL 1.0, the starting global ID is always (0, 0, ... 0). In addition, a work-item is also identified within a work-group by a unique local ID. The local ID, which can also be read by the kernel, is computed using the value given by

LocalWorkSize. The starting local ID is always (0, 0, ... 0).

Lasterror is set.
See also:

24.1.23 EnqueueNDRangeKernel(kernel as CLKernelMBS, GlobalWorkSize as Integer, LocalWorkSize as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to execute a kernel on a device.
Notes: kernel: A valid kernel object. The OpenCL context associated with kernel and command_queue must be the same.
GlobalWorkSize: The number of global work-items.
LocalWorkSize: The number of work-items that make up a work-group (also referred to as the size of the work-group) that will execute the kernel specified by kernel.

The work-group size to be used for kernel can also be specified in the program source using the ___attribute___((reqd_work_group_size(X, Y, Z)))qualifier. In this case the size of work group specified by local_work_size must match the value specified by the reqd_work_group_size ___attribute___ qualifier.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Optional, Returns an event object that identifies this particular kernel execution instance. Event objects are unique and can be used to identify a particular kernel execution instance later on.

Work-group instances are executed in parallel across multiple compute units or concurrently on the same compute unit.

Each work-item is uniquely identified by a global identifier. The global ID, which can be read inside the kernel, is computed using the value given by GlobalWorkSize and global_work_offset. In OpenCL 1.0, the starting global ID is always (0, 0, ... 0). In addition, a work-item is also identified within a work-group by a unique local ID. The local ID, which can also be read by the kernel, is computed using the value given by LocalWorkSize. The starting local ID is always (0, 0, ... 0).

Lasterror is set.
See also:

24.1.24 EnqueueReadBuffer(buffer as CLMemMBS, BlockingRead as boolean, offset as Integer, size as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueue commands to read from a buffer object to host memory.
Notes: buffer: Refers to a valid buffer object.
BlockingRead: Optional, Indicates if the read operations are blocking or non-blocking. If BlockingRead is true i.e. the read command is blocking, clEnqueueReadBuffer does not return until the buffer data has been read and copied into memory pointed to by ptr.

If BlockingRead is false i.e. the read command is non-blocking, EnqueueReadBuffer queues a non-blocking read command and returns. The contents of the buffer that ptr points to cannot be used until the read command has completed. The event argument returns an event object which can be used to query the execution status of the read command. When the read command has completed, the contents of the buffer that ptr points to can be used by the application.

offset: The offset in bytes in the buffer object to read from.
size: The size in bytes of data being read.
mem: The pointer to buffer in host memory where data is to be read into.

EventWaitList: Optional, specifies events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and command_queue must be the same.

outEvent: Optional, Returns an event object that identifies this particular read command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueReadBuffer to read a region of the buffer object with the ptr argument value set to mem + offset, where mem is a pointer to the memory region specified when the buffer object being read is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

All commands that use this buffer object have finished execution before the read command begins execution
The buffer object is not mapped
The buffer object is not used by any command-queue until the read command has finished execution

Lasterror is set.
See also:

24.1.25 EnqueueReadBuffer(buffer as CLMemMBS, offset as Integer, size as Integer, mem as Memoryblock)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueue commands to read from a buffer object to host memory.
Notes: buffer: Refers to a valid buffer object.
BlockingRead: Optional, Indicates if the read operations are blocking or non-blocking. If BlockingRead is true i.e. the read command is blocking, clEnqueueReadBuffer does not return until the buffer data has been read and copied into memory pointed to by ptr.

If BlockingRead is false i.e. the read command is non-blocking, EnqueueReadBuffer queues a non-blocking read command and returns. The contents of the buffer that ptr points to cannot be used until the read command has completed. The event argument returns an event object which can be used to query the execution status of the read command. When the read command has completed, the contents of the buffer that ptr points to can be used by the application.

offset: The offset in bytes in the buffer object to read from.
size: The size in bytes of data being read.
mem: The pointer to buffer in host memory where data is to be read into.

EventWaitList: Optional, specifies events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and command_queue must be the same.

outEvent: Optional, Returns an event object that identifies this particular read command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueReadBuffer to read a region of the buffer object with the ptr argument value set to mem + offset, where mem is a pointer to the memory region specified when the buffer object being read is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

All commands that use this buffer object have finished execution before the read command begins execution
The buffer object is not mapped
The buffer object is not used by any command-queue until the read command has finished execution

Lasterror is set.
See also:

24.1.26 EnqueueReadImage(image as CLMemMBS, BlockingRead as boolean, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to read from a 2D or 3D image object to host memory.
Notes: image: Refers to a valid 2D or 3D image object.

BlockingRead: Optional. Indicates if the read operations are blocking or non-blocking.

If BlockingRead is true i.e. the read command is blocking, clEnqueueReadImage does not return until the buffer data has been read and copied into memory pointed to by mem.

If BlockingRead is false i.e. map operation is non-blocking, clEnqueueReadImage queues a non-blocking read command and returns. The contents of the buffer that mem points to cannot be used until the read command has completed. The event argument returns an event object which can be used to query the execution status of the read command. When the read command has completed, the contents of the buffer that mem points to can be used by the application.

origin: Defines the (x, y, z) offset in pixels in the image from where to read. If image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle being read. If image is a 2D image object, the depth value given by RegionDepth must be 1.

RowPitch: The length of each row in bytes. This value must be greater than or equal to the element size in bytes * width. If RowPitch is set to 0, the appropriate row pitch is calculated based on the size of each element in bytes multiplied by width.

SlicePitch: Size in bytes of the 2D slice of the 3D region of a 3D image being read. This must be 0 if image is a 2D image. This value must be greater than or equal to RowPitch * height. If SlicePitch is set to 0, the appropriate slice pitch is calculated based on the RowPitch * height.

mem: The pointer to a buffer in host memory where image data is to be read from.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional, Returns an event object that identifies this particular read command and can be used to query or queue a wait for this particular command to complete. event can be nil in which case it will not be possible for the application to query the status of this command or queue a wait for this command to complete.

Calling EnqueueReadImage to read a region of the image object with the mem argument value set to HostPtr + (sourceOriginZ * image slice pitch + sourceOriginY * image row pitch + sourceOriginX * bytes per pixel), where host_ptr is a pointer to the memory region specified when the image object being read is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

- All commands that use this image object have finished execution before the read command begins execution.
- The RowPitch and SlicePitch argument values in EnqueueReadImage must be set to the image row pitch and slice pitch.
- The image object is not mapped.
- The image object is not used by any command-queue until the read command has finished execution.

Lasterror is set.
See also:

- 24.1.27 EnqueueReadImage(image as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock) 1048

24.1.27 EnqueueReadImage(image as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to read from a 2D or 3D image object to host memory..
Notes: image: Refers to a valid 2D or 3D image object.

BlockingRead: Optional. Indicates if the read operations are blocking or non-blocking.

If BlockingRead is true i.e. the read command is blocking, clEnqueueReadImage does not return until the buffer data has been read and copied into memory pointed to by mem.

If BlockingRead is false i.e. map operation is non-blocking, clEnqueueReadImage queues a non-blocking read command and returns. The contents of the buffer that mem points to cannot be used until the read command has completed. The event argument returns an event object which can be used to query the execution status of the read command. When the read command has completed, the contents of the buffer that mem points to can be used by the application.

origin: Defines the (x, y, z) offset in pixels in the image from where to read. If image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle being read. If image is a 2D image object, the depth value given by RegionDepth must be 1.

RowPitch: The length of each row in bytes. This value must be greater than or equal to the element size in bytes * width. If RowPitch is set to 0, the appropriate row pitch is calculated based on the size of each element in bytes multiplied by width.

SlicePitch: Size in bytes of the 2D slice of the 3D region of a 3D image being read. This must be 0 if image is a 2D image. This value must be greater than or equal to RowPitch * height. If SlicePitch is set to 0, the appropriate slice pitch is calculated based on the RowPitch * height.

mem: The pointer to a buffer in host memory where image data is to be read from.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional, Returns an event object that identifies this particular read command and can be used to query or queue a wait for this particular command to complete. event can be nil in which case it will not be possible for the application to query the status of this command or queue a wait for this command to complete.

Calling EnqueueReadImage to read a region of the image object with the mem argument value set to HostPtr + (sourceOriginZ * image slice pitch + sourceOriginY * image row pitch + sourceOriginX * bytes per pixel), where host_ptr is a pointer to the memory region specified when the image object being read is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

- All commands that use this image object have finished execution before the read command begins execution.

- The RowPitch and SlicePitch argument values in EnqueueReadImage must be set to the image row pitch and slice pitch.
- The image object is not mapped.
- The image object is not used by any command-queue until the read command has finished execution.

Lasterror is set.
See also:

- 24.1.26 EnqueueReadImage(image as CLMemMBS, BlockingRead as boolean, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 1047

24.1.28 EnqueueReadPicture(image as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, RegionWidth as Integer, RegionHeight as Integer, pic as picture)

Plugin Version: 11.1, Platform: macOS, Targets: Desktop only.

Function: Enqueues a command to read from a 2D or 3D image object to a Xojo picture object.
Example:

```
const size = 500

// create test picture
dim pic1 as Picture = LogoMBS(size)
// create destination picture
dim pic2 as new Picture(size, size, 32)

// get device list
dim devices() as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)
dim device as CLDeviceMBS = devices(0)

// Create context for that device
dim c as new CLContextMBS(device)

// query what format Xojo uses for pictures
dim RowPitch as Integer
dim format as CLImageFormatMBS = OpenCLMBS.GetPictureImageFormat(pic1, RowPitch)

// create a matching memory object
dim m as new CLMemMBS(c, CLMemMBS.kMemoryReadWrite, format, size, size, RowPitch)

// create command queue
dim cq as new CLCommandQueueMBS(c, device, 0)
```

```
// copy picture content into CLMem object
cq.EnqueueWritePicture(m, 0, 0, size, size, pic1)

// and copy back to second picture
cq.EnqueueReadPicture(m, 0, 0, size, size, pic2)

// finally display it
Backdrop = pic2
```

Notes: image: Refers to a valid 2D or 3D image object.

origin: Defines the (x, y) offset in pixels in the image from where to read.
region: Defines the (width, heigh) in pixels of the 2D or 3D rectangle being read.

pic: The Xojo picture object to write pixel data to.

This command is always blocking.
Lasterror is set.

24.1.29 EnqueueTask(kernel as CLKernelMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to execute a kernel on a device.
Notes: kernel: A valid kernel object. The OpenCL context associated with kernel and command_queue must be the same.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is not passed or empty, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Optional, Returns an event object that identifies this particular kernel execution instance. Event objects are unique and can be used to identify a particular kernel execution instance later on.

The kernel is executed using a single work-item.

EnqueueTask is equivalent to calling EnqueueNDRangeKernel with work_dim = 1, global_work_size set to 1, and local_work_size set to 1.
Lasterror is set.
See also:

- 24.1.30 EnqueueTask(kernel as CLKernelMBS, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 1052

24.1.30 EnqueueTask(kernel as CLKernelMBS, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to execute a kernel on a device.
Notes: kernel: A valid kernel object. The OpenCL context associated with kernel and command_queue must be the same.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is not passed or empty, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Optional, Returns an event object that identifies this particular kernel execution instance. Event objects are unique and can be used to identify a particular kernel execution instance later on.

The kernel is executed using a single work-item.

EnqueueTask is equivalent to calling EnqueueNDRangeKernel with work_dim = 1, global_work_size set to 1, and local_work_size set to 1.
Lasterror is set.
See also:

- 24.1.29 EnqueueTask(kernel as CLKernelMBS) 1051

24.1.31 EnqueueUnmapMemObject(buffer as CLMemMBS, mem as Memoryblock)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to unmap a previously mapped region of a memory object.
Notes: memobj: A valid memory object. The OpenCL context associated with CLCommandQueueMBS and memobj must be the same.

mem: The host address returned by a previous call to EnqueueMapBuffer or EnqueueMapImage for memobj. Do not use this memoryblock after it has been unmapped.

EventWaitList: Optionally, Specify events that need to complete before EnqueueUnmapMemObject can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optionally, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Reads or writes from the host using the pointer returned by EnqueueMapBuffer or EnqueueMapImage are

considered to be complete.

EnqueueMapBuffer and EnqueueMapImage increments the mapped count of the memory object. The initial mapped count value of a memory object is zero. Multiple calls to EnqueueMapBuffer or EnqueueMapImage on the same memory object will increment this mapped count by appropriate number of calls. EnqueueUnmapMemObject decrements the mapped count of the memory object.

EnqueueMapBuffer and clEnqueueMapImage act as synchronization points for a region of the memory object being mapped.
See also:

24.1.32 EnqueueUnmapMemObject(buffer as CLMemMBS, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to unmap a previously mapped region of a memory object.
Notes: memobj: A valid memory object. The OpenCL context associated with CLCommandQueueMBS and memobj must be the same.

mem: The host address returned by a previous call to EnqueueMapBuffer or EnqueueMapImage for memobj. Do not use this memoryblock after it has been unmapped.

EventWaitList: Optionally, Specify events that need to complete before EnqueueUnmapMemObject can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optionally, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Reads or writes from the host using the pointer returned by EnqueueMapBuffer or EnqueueMapImage are considered to be complete.

EnqueueMapBuffer and EnqueueMapImage increments the mapped count of the memory object. The initial mapped count value of a memory object is zero. Multiple calls to EnqueueMapBuffer or EnqueueMapImage on the same memory object will increment this mapped count by appropriate number of calls. EnqueueUnmapMemObject decrements the mapped count of the memory object.

EnqueueMapBuffer and clEnqueueMapImage act as synchronization points for a region of the memory object

being mapped.
See also:

- 24.1.31 EnqueueUnmapMemObject(buffer as CLMemMBS, mem as Memoryblock) 1052

24.1.33 EnqueueWaitForEvents(EventWaitList() as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a wait for a specific event or a list of events to complete before any future commands queued in the command-queue are executed.
Notes: EventWaitList: Events specified in EventWaitList act as synchronization points.

The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

Lasterror is set.

24.1.34 EnqueueWriteBuffer(buffer as CLMemMBS, BlockingWrite as boolean, offset as Integer, size as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueue commands to write to a buffer object from host memory.
Notes: buffer: Refers to a valid buffer object.
BlockingWrite: Optional, Indicates if the write operations are blocking or nonblocking.

If blocking_write is true, the OpenCL implementation copies the data referred to by mem and enqueues the write operation in the command-queue. The memory pointed to by mem can be reused by the application after the EnqueueWriteBuffer call returns.

If blocking_write is false, the OpenCL implementation will use mem to perform a nonblocking write. As the write is non-blocking the implementation can return immediately. The memory pointed to by mem cannot be reused by the application after the call returns. The event argument returns an event object which can be used to query the execution status of the write command. When the write command has completed, the memory pointed to by mem can then be reused by the application.

offset: The offset in bytes in the buffer object to write to.
size: The size in bytes of data being written.
mem: The pointer to buffer in host memory where data is to be written from.

EventWaitList: Optional. Specifies events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optional. Returns an event object that identifies this particular write command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueWriteBuffer to update the latest bits in a region of the buffer object with the mem argument value set to host_ptr + offset, where host_ptr is a pointer to the memory region specified when the buffer object being written is created with CL_MEM_USE_HOST_PTR, must meet the following requirements in order to avoid undefined behavior:

The host memory region given by (mem + offset, size) contains the latest bits when the enqueued write command begins execution.
The buffer object is not mapped.
The buffer object is not used by any command-queue until the write command has finished execution.

Lasterror is set.
See also:

- 24.1.35 EnqueueWriteBuffer(buffer as CLMemMBS, offset as Integer, size as Integer, mem as Memoryblock) 1055

24.1.35 EnqueueWriteBuffer(buffer as CLMemMBS, offset as Integer, size as Integer, mem as Memoryblock)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueue commands to write to a buffer object from host memory.
Notes: buffer: Refers to a valid buffer object.
BlockingWrite: Optional, Indicates if the write operations are blocking or nonblocking.

If blocking_write is true, the OpenCL implementation copies the data referred to by mem and enqueues the write operation in the command-queue. The memory pointed to by mem can be reused by the application after the EnqueueWriteBuffer call returns.

If blocking_write is false, the OpenCL implementation will use mem to perform a nonblocking write. As the write is non-blocking the implementation can return immediately. The memory pointed to by mem cannot be reused by the application after the call returns. The event argument returns an event object which can be used to query the execution status of the write command. When the write command has completed, the memory pointed to by mem can then be reused by the application.

offset: The offset in bytes in the buffer object to write to.
size: The size in bytes of data being written.
mem: The pointer to buffer in host memory where data is to be written from.

EventWaitList: Optional. Specifies events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optional. Returns an event object that identifies this particular write command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueWriteBuffer to update the latest bits in a region of the buffer object with the mem argument value set to host_ptr + offset, where host_ptr is a pointer to the memory region specified when the buffer object being written is created with CL_MEM_USE_HOST_PTR, must meet the following requirements in order to avoid undefined behavior:

The host memory region given by (mem + offset, size) contains the latest bits when the enqueued write command begins execution.
The buffer object is not mapped.
The buffer object is not used by any command-queue until the write command has finished execution.

Lasterror is set.
See also:

- 24.1.34 EnqueueWriteBuffer(buffer as CLMemMBS, BlockingWrite as boolean, offset as Integer, size as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 1054

24.1.36 EnqueueWriteImage(image as CLMemMBS, BlockingWrite as boolean, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to write from a 2D or 3D image object to host memory.
Notes: image: Refers to a valid 2D or 3D image object.

BlockingWrite: Optional. Indicates if the write operation is blocking or non-blocking.

If BlockingWrite is true the OpenCL implementation copies the data referred to by mem and enqueues the write command in the command-queue. The memory pointed to by mem can be reused by the application after the clEnqueueWriteImage call returns. If BlockingWrite is false the OpenCL implementation will use mem to perform a nonblocking write. As the write is non-blocking the implementation can return immediately. The memory pointed to by mem cannot be reused by the application after the call returns. The event argument returns an event object which can be used to query the execution status of the write command. When the write command has completed, the memory pointed to by mem can then be reused by the application.

origin: Defines the (x, y, z) offset in pixels in the image from where to write or write. If image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle being write or written. If image is a 2D image object, the depth value given by RegionDepth must be 1.

RowPitch
The length of each row in bytes. This value must be greater than or equal to the element size in bytes * width. If RowPitch is set to 0, the appropriate row pitch is calculated based on the size of each element in bytes multiplied by width.

RowPitch: Size in bytes of the 2D slice of the 3D region of a 3D image being written. This must be 0 if image is a 2D image. This value must be greater than or equal to RowPitch * height. If SlicePitch is set to 0, the appropriate slice pitch is calculated based on the RowPitch * height.

mem: The pointer to a buffer in host memory where image data is to be written to.

EventWaitList: Optional. Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional. Returns an event object that identifies this particular write command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueWriteImage to update the latest bits in a region of the image object with the mem argument value set to mem + (sourceOriginZ * image slice pitch + sourceOriginY * image row pitch + sourceOriginX * bytes per pixel), where mem is a pointer to the memory region specified when the image object being written is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

- The host memory region being written contains the latest bits when the enqueued write command begins execution.
- The RowPitch and SlicePitch argument values in EnqueueWriteImage must be set to the image row

pitch and slice pitch.

- The image object is not mapped.
- The image object is not used by any command-queue until the write command has finished execution.

See also:

- 24.1.37 EnqueueWriteImage(image as CLMemMBS,sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock) 1058

24.1.37 EnqueueWriteImage(image as CLMemMBS,sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Enqueues a command to write from a 2D or 3D image object to host memory.
Notes: image: Refers to a valid 2D or 3D image object.

BlockingWrite: Optional. Indicates if the write operation is blocking or non-blocking.

If BlockingWrite is true the OpenCL implementation copies the data referred to by mem and enqueues the write command in the command-queue. The memory pointed to by mem can be reused by the application after the clEnqueueWriteImage call returns. If BlockingWrite is false the OpenCL implementation will use mem to perform a nonblocking write. As the write is non-blocking the implementation can return immediately. The memory pointed to by mem cannot be reused by the application after the call returns. The event argument returns an event object which can be used to query the execution status of the write command. When the write command has completed, the memory pointed to by mem can then be reused by the application.

origin: Defines the (x, y, z) offset in pixels in the image from where to write or write. If image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle being write or written. If image is a 2D image object, the depth value given by RegionDepth must be 1.

RowPitch
The length of each row in bytes. This value must be greater than or equal to the element size in bytes * width. If RowPitch is set to 0, the appropriate row pitch is calculated based on the size of each element in bytes multiplied by width.

RowPitch: Size in bytes of the 2D slice of the 3D region of a 3D image being written. This must be 0 if image is a 2D image. This value must be greater than or equal to RowPitch * height. If SlicePitch is set to 0, the appropriate slice pitch is calculated based on the RowPitch * height.

mem: The pointer to a buffer in host memory where image data is to be written to.

EventWaitList: Optional. Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional. Returns an event object that identifies this particular write command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueWriteImage to update the latest bits in a region of the image object with the mem argument value set to mem + (sourceOriginZ * image slice pitch + sourceOriginY * image row pitch + sourceOriginX * bytes per pixel), where mem is a pointer to the memory region specified when the image object being written is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

- The host memory region being written contains the latest bits when the enqueued write command begins execution.
- The RowPitch and SlicePitch argument values in EnqueueWriteImage must be set to the image row pitch and slice pitch.
- The image object is not mapped.
- The image object is not used by any command-queue until the write command has finished execution.

See also:

- 24.1.36 EnqueueWriteImage(image as CLMemMBS, BlockingWrite as boolean, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 1056

24.1.38 EnqueueWritePicture(image as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, RegionWidth as Integer, RegionHeight as Integer, pic as picture)

Plugin Version: 11.1, Platform: macOS, Targets: Desktop only.

Function: Enqueues a command to write from a 2D or 3D image object to a Xojo Picture.
Example:

```
const size = 500

// create test picture
dim pic1 as Picture = LogoMBS(size)
// create destination picture
dim pic2 as new Picture(size, size, 32)

// get device list
dim devices() as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)
dim device as CLDeviceMBS = devices(0)

// Create context for that device
dim c as new CLContextMBS(device)

// query what format Xojo uses for pictures
dim RowPitch as Integer
dim format as CLImageFormatMBS = OpenCLMBS.GetPictureImageFormat(pic1, RowPitch)

// create a matching memory object
dim m as new CLMemMBS(c, CLMemMBS.kMemoryReadWrite, format, size, size, RowPitch)

// create command queue
dim cq as new CLCommandQueueMBS(c, device, 0)

// copy picture content into CLMem object
cq.EnqueueWritePicture(m, 0, 0, size, size, pic1)

// and copy back to second picture
cq.EnqueueReadPicture(m, 0, 0, size, size, pic2)

// finally display it
Backdrop = pic2
```

Notes: image: Refers to a valid 2D or 3D image object.

BlockingWrite: Optional. Indicates if the write operation is blocking or non-blocking.

origin: Defines the (x, y) offset in pixels in the image from where to write or write.

region: Defines the (width, height) in pixels of the 2D or 3D rectangle being write or written.

pic: The target Xojo picture object. This must match in the image format for the image object and the size you specified in region.

This operation is always performed blocked.
Lasterror is set.

24.1.39 Finish

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Blocks until all previously queued OpenCL commands in a command-queue are issued to the associated device and have completed.
Notes: Blocks until all previously queued OpenCL commands in command_queue are issued to the associated device and have completed.

Finish does not return until all queued commands in command_queue have been processed and completed. clFinish is also a synchronization point.

Lasterror is set.

24.1.40 Flush

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Issues all previously queued OpenCL commands in a command-queue to the device associated with the command-queue.
Notes: Issues all previously queued OpenCL commands in command_queue to the device associated with command_queue.

Flush only guarantees that all queued commands to command_queue get issued to the appropriate device. There is no guarantee that they will be complete after Flush returns.

Lasterror is set.

Any blocking commands queued in a command-queue such as EnqueueReadImage or EnqueueReadBuffer with BlockingRead set to true, EnqueueWriteImage or EnqueueWriteBuffer with BlockingWrite set to true, EnqueueMapImage or EnqueueMapBuffer with BlockingMap set to true or WaitForEvents perform an implicit flush of the command-queue.

To use event objects that refer to commands enqueued in a command-queue as event objects to wait on by commands enqueued in a different command-queue, the application must call a Flush or any blocking commands that perform an implicit flush of the command-queue where the commands that refer to these event objects are enqueued.
Lasterror is set.

24.1.41 Properties as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the currently specified properties for the command-queue.
Notes: Lasterror is set.

24.1.42 ReferenceCount as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the command-queue reference count.
Notes: Lasterror is set.

24.1.43 Properties

24.1.44 Handle as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The internel object reference.
Notes: Not zero if this object is valid.
(Read and Write property)

24.1.45 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Notes: See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

24.2 class CLContextMBS

24.2.1 class CLContextMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The OpenCL class for a context.
Example:

```
dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)
```

Notes: Contexts are used by the OpenCL runtime for managing objects such as command-queues, memory, program and kernel objects and for executing kernels on one or more devices specified in the context.
Blog Entries

- MBS Plugins 11.1 Release notes
- MBS REALbasic Plugins, version 11.1pr5

24.2.2 Methods

24.2.3 Constructor(Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates an OpenCL context.
Example:

```
dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)
```

Notes: Platform: Optional, Specifies the platform to use.
Devices: The devices you want to use. Can be one or several devices. If you specify none, the default one is picked.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Lasterror is set.
See also:

24.2.4 Constructor(Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates an OpenCL context.
Notes: Platform: Optional, specifies the platform to use.
Devices: The devices you want to use. Can be one or several devices. If you specify none, the default one is picked.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Lasterror is set.
See also:

24.2.5 Constructor(DeviceType as Integer, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Create an OpenCL context from a device type that identifies the specific device(s) to use.
Example:

```
dim co as new CLContextMBS(CLDeviceMBS.kDeviceTypeAll)
```

Notes: Platform: Optional, Specifies the platform to use.
DeviceType: A bit-field that identifies the type of device and is described in the table below.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Constants	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.
See also:

- 24.2.3 Constructor(Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1063
- 24.2.4 Constructor(Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1064
- 24.2.6 Constructor(Platform as CLPlatformMBS, Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1065
- 24.2.7 Constructor(Platform as CLPlatformMBS, Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1066
- 24.2.8 Constructor(Platform as CLPlatformMBS, DeviceType as Integer, ErrorHandlerMode as Integer = 0) 1066

24.2.6 Constructor(Platform as CLPlatformMBS, Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates an OpenCL context.
Notes: Platform: Specifies the platform to use.
Devices: The devices you want to use. Can be one or several devices. If you specify none, the default one is picked.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Lasterror is set.
See also:

- 24.2.3 Constructor(Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1063
- 24.2.4 Constructor(Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1064
- 24.2.5 Constructor(DeviceType as Integer, ErrorHandlerMode as Integer = 0) 1064
- 24.2.7 Constructor(Platform as CLPlatformMBS, Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1066
- 24.2.8 Constructor(Platform as CLPlatformMBS, DeviceType as Integer, ErrorHandlerMode as Integer = 0) 1066

24.2.7 Constructor(Platform as CLPlatformMBS, Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates an OpenCL context.
Notes: Platform: Specifies the platform to use.
Devices: The devices you want to use. Can be one or several devices. If you specify none, the default one is picked.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Lasterror is set.
See also:

- 24.2.3 Constructor(Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1063
- 24.2.4 Constructor(Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1064
- 24.2.5 Constructor(DeviceType as Integer, ErrorHandlerMode as Integer = 0) 1064
- 24.2.6 Constructor(Platform as CLPlatformMBS, Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1065
- 24.2.8 Constructor(Platform as CLPlatformMBS, DeviceType as Integer, ErrorHandlerMode as Integer = 0) 1066

24.2.8 Constructor(Platform as CLPlatformMBS, DeviceType as Integer, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Create an OpenCL context from a device type that identifies the specific device(s) to use.
Notes: Platform: Optional, Specifies the platform to use.

DeviceType: A bit-field that identifies the type of device and is described in the table below.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Constants	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.
See also:

- 24.2.3 Constructor(Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1063
- 24.2.4 Constructor(Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1064
- 24.2.5 Constructor(DeviceType as Integer, ErrorHandlerMode as Integer = 0) 1064
- 24.2.6 Constructor(Platform as CLPlatformMBS, Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1065
- 24.2.7 Constructor(Platform as CLPlatformMBS, Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0) 1066

24.2.9 Devices as CLDeviceMBS()

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the list of devices in context.
Example:

```
// create context for all devices
dim co as new CLContextMBS(CLDeviceMBS.kDeviceTypeAll)

// and query it for it's devices
for each d as CLDeviceMBS in co.Devices
MsgBox d.Name
next
```

24.2.10 GetSupportedImageFormats(flags as UInt64, type as UInt32) as CLImageFormatMBS()

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Get the list of image formats supported by an OpenCL implementation.
Example:

```
dim co as new CLContextMBS(CLDeviceMBS.kDeviceTypeAll)

dim formats(-1) as CLImageFormatMBS = co.GetSupportedImageFormats(CLMemMBS.kMemoryReadWrite, CLMemMBS.kMemoryTypeImage2D)
dim lines(-1) as string

for each f as CLImageFormatMBS in formats
// see constants for what this values mean
lines.Append hex(f.ImageChannelOrder)+" - "+hex(f.ImageChannelDataType)
next

MsgBox Join(lines,EndOfLine)
```

Notes: self: A valid OpenCL context on which the image object(s) will be created.
flags: A bit-field that is used to specify allocation and usage information about the image memory object being created and is described in the List of supported cl_mem_flags values for clCreateBuffer
type: Describes the image type and must be either kMemoryTypeImage2D or kMemoryTypeImage3D.

Returns an array of imageformat objects.

24.2.11 ReferenceCount as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the context reference count.
Example:

```
dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)

MsgBox str(context.ReferenceCount) // 1

// Create a command queue
dim queue as new CLCommandQueueMBS(context, device, 0)
```

```
MsgBox str(context.ReferenceCount) // 2 as the command queue points to the context, too.
```

24.2.12 Properties

24.2.13 Handle as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The internel object reference.
Notes: Not zero if this object is valid.
(Read and Write property)

24.2.14 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Notes: See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

24.2.15 Constants

Error mode constants

Constant	Value	Description
kErrorModeIgnore	0	
kErrorModeLogMessagesToStderr	3	Sends all log messages to the file descriptor stderr.
kErrorModeLogMessagesToStdout	2	Sends all log messages to the file descriptor stdout.
kErrorModeLogMessagesToSystemLog	1	Fowards on all log messages to the Apple System Logger.

24.3 class CLDeviceMBS

24.3.1 class CLDeviceMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for an OpenCL Device.

24.3.2 Methods

24.3.3 AddressBits as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The default compute device address space size specified as an unsigned integer value in bits.
Example:

```
dim Devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)

for each p as CLDeviceMBS in Devices
MsgBox p.Name+": "+str(p.AddressBits)
next
```

Notes: Currently supported values are 32 or 64 bits.
Lasterror is set.

24.3.4 Available as Boolean

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns true if the device is available and false if the device is not available.
Notes: Lasterror is set.

24.3.5 CompilerAvailable as Boolean

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns false if the implementation does not have a compiler available to compile the program source.
Notes: Is true if the compiler is available. This can be false for the embededed platform profile only.

Lasterror is set.

24.3.6 DeviceType as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The OpenCL device type.
Notes: Currently supported values are one of or a combination of: kDeviceTypeCPU, kDeviceTypeGPU, kDeviceTypeAccelerator, or kDeviceTypeDefault.
Lasterror is set.

24.3.7 DeviceVersion as String

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: OpenCL version string.
Notes: Returns the OpenCL version supported by the device. This version string has the following format:

OpenCL<space><major_version.minor_version><space><vendor-specific information>

The major_version.minor_version value returned will be 1.0.
Lasterror is set.

24.3.8 DriverVersion as String

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: OpenCL software driver version string in the form major_number.minor_number.
Notes: Lasterror is set.

24.3.9 EndianLittle as Boolean

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns true if the OpenCL device is a little endian device and false otherwise.
Notes: Lasterror is set.

24.3.10 ErrorCorrectionSupport as Boolean

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns true if the device implements error correction for the memories, caches, registers etc. in the device.
Notes: Returns false if the device does not implement error correction. This can be a requirement for certain clients of OpenCL.
Lasterror is set.

24.3.11 ExecutionCapabilities as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Describes the execution capabilities of the device.
Notes: This is a bit-field that describes one or more of the following values:

kExecKernel - The OpenCL device can execute OpenCL kernels.
kExceNativeKernel - The OpenCL device can execute native kernels.

The mandated minimum capability is kExecKernel.
Lasterror is set.

24.3.12 Extensions as String

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns a space separated list of extension names.
Example:

```
// show msgbox with all extensions for first device

dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)
dim device as CLDeviceMBS = devices(0)

dim extensions(-1) as string = split(device.Extensions," ")

dim lines(-1) as string

for each extension as string in extensions
lines.append extension
next

MsgBox Join(lines,EndOfLine)
```

Notes: (the extension names themselves do not contain any spaces).
The list of extension names returned currently can include one or more of the following approved extension names:

cl_khr_fp64
cl_khr_select_fprounding_mode
cl_khr_global_int32_base_atomics
cl_khr_global_int32_extended_atomics
cl_khr_local_int32_base_atomics
cl_khr_local_int32_extended_atomics
cl_khr_int64_base_atomics
cl_khr_int64_extended_atomics
cl_khr_3d_image_writes
cl_khr_byte_addressable_store
cl_khr_fp16

Lasterror is set.

24.3.13 GlobalMemoryCacheLineSize as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Size of global memory cache line in bytes.
Notes: Lasterror is set.

24.3.14 GlobalMemoryCacheSize as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Size of global memory cache in bytes.
Notes: Lasterror is set.

24.3.15 GlobalMemoryCacheType as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Type of global memory cache supported.
Notes: See kCacheMemType* constants.

Lasterror is set.

24.3.16 GlobalMemorySize as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Size of global device memory in bytes.
Notes: Lasterror is set.

24.3.17 Image2DMaxHeight as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max height of 2D image in pixels.
Notes: The minimum value is 8192 if ImageSupport is true.
Lasterror is set.

24.3.18 Image2DMaxWidth as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max width of 2D image in pixels.
Notes: The minimum value is 8192 if ImageSupport is true.
Lasterror is set.

24.3.19 Image3DMaxDepth as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max depth of 3D image in pixels.
Notes: The minimum value is 2048 if ImageSupport is true.
Lasterror is set.

24.3.20 Image3DMaxHeight as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max height of 3D image in pixels.
Notes: The minimum value is 2048 if ImageSupport is true.

Lasterror is set.

24.3.21 Image3DMaxWidth as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max width of 3D image in pixels.
Notes: The minimum value is 2048 if ImageSupport is true.
Lasterror is set.

24.3.22 ImageSupport as Boolean

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns true if images are supported by the OpenCL device and false otherwise.
Notes: Lasterror is set.

24.3.23 LocalMemorySize as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Size of local memory arena in bytes.
Notes: The minimum value is 16 KB.
Lasterror is set.

24.3.24 LocalMemType as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Type of local memory supported.
Notes: This can be set to kMemTypeLocal implying dedicated local memory storage such as SRAM, or kMemTypeGlobal.
Lasterror is set.

24.3.25 MaxClockFrequency as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Maximum configured clock frequency of the device in MHz.
Notes: Lasterror is set.

24.3.26 MaxComputeUnits as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The number of parallel compute cores on the OpenCL device.
Notes: The minimum value is 1.
Lasterror is set.

24.3.27 MaxConstantArgs as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max number of arguments declared with the ___constant qualifier in a kernel.
Notes: The minimum value is 8.
Lasterror is set.

24.3.28 MaxConstantBufferSize as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max size in bytes of a constant buffer allocation.
Notes: The minimum value is 64 KB.
Lasterror is set.

24.3.29 MaxMemoryAllocSize as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max size of memory object allocation in bytes.
Notes: The minimum value is max (1/4th of GlobalMemorySize, 128*1024*1024)
Lasterror is set.

24.3.30 MaxParameterSize as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max size in bytes of the arguments that can be passed to a kernel.
Notes: The minimum value is 256.

Lasterror is set.

24.3.31 MaxReadImageArgs as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max number of simultaneous image objects that can be read by a kernel.
Notes: Lasterror is set.
The minimum value is 128 if ImageSupport is true.

24.3.32 MaxSamplers as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Maximum number of samplers that can be used in a kernel.
Notes: The minimum value is 16 if ImageSupport is true.
Lasterror is set.

24.3.33 MaxWorkGroupSize as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Maximum number of work-items in a work-group executing a kernel using the data parallel execution model.
Notes: (Refer to EnqueueNDRangeKernel). The minimum value is 1.
Lasterror is set.

24.3.34 MaxWorkItemDimensions as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Maximum dimensions that specify the global and local work-item IDs used by the data parallel execution model.
Notes: (Refer to EnqueueNDRangeKernel). The minimum value is 3.
Lasterror is set.

24.3.35 MaxWriteImageArgs as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Max number of simultaneous image objects that can be written to by a kernel.
Notes: The minimum value is 8 if ImageSupport is true.
Lasterror is set.

24.3.36 MemoryBaseAddressAlign as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Describes the alignment in bits of the base address of any allocated memory object.
Notes: Lasterror is set.

24.3.37 MinDataTypeAlignSize as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The smallest alignment in bytes which can be used for any data type.
Notes: Lasterror is set.

24.3.38 Name as String

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Device name string.
Example:

```
dim Devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)

for each p as CLDeviceMBS in Devices
MsgBox p.Name
next
```

Notes: Lasterror is set.

24.3.39 Platform as CLPlatformMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The platform associated with this device.
Notes: Lasterror is set.

24.3.40 PreferredVectorWidthChar as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes: The vector width is defined as the number of scalar elements that can be stored in the vector.
Lasterror is set.

24.3.41 PreferredVectorWidthDouble as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes: The vector width is defined as the number of scalar elements that can be stored in the vector.

If the cl_khr_fp64 extension is not supported, this function must return 0.
Lasterror is set.

24.3.42 PreferredVectorWidthFloat as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes: The vector width is defined as the number of scalar elements that can be stored in the vector.
Lasterror is set.

24.3.43 PreferredVectorWidthInt as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes: The vector width is defined as the number of scalar elements that can be stored in the vector.
Lasterror is set.

24.3.44 PreferredVectorWidthLong as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes: The vector width is defined as the number of scalar elements that can be stored in the vector.

Lasterror is set.

24.3.45 PreferredVectorWidthShort as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes: The vector width is defined as the number of scalar elements that can be stored in the vector.
Lasterror is set.

24.3.46 Profile as String

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: OpenCL profile string.
Notes: Returns the profile name supported by the device (see note). The profile name returned can be one of the following strings:

FULL_PROFILE - if the device supports the OpenCL specification (functionality defined as part of the core specification and does not require any extensions to be supported).

EMBEDDED_PROFILE - if the device supports the OpenCL embedded profile.
Lasterror is set.

24.3.47 ProfilingTimerResolution as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Describes the resolution of device timer. This is measured in nanoseconds.
Notes: Lasterror is set.

24.3.48 QueueProperties as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Describes the command-queue properties supported by the device.
Notes: See kQueueOutOfOrderExecModeEnable and kQueueProfilingEnable.
Lasterror is set.

24.3.49 SingleFPConfig as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Describes single precision floating-point capability of the device.
Notes: The mandated minimum floating-point capability is kFPRoundToNearest+kFPInfNAN.
Lasterror is set.

24.3.50 Vendor as String

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Vendor name string.
Notes: Lasterror is set.

24.3.51 VendorID as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: A unique device vendor identifier.
Notes: An example of a unique device identifier could be the PCIe ID.
Lasterror is set.

24.3.52 Properties

24.3.53 Handle as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The internel object reference.
Notes: Not zero if this object is valid.
(Read and Write property)

24.3.54 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Notes: See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.

(Read and Write property)

24.3.55 Constants

Constants

Constant	Value	Description
kFPDenorm	1	One of the floating point capabilities constants. denorms are supported
kFPFMA	32	One of the floating point capabilities constants. IEEE754-2008 fused multiply-add is supported
kFPInfNAN	2	One of the floating point capabilities constants. INF and quiet NaNs are supported
kFPRoundToInf	16	One of the floating point capabilities constants. Round to +ve and -ve infinity rounding modes supported
kFPRoundToNearest	4	One of the floating point capabilities constants. Round to nearest even rounding mode supported
kFPRoundToZero	8	One of the floating point capabilities constants. Round to zero rounding mode supported

Cache memory type constants.

Constant	Value	Description
kCacheMemTypeNone	0	
kCacheMemTypeReadOnlyCache	1	Read Only Cache.
kCacheMemTypeReadWriteCache	2	Read/Write Cache.

Device Type Constants

Constant	Value	Description
kDeviceTypeAccelerator	8	Accelerator = some special acceleration device
kDeviceTypeAll	&Hffffffff	This is the bitmask to catch all possible types.
kDeviceTypeCPU	2	CPU = your processor
kDeviceTypeDefault	1	Default device.
kDeviceTypeGPU	4	GPU = your graphics card

Execution Capabilities Constants

Constant	Value	Description
kExceNativeKernel	2	The OpenCL device can execute native kernels.
kExecKernel	1	The OpenCL device can execute OpenCL kernels.

Memory Type Constants

Constant	Value	Description
kMemTypeGlobal	2	Dedicated local memory storage such as SRAM.
kMemTypeLocal	1	

Queue properties constants.

Constant	Value	Description
kQueueOutOfOrderExecModeEnable	1	Out of order execution mode enabled.
kQueueProfilingEnable	2	Profiling enabled.

24.4 class CLEventMBS

24.4.1 class CLEventMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for an OpenCL event.
Notes: You can chain several operations together inside a command queue. With events you can have an item execute after another item.
Blog Entries

- MBS Plugins 11.1 Release notes
- MBS REALbasic Plugins, version 11.1pr5

24.4.2 Methods

24.4.3 CommandExecutionStatus as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the execution status of the command identified by event.
Notes: See kCommandExecutionStatus* constants.
Lasterror is set.

24.4.4 CommandQueue as CLCommandQueueMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the command-queue associated with event.
Notes: Lasterror is set.

24.4.5 CommandType as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the command associated with event.
Notes: See kCommand* constants.
Lasterror is set.

24.4.6 ProfilingCommandEnd as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: A 64-bit value that describes the current device time counter in nanoseconds when the command identified by event has finished execution on the device.
Notes: Lasterror is set.

24.4.7 ProfilingCommandQueued as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: A 64-bit value that describes the current device time counter in nanoseconds when the command identified by event is enqueued in a command-queue by the host.
Notes: Lasterror is set.

24.4.8 ProfilingCommandStart as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: A 64-bit value that describes the current device time counter in nanoseconds when the command identified by event starts execution on the device.
Notes: Lasterror is set.

24.4.9 ProfilingCommandSubmit as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: A 64-bit value that describes the current device time counter in nanoseconds when the command identified by event that has been enqueued is submitted by the host to the device associated with the commandqueue.
Notes: Lasterror is set.

24.4.10 ReferenceCount as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the event reference count.
Notes: The reference count returned should be considered immediately stale. It is unsuitable for general use in applications. This feature is provided for identifying memory leaks.
Lasterror is set.

24.4.11 Properties

24.4.12 Handle as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The internel object reference.
Notes: Not zero if this object is valid.
(Read and Write property)

24.4.13 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Notes: See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

24.4.14 Constants

Command Type Constants

Constant	Value	Description
kCommandAcquireGLObjects	&h11FF	Acquire GL objects
kCommandCopyBuffer	&h11F5	Copy Buffer
kCommandCopyBufferToImage	&h11FA	Copy Buffer to Image
kCommandCopyImage	&h11F8	Copy Image
kCommandCopyImageToBuffer	&h11F9	Copy Image to Buffer
kCommandMapBuffer	&h11FB	Map Buffer
kCommandMapImage	&h11FC	Map Image
kCommandMarker	&h11FE	Marker
kCommandNativeKernel	&h11F2	Execute Native Kernel
kCommandNDRangeKernel	&h11F0	Execute a ND Range Kernel
kCommandReadBuffer	&h11F3	Read Buffer
kCommandReadImage	&h11F6	Read Image
kCommandReleaseGLObjects	&h1200	Release GL objects
kCommandTask	&h11F1	Execute task
kCommandUnmapMemObject	&h11FD	Unmap memory object
kCommandWriteBuffer	&h11F4	Write Buffer
kCommandWriteImage	&h11F7	Write Image

Command excecution status constants.

Constant	Value	Description
kCommandExecutionStatusComplete	0	The command has completed.
kCommandExecutionStatusQueued	3	command has been enqueued in the command-queue.
kCommandExecutionStatusRunning	1	Device is currently executing this command.
kCommandExecutionStatusSubmitted	2	enqueued command has been submitted by the host to the device asso with the command-queue.

24.5 class CLImageFormatMBS

24.5.1 class CLImageFormatMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** the OpenCL class for an image format.

24.5.2 Properties

24.5.3 ImageChannelDataType as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Describes the size of the channel data type.
Notes: The number of bits per element determined by the ImageChannelDataType and ImageChannelOrder must be a power of two. The list of supported values is described in the table below.

Image Channel Data Type	Description
kChannelTypeSNormInt8	Each channel component is a normalized signed 8-bit integer value.
kChannelTypeSNormInt16	Each channel component is a normalized signed 16-bit integer value.
kChannelTypeUNormInt8	Each channel component is a normalized unsigned 8-bit integer value.
kChannelTypeUNormInt16	Each channel component is a normalized unsigned 16-bit integer value.
kChannelTypeUNormShort565	Represents a normalized 5-6-5 3-channel RGB image. The channel order must be kChannelOrderRGB.
kChannelTypeUNormShort555	Represents a normalized x-5-5-5 4-channel xRGB image. The channel order must be kChannelOrderRGB.
kChannelTypeUNormInt101010	Represents a normalized x-10-10-10 4-channel xRGB image. The channel order must be kChannelOrderRGB.
kChannelTypeSignedInt8	Each channel component is an unnormalized signed 8-bit integer value.
kChannelTypeSignedInt16	Each channel component is an unnormalized signed 16-bit integer value.
kChannelTypeSignedInt32	Each channel component is an unnormalized signed 32-bit integer value.
kChannelTypeUnsignedInt8	Each channel component is an unnormalized unsigned 8-bit integer value.
kChannelTypeUnsignedInt16	Each channel component is an unnormalized unsigned 16-bit integer value.
kChannelTypeUnsignedInt32	Each channel component is an unnormalized unsigned 32-bit integer value.
kChannelTypeHalfFloat	Each channel component is a 16-bit half-float value.
kChannelTypeFloat	Each channel component is a single precision floating-point value.

(Read and Write property)

24.5.4 ImageChannelOrder as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Specifies the number of channels and the channel layout i.e. the memory layout in which channels are stored in the image.
Notes: Valid values are described in the table below.

Format	Description
kChannelOrderR, or kChannelOrderA	
kChannelOrderIntensity	This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelTypeUNormInt16, kChannelTypeSNormInt8, kChannelTypeSNormInt16, kChannelTypeHalfFloat, or kChannelTypeFloat.
kChannelOrderLuminance	This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelTypeUNormInt16, kChannelTypeSNormInt8, kChannelTypeSNormInt16, kChannelTypeHalfFloat, or kChannelTypeFloat.
kChannelOrderRG, or kChannelOrderRA	
kChannelOrderRGB	This format can only be used if channel data type = kChannelTypeUNormShort565, kChannelTypeUNormShort555 or kChannelTypeUNormInt101010.
kChannelOrderRGBA	
kChannelOrderARGB, kChannelOrderBGRA.	This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelTypeSNormInt8, kChannelTypeSignedInt8 or kChannelTypeUnsignedInt8.

(Read and Write property)

24.5.5 Constants

Channel Order Constants

Constant	Value	Description
kChannelOrderA	&h10B1	
kChannelOrderARGB	&h10B7	
kChannelOrderBGRA	&h10B6	
kChannelOrderIntensity	&h10B8	This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelTypeUNormInt16, kChannelTypeSNormInt8, kChannelTypeSNormInt16, kChannelTypeHalfFloat, or kChannelTypeFloat.
kChannelOrderLuminance	&h10B9	This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelTypeUNormInt16, kChannelTypeSNormInt8, kChannelTypeSNormInt16, kChannelTypeHalfFloat, or kChannelTypeFloat.
kChannelOrderR	&h10B0	
kChannelOrderRA	&h10B3	
kChannelOrderRG	&h10B2	
kChannelOrderRGB	&h10B4	This format can only be used if channel data type = kChannelTypeUNormShort565, kChannelTypeUNormShort555 or kChannelTypeUNormInt101010.
kChannelOrderRGBA	&h10B5	

Channel data type constants

Constant	Value	Description
kChannelTypeFloat	&h10DE	Each channel component is a single precision floating-point value.
kChannelTypeHalfFloat	&h10DD	Each channel component is a 16-bit half-float value.
kChannelTypeSignedInt16	&h10D8	Each channel component is an unnormalized signed 16-bit integer value.
kChannelTypeSignedInt32	&h10D9	Each channel component is an unnormalized signed 32-bit integer value.
kChannelTypeSignedInt8	&h10D7	Each channel component is an unnormalized signed 8-bit integer value.
kChannelTypeSNormInt16	&h10D1	Each channel component is a normalized signed 16-bit integer value.
kChannelTypeSNormInt8	&h10D0	Each channel component is a normalized signed 8-bit integer value.
kChannelTypeUNormInt101010	&h10D6	Represents a normalized x-10-10-10 4-channel xRGB image. The channel ord must be kChannelOrderRGB.
kChannelTypeUNormInt16	&h10D3	Each channel component is a normalized unsigned 16-bit integer value.
kChannelTypeUNormInt8	&h10D2	Each channel component is a normalized unsigned 8-bit integer value.
kChannelTypeUNormShort555	&h10D5	Represents a normalized x-5-5-5 4-channel xRGB image. The channel ord must be kChannelOrderRGB.
kChannelTypeUNormShort565	&h10D4	Represents a normalized 5-6-5 3-channel RGB image. The channel order mu be kChannelOrderRGB.
kChannelTypeUnsignedInt16	&h10DB	Each channel component is an unnormalized unsigned 16-bit integer value.
kChannelTypeUnsignedInt32	&h10DC	Each channel component is an unnormalized unsigned 32-bit integer value.
kChannelTypeUnsignedInt8	&h10DA	Each channel component is an unnormalized unsigned 8-bit integer value.

24.6 class CLKernelMBS

24.6.1 class CLKernelMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for an OpenCL Kernel.
Blog Entries

- MBS Plugins 11.1 Release notes
- MBS REALbasic Plugins, version 11.1pr5

24.6.2 Methods

24.6.3 Constructor(Program as CLProgramMBS, KernelName as string)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates a kernal object.
Notes: Program: A program object with a successfully built executable.
KernelName: A function name in the program declared with the ___kernel qualifier

A kernel is a function declared in a program. A kernel is identified by the ___kernel qualifier applied to any function in a program. A kernel object encapsulates the specific ___kernel function declared in a program and the argument values to be used when executing this ___kernel function.
Lasterror is set.

24.6.4 FunctionName as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the kernel function name.
Notes: Lasterror is set.

24.6.5 GetKernelCompileWorkGroupSize(device as CLDeviceMBS, byref X as Int64, byref Y as Int64, byref Z as Int64)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns the work-group size specified by the ___attribute___((reqd_work_gr oup_size(X, Y, Z))) qualifier.

Notes: device: Identifies a specific device in the list of devices associated with kernel. The list of devices is the list of devices in the OpenCL context that is associated with kernel. If the list of devices associated with kernel is a single device, device can be a nil value.

If the work-group size is not specified using the above attribute qualifier (0, 0, 0) is returned.
Lasterror is set.

24.6.6 GetKernelLocalMemorySize(device as CLDeviceMBS = nil) as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns the amount of local memory in bytes being used by a kernel.
Notes: device: Identifies a specific device in the list of devices associated with kernel. The list of devices is the list of devices in the OpenCL context that is associated with kernel. If the list of devices associated with kernel is a single device, device can be a nil value.

This includes local memory that may be needed by an implementation to execute the kernel, variables declared inside the kernel with the ___local address qualifier and local memory to be allocated for arguments to the kernel declared as pointers with the ___local address qualifier and whose size is specified with clSetKernelArg.

If the local memory size, for any pointer argument to the kernel declared with the ___local address qualifier, is not specified, its size is assumed to be 0.
Lasterror is set.

24.6.7 GetKernelWorkGroupSize(device as CLDeviceMBS = nil) as Int64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: This provides a mechanism for the application to query the work-group size that can be used to execute a kernel on a specific device given by device.
Notes: device: Identifies a specific device in the list of devices associated with kernel. The list of devices is the list of devices in the OpenCL context that is associated with kernel. If the list of devices associated with kernel is a single device, device can be a nil value.

The OpenCL implementation uses the resource requirements of the kernel (register usage etc.) to determine what this work-group size should be.
Lasterror is set.

24.6.8 NumberOfArguments as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the number of arguments to kernel.
Notes: Lasterror is set.

24.6.9 ReferenceCount as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the kernel reference count.
Notes: The reference count returned should be considered immediately stale. It is unsuitable for general use in applications. This feature is provided for identifying memory leaks.
Lasterror is set.

24.6.10 SetKernelArgDouble(index as Integer, value as Double)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Sets the kernel argument with the given index.
Notes: index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the value.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types.
Lasterror is set.

24.6.11 SetKernelArgFloat(index as Integer, value as Single)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Sets the kernel argument with the given index.
Notes: index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the value.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types.
Lasterror is set.

24.6.12 SetKernelArgInt32(index as Integer, value as Int32)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Sets the kernel argument with the given index.
Notes: index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the value.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types.
Lasterror is set.

24.6.13 SetKernelArgInt64(index as Integer, value as Int64)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Sets the kernel argument with the given index.
Notes: index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the value.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types.
Lasterror is set.

24.6.14 SetKernelArgMem(index as Integer, mem as CLMemMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Sets the kernel argument with the given index.
Notes: index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the memory object to set for argument.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types.
Lasterror is set.

24.6.15 Properties

24.6.16 Context as CLContextMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the context associated with kernel.
Notes: Lasterror is set.
(Read and Write property)

24.6.17 Handle as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The internel object reference.
Notes: Not zero if this object is valid.
(Read and Write property)

24.6.18 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Notes: See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

24.6.19 Program as CLProgramMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the program object associated with kernel.
Notes: Lasterror is set.
(Read and Write property)

24.7 class CLMemMBS

24.7.1 class CLMemMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for a OpenCL memory block.
Example:

```
const Size = 4096
dim context as CLContextMBS // your context
dim input as new CLMemMBS(context, CLMEMMBS.kMemoryReadOnly, 4096)
```

Blog Entries

- MBS Plugins 11.1 Release notes
- MBS REALbasic Plugins, version 11.1pr5

24.7.2 Methods

24.7.3 Constructor(Context as CLContextMBS, Flags as UInt64, ImageFormat as CLImageFormatMBS, Width as Integer, Height as Integer, Depth as Integer, RowPitch as Integer, SlicePitch as Integer, HostPtr as Memoryblock = nil)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates a 3D image object.
Notes: context: A valid OpenCL context on which the image object is to be created.
flags: A bit-field that is used to specify allocation and usage information about the image memory object being created. See kMemory* constants.
ImageFormat: the image format properties of the image to be allocated.
Width, Height: The width and height of the image in pixels. These must be values greater than or equal to 1.
Depth: The depth of the image in pixels. This must be a value greater than 1.
RowPitch: The scan-line pitch in bytes. This must be 0 if HostPtr is nil and can be either 0 or greater than or equal to Width * size of element in bytes if HostPtr is not nil. If HostPtr is not nil and RowPitch is equal to 0, RowPitch is calculated as Width * size of element in bytes. If RowPitch is not 0, it must be a multiple of the image element size in bytes.
SlicePitch: The size in bytes of each 2D slice in the 3D image. This must be 0 if HostPtr is nil and can be either 0 or greater than or equal to RowPitch * Height if HostPtr is not nil. If HostPtr is not nil and SlicePitch equal to 0, SlicePitch is calculated as RowPitch * Height. If SlicePitch is not 0, it must be a multiple of the RowPitch.

HostPtr: A pointer to the image data that may already be allocated by the application. The size of the buffer that HostPtr points to must be greater than or equal to SlicePitch * image_depth. The size of each element in bytes must be a power of 2. The image data specified by HostPtr is stored as a linear sequence of adjacent 2D slices. Each 2D slice is a linear sequence of adjacent scanlines. Each scanline is a linear sequence of image elements.

Lasterror is set.
See also:

24.7.4 Constructor(Context as CLContextMBS, Flags as UInt64, ImageFormat as CLImageFormatMBS, Width as Integer, Height as Integer, RowPitch as Integer, HostPtr as Memoryblock = nil)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates a 2D image object.
Notes: context: A valid OpenCL context on which the image object is to be created.
flags: A bit-field that is used to specify allocation and usage information about the image memory object being created. See kMemory* constants.
ImageFormat: The format properties of the image to be allocated.
Width and Height: The width and height of the image in pixels. These must be values greater than or equal to 1.
RowPitch: The scan-line pitch in bytes. This must be 0 if HostPtr is nil and can be either 0 or greater than or equal to Width * size of element in bytes if HostPtr is not nil. If HostPtr is not nil and RowPitch is equal to 0, RowPitch is calculated as Width * size of element in bytes. If RowPitch is not 0, it must be a multiple of the image element size in bytes.
HostPtr: A pointer to the image data that may already be allocated by the application. The size of the buffer that HostPtr points to must be greater than or equal to RowPitch * Height. The size of each element in bytes must be a power of 2. The image data specified by HostPtr is stored as a linear sequence of adjacent scanlines. Each scanline is stored as a linear sequence of image elements.

Lasterror is set.
See also:

24.7.5 Constructor(Context as CLContextMBS, Flags as UInt64, Size as Integer, HostPtr as Memoryblock = nil)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates a new buffer object.
Notes: context: A valid OpenCL context used to create the buffer object.
flags: A bit-field that is used to specify allocation and usage information such as the memory arena that should be used to allocate the buffer object and how it will be used. The following table describes the possible values for flags:
size: The size in bytes of the buffer memory object to be allocated.
HostPtr: A memoryblock that may already be allocated by the application. The size of the buffer that HostPtr points to must be greater than or equal to the size bytes.

Flags	Description
kMemoryReadWrite	This flag specifies that the memory object will be read and written by a kernel. This is the default.
kMemoryWriteOnly	This flags specifies that the memory object will be written but not read by a kernel. Reading from a buffer or image object created with kMemoryWriteOnly inside a kernel is undefined.
kMemoryReadOnly	This flag specifies that the memory object is a read-only memory object when used inside a kernel. Writing to a buffer or image object created with kMemoryReadOnly inside a kernel is undefined.
kMemoryUseHostPtr	This flag is valid only if HostPtr is not nil. If specified, it indicates that the application wants the OpenCL implementation to use memory referenced by HostPtr as the storage bits for the memory object. OpenCL implementations are allowed to cache the buffer contents pointed to by HostPtr in device memory. This cached copy can be used when kernels are executed on a device. The result of OpenCL commands that operate on multiple buffer objects created with the same HostPtr or overlapping host regions is considered to be undefined.
kMemoryAllocHostPtr	This flag specifies that the application wants the OpenCL implementation to allocate memory from host accessible memory. kMemoryAllocHostPtr and kMemoryUseHostPtr are mutually exclusive.
kMemoryCopyHostPtr	This flag is valid only if HostPtr is not nil. If specified, it indicates that the application wants the OpenCL implementation to allocate memory for the memory object and copy the data from memory referenced by HostPtr. kMemoryCopyHostPtr and kMemoryUseHostPtr are mutually exclusive. kMemoryCopyHostPtr can be used with kMemoryAllocHostPtr to initialize the contents of the cl_mem object allocated using host-accessible (e.g. PCIe) memory.

Lasterror is set.
See also:

- 24.7.3 Constructor(Context as CLContextMBS, Flags as UInt64, ImageFormat as CLImageFormatMBS, Width as Integer, Height as Integer, Depth as Integer, RowPitch as Integer, SlicePitch as Integer,

24.7.6 Context as CLContextMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return context specified when memory object is created.
Notes: Lasterror is set.

24.7.7 Flags as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the flags argument value specified with Constructor.
Notes: Lasterror is set.

24.7.8 ImageDepth as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return depth of the image in pixels.
Notes: For a 2D image, depth equals 0.
Lasterror is set.

24.7.9 ImageElementSize as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return size of each element of the image memory object given by image.
Notes: An element is made up of n channels. The value of n is given with image format descriptor.
Lasterror is set.

24.7.10 ImageFormat as CLImageFormatMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return image format descriptor.
Notes: Lasterror is set.

24.7.11 ImageHeight as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return height of image in pixels.
Notes: Lasterror is set.

24.7.12 ImageRowPitch as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return size in bytes of a row of elements of the image object given by image.
Notes: Lasterror is set.

24.7.13 ImageSlicePitch as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return size in bytes of a 2D slice for the 3D image object given by image.
Notes: For a 2D image object this value will be 0.
Lasterror is set.

24.7.14 ImageWidth as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return width of image in pixels.
Notes: Lasterror is set.

24.7.15 ReferenceCount as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return memory object reference count.
Notes: The reference count returned should be considered immediately stale. It is unsuitable for general use in applications. This feature is provided for identifying memory leaks.
Lasterror is set.

24.7.16 Size as UInt64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return actual size of memory object in bytes.
Notes: Lasterror is set.

24.7.17 Type as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns the memory type.
Notes: Either normal buffer, image 2D or image 3D.
Lasterror is set.

24.7.18 Properties

24.7.19 Handle as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The internel object reference.
Notes: Not zero if this object is valid.
(Read and Write property)

24.7.20 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Notes: See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

24.7.21 Target as Memoryblock

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The reference to the memoryblock if you used kMemoryUseHostPtr to create this memory object.
Notes: (Read and Write property)

24.7.22 Constants

Mapping mode constants

Constant	Value	Description
kMapRead	1	
kMapWrite	2	

Constants for creating a memory block.

Constant	Value	Description
kMemoryAllocHostPtr	16	
kMemoryCopyHostPtr	32	
kMemoryReadOnly	4	
kMemoryReadWrite	1	
kMemoryUseHostPtr	8	
kMemoryWriteOnly	2	This flags specifies that the memory object will be written but not read by a kernel. Reading from a buffer or image object created with kMemoryWriteOnly inside a kernel is undefined.

Memory object types.

Constant	Value	Description
kMemoryTypeBuffer	&h10F0	A normal memory buffer.
kMemoryTypeImage2D	&h10F1	2D Image
kMemoryTypeImage3D	&h10F2	3D Image

24.8 class CLPlatformMBS

24.8.1 class CLPlatformMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The OpenCL class for a platform.
Blog Entries

- MBS Plugins 11.1 Release notes
- MBS REALbasic Plugins, version 11.1pr5

24.8.2 Methods

24.8.3 DeviceCount(types as Int64) as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Queries number of devices with given types.
Example:

```
dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+str(p.DeviceCount(CLDeviceMBS.kDeviceTypeAll))+" devices"
next
```

Notes: types: A bitfield that identifies the type of OpenCL device. The device_type can be used to query specific OpenCL devices or all OpenCL devices available. The valid values for device_type are specified in the following table.

cl_device_type	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.

24.8.4 Devices(types as Int64) as CLDeviceMBS()

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Queries devices with given types.
Example:

```
// check all platforms
dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
dim lines(-1) as string

lines.Append p.Name
lines.Append ""

// and show device names
for each d as CLDeviceMBS in p.Devices(CLDeviceMBS.kDeviceTypeAll)
lines.Append d.name
next

MsgBox Join(lines,EndOfLine)
next
```

Notes: types: A bitfield that identifies the type of OpenCL device. The device_type can be used to query specific OpenCL devices or all OpenCL devices available. The valid values for device_type are specified in the following table.

cl_device_type	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.

24.8.5 Extensions as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns a space-separated list of extension names (the extension names themselves do not contain any spaces) supported by the platform.
Example:

```
dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+p.Extensions
next
```

Notes: Extensions defined here must be supported by all devices associated with this platform.
Lasterror is set.

24.8.6 Name as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Platform name string.
Example:

```
dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name
next
```

Notes: Lasterror is set.

24.8.7 Profile as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: OpenCL profile string.
Example:

```
dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+p.Profile
```

```
next
```

Notes: Returns the profile name supported by the implementation. The profile name returned can be one of the following strings:

FULL_PROFILE - if the implementation supports the OpenCL specification (functionality defined as part of the core specification and does not require any extensions to be supported).

EMBEDDED_PROFILE - if the implementation supports the OpenCL embedded profile. The embedded profile is defined to be a subset for each version of OpenCL.

Lasterror is set.

24.8.8 Vendor as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Platform vendor string.
Example:

```
dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+p.Vendor
next
```

Notes: Lasterror is set.

24.8.9 Version as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: OpenCL version string.
Example:

```
dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+p.Version
next
```

Notes: Returns the OpenCL version supported by the implementation. This version string has the following format:

OpenCL<space><major_version.minor_version><space><platform-specific information>

The major_version.minor_version value returned will be 1.0.
Lasterror is set.

24.8.10 Properties

24.8.11 Handle as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The internel object reference.
Notes: Not zero if this object is valid.
(Read and Write property)

24.8.12 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Notes: See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

24.9 class CLProgramMBS

24.9.1 class CLProgramMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The OpenCL class for a program.
Blog Entries

- MBS Plugins 11.1 Release notes
- MBS REALbasic Plugins, version 11.1pr5

24.9.2 Methods

24.9.3 Binaries as String()

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the program binaries for all devices associated with program.
Notes: For each device in program, the binary returned can be the binary specified for the device when program is created with Constructor or it can be the executable binary generated by BuildProgram. If program is created with Constructor (with Source code), the binary returned is the binary generated by BuildProgram. The bits returned can be an implementation-specific intermediate representation (a.k.a. IR) or device specific executable bits or both. The decision on which information is returned in the binary is up to the OpenCL implementation.

Each entry in this array is used by the implementation as the location in memory where to copy the program binary for a specific device, if there is a binary available.

Lasterror is set.

24.9.4 BinarySizes as UInt64()

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns an array that contains the size in bytes of the program binary for each device associated with program.
Notes: The size of the array is the number of devices associated with program. If a binary is not available for a device(s), a size of zero is returned.

Lasterror is set.

24.9.5 BuildLog(device as CLDeviceMBS) as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the build log when BuildProgram was called for device.
Notes: If build status of program for device is kBuildNone, an empty string is returned.
Lasterror is set.

24.9.6 BuildOptions(device as CLDeviceMBS) as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the build options specified by the options argument in BuildProgram for device.
Notes: If build status of program for device is kBuildNone, an empty string is returned.
Lasterror is set.

24.9.7 BuildProgram(device as CLDeviceMBS, options as string = "")

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Builds (compiles and links) a program executable from the program source or binary.
Notes: See other BuildProgram method for details
See also:

24.9.8 BuildProgram(devices() as CLDeviceMBS, options as string = "")

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Builds (compiles and links) a program executable from the program source or binary.
Notes:

devices	Optional, a list of devices you want to build for. If you specify no device, you build for all devices.
device	Optional, the device you want to build for. If you specify no device, you build for all devices.
options	A string that describes the build options to be used for building the program executable. The list of supported options is described in "Build Options" below.

OpenCL allows program executables to be built using the source or the binary.

The build options are categorized as pre-processor options, options for math intrinsics, options that control optimization and miscellaneous options. This specification defines a standard set of options that must be supported by an OpenCL compiler when building program executables online or offline. These may be extended by a set of vendor- or platform-specific options.

Preprocessor Options

These options control the OpenCL preprocessor which is run on each program source before actual compilation. -D options are processed in the order they are given in the options argument to clBuildProgram.
-D name
Predefine name as a macro, with definition 1.

-D name=definition
The contents of definition are tokenized and processed as if they appeared during translation phase three in a '#define' directive. In particular, the definition will be truncated by embedded newline characters.

-I dir
Add the directory dir to the list of directories to be searched for header files.

Math Intrinsics Options

These options control compiler behavior regarding floating-point arithmetic. These options trade off between speed and correctness.

-cl-single-precision-constant
Treat double precision floating-point constant as single precision constant.

-cl-denorms-are-zero
This option controls how single precision and double precision denormalized numbers are handled. If specified as a build option, the single precision denormalized numbers may be flushed to zero and if the optional extension for double precision is supported, double precision denormalized numbers may also be flushed to zero. This is intended to be a performance hint and the OpenCL compiler can choose not to flush denorms to zero if the device supports single precision (or double precision) denormalized numbers.

This option is ignored for single precision numbers if the device does not support single precision denormalized numbers i.e. kFPDenorm bit is not set in SingleFPConfig.

This option is ignored for double precision numbers if the device does not support double precision or if it does support double precison but CL_FP_DENORM bit is not set in CL_DEVICE_DOUBLE_FP_CON-

FIG.

This flag only applies for scalar and vector single precision floating-point variables and computations on these floating-point variables inside a program. It does not apply to reading from or writing to image objects.

Optimization Options

These options control various sorts of optimizations. Turning on optimization flags makes the compiler attempt to improve the performance and/or code size at the expense of compilation time and possibly the ability to debug the program.
-cl-opt-disable
This option disables all optimizations. The default is optimizations are enabled.

-cl-strict-aliasing
This option allows the compiler to assume the strictest aliasing rules.

The following options control compiler behavior regarding floating-point arithmetic. These options trade off between performance and correctness and must be specifically enabled. These options are not turned on by default since it can result in incorrect output for programs which depend on an exact implementation of IEEE 754 rules/specifications for math functions.

-cl-mad-enable
Allow a * b + c to be replaced by a mad. The mad computes a * b + c with reduced accuracy. For example, some OpenCL devices implement mad as truncate the result of a * b before adding it to c.

-cl-no-signed-zeros
Allow optimizations for floating-point arithmetic that ignore the signedness of zero. IEEE 754 arithmetic specifies the behavior of distinct +0.0 and -0.0 values, which then prohibits simplification of expressions such as x+0.0 or 0.0*x (even with -clfinite-math only). This option implies that the sign of a zero result isn't significant.

-cl-unsafe-math-optimizations
Allow optimizations for floating-point arithmetic that (a) assume that arguments and results are valid, (b) may violate IEEE 754 standard and (c) may violate the OpenCL numerical compliance requirements as defined in section 7.4 for single-precision floating-point, section 9.3.9 for double-precision floating-point, and edge case behavior in section 7.5. This option includes the -cl-no-signed-zeros and -cl-mad-enable options.

-cl-finite-math-only
Allow optimizations for floating-point arithmetic that assume that arguments and results are not NaNs or ¬±,àû. This option may violate the OpenCL numerical compliance requirements defined in in section 7.4 for single-precision floating-point, section 9.3.9 for double-precision floating-point, and edge case behavior in section 7.5.

-cl-fast-relaxed-math
Sets the optimization options -cl-finite-math-only and -cl-unsafe-math-optimizations. This allows optimizations for floating-point arithmetic that may violate the IEEE 754 standard and the OpenCL numerical compliance requirements defined in the specification in section 7.4 for single-precision floating-point, section 9.3.9 for double-precision floating-point, and edge case behavior in section 7.5. This option causes the preprocessor macro ___FAST_RELAXED_MATH___ to be defined in the OpenCL program.

Options to Request or Suppress Warnings

Warnings are diagnostic messages that report constructions which are not inherently erroneous but which are risky or suggest there may have been an error. The following languageindependent options do not enable specific warnings but control the kinds of diagnostics produced by the OpenCL compiler.
-w
Inhibit all warning messages.

-Werror
Make all warnings into errors.

Lasterror is set.
See also:

- 24.9.7 BuildProgram(device as CLDeviceMBS, options as string = "") 1109
- 24.9.9 BuildProgram(options as string = "") 1112

24.9.9 BuildProgram(options as string = "")

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Builds (compiles and links) a program executable from the program source or binary.
Notes: See other BuildProgram method for details
Lasterror is set.
See also:

- 24.9.7 BuildProgram(device as CLDeviceMBS, options as string = "") 1109
- 24.9.8 BuildProgram(devices() as CLDeviceMBS, options as string = "") 1109

24.9.10 BuildStatus(device as CLDeviceMBS) as Int64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns the build status of program for a specific device as given by device.
Notes: See kBuild* constants.

Lasterror is set.

24.9.11 Constructor(context as CLContextMBS, devices() as CLDeviceMBS, binaries() as string, status() as Integer)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates a program object for a context, and loads specified binary data into the program object.
Notes: context: Must be a valid OpenCL context.
devices: a list of devices that are in context. The binaries are loaded for devices specified in this list.

The devices associated with the program object will be the list of devices specified by devices. The list of devices specified by devices must be devices associated with context.

binaries: An array of strings containing the program binaries to be loaded for devices specified by devices. For each device given by devices(i), the string with the program binary for that device is given by binaries(i).

The program binaries specified by binaries contain the bits that describe the program executable that will be run on the device(s) associated with context. The program binary can consist of either or both of device-specific executable(s), and/or implementation-specific intermediate representation (IR) which will be converted to the device-specific executable.

sttaus: Returns whether the program binary for each device specified in devices was loaded successfully or not. It is an array of ubound -1 and is filled by the plugin.

Lasterror is set.

OpenCL allows applications to create a program object using the program source or binary and build appropriate program executables. This allows applications to determine whether they want to use the pre-built offline binary or load and compile the program source and use the executable compiled/linked online as the program executable. This can be very useful as it allows applications to load and build program executables online on its first instance for appropriate OpenCL devices in the system. These executables can now be queried and cached by the application. Future instances of the application launching will no longer need to compile and build the program executables. The cached executables can be read and loaded by the application, which can help significantly reduce the application initialization time.
See also:

- 24.9.12 Constructor(context as CLContextMBS, line as string) 1114
- 24.9.13 Constructor(context as CLContextMBS, lines() as string) 1114

24.9.12 Constructor(context as CLContextMBS, line as string)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates a program object for a context, and loads the source code specified by the line string into the program object.
Notes: context: Must be a valid OpenCL context.
line: A string with all the lines of the program.

The devices associated with the program object are the devices associated with context.

OpenCL allows applications to create a program object using the program source or binary and build appropriate program executables. This allows applications to determine whether they want to use the pre-built offline binary or load and compile the program source and use the executable compiled/linked online as the program executable. This can be very useful as it allows applications to load and build program executables online on its first instance for appropriate OpenCL devices in the system. These executables can now be queried and cached by the application. Future instances of the application launching will no longer need to compile and build the program executables. The cached executables can be read and loaded by the application, which can help significantly reduce the application initialization time.

An OpenCL program consists of a set of kernels that are identified as functions declared with the ___kernel qualifier in the program source. OpenCL programs may also contain auxiliary functions and constant data that can be used by ___kernel functions. The program executable can be generated online or offline by the OpenCL compiler for the appropriate target device(s).

Lasterror is set.
See also:

- 24.9.11 Constructor(context as CLContextMBS, devices() as CLDeviceMBS, binaries() as string, status() as Integer) 1113
- 24.9.13 Constructor(context as CLContextMBS, lines() as string) 1114

24.9.13 Constructor(context as CLContextMBS, lines() as string)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates a program object for a context, and loads the source code specified by the text strings in the lines array into the program object.
Notes: context: Must be a valid OpenCL context.
lines: An array of strings that make up the source code.

The devices associated with the program object are the devices associated with context.

OpenCL allows applications to create a program object using the program source or binary and build appropriate program executables. This allows applications to determine whether they want to use the pre-built offline binary or load and compile the program source and use the executable compiled/linked online as the program executable. This can be very useful as it allows applications to load and build program executables online on its first instance for appropriate OpenCL devices in the system. These executables can now be queried and cached by the application. Future instances of the application launching will no longer need to compile and build the program executables. The cached executables can be read and loaded by the application, which can help significantly reduce the application initialization time.

An OpenCL program consists of a set of kernels that are identified as functions declared with the ___kernel qualifier in the program source. OpenCL programs may also contain auxiliary functions and constant data that can be used by ___kernel functions. The program executable can be generated online or offline by the OpenCL compiler for the appropriate target device(s).

Lasterror is set.
See also:

- 24.9.11 Constructor(context as CLContextMBS, devices() as CLDeviceMBS, binaries() as string, status() as Integer) 1113
- 24.9.12 Constructor(context as CLContextMBS, line as string) 1114

24.9.14 Context as CLContextMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The context for this program.
Notes: Lasterror is set.

24.9.15 CreateKernelsInProgram(maxKernels as Integer = 100) as CLKernelMBS()

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Creates kernel objects for all kernel functions in program.
Notes: maxKernels: maximum number of kernels to return.

Kernel objects are not created for any ___kernel functions in program that do not have the same function definition across all devices for which a program executable has been successfully built.

Kernel objects can only be created once you have a program object with a valid program source or binary loaded into the program object and the program executable has been successfully built for one or more devices associated with program. No changes to the program executable are allowed while there are kernel objects associated with a program object. This means that calls to BuildProgram return kInvalidOperation

(in lasterror) if there are kernel objects attached to a program object. The OpenCL context associated with program will be the context associated with kernel. The list of devices associated with program are the devices associated with kernel. Devices associated with a program object for which a valid program executable has been built can be used to execute kernels declared in the program object.

Lasterror is set.

24.9.16 Devices as CLDeviceMBS()

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the list of devices associated with the program object.
Notes: This can be the devices associated with context on which the program object has been created or can be a subset of devices that are specified when a progam object is created.

24.9.17 NumDevices as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the number of devices associated with program.
Notes: Lasterror is set.

24.9.18 ReferenceCount as UInt32

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the program reference count.
Notes: Lasterror is set.

24.9.19 Source as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Return the program source code specified in the Constructor.
Notes: The source string returned is a concatenation of all source strings specified to Constructor.

24.9.20 Properties

24.9.21 Handle as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The internel object reference.
Notes: Not zero if this object is valid.
(Read and Write property)

24.9.22 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Notes: See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

24.9.23 Constants

Build Status constants

Constant	Value	Description
kBuildError	-2	The build status returned if the last call to BuildProgram on the specified program object for device generated an error.
kBuildInProgress	-3	The build status returned if the last call to BuildProgram on the specified program object for device has not finished.
kBuildNone	-1	The build status returned if no build has been performed on the specified program object for device.
kBuildSuccess	0	The build status returned if the last call to BuildProgram on the specified program object for device was successful.

24.10 class CLSamplerMBS

24.10.1 class CLSamplerMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for a Sampler.
Blog Entries

- MBS Real Studio Plugins, version 11.2pr9
- MBS Plugins 11.1 Release notes
- MBS REALbasic Plugins, version 11.1pr5

24.10.2 Methods

24.10.3 AddressingMode as UInt32

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Return the value specified by addressingmode argument to Constructor.

24.10.4 Constructor(Context as CLContextMBS, NormalizedCoords as Boolean, AddressingMode as UInt32, FilterMode as UInt32)

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Creates a sampler object.
Notes: context: Must be a valid OpenCL context.

NormalizedCoords: Determines if the image coordinates specified are normalized (if normalized_coords is true) or not (if normalized_coords is false).

AddressingMode: Specifies how out-of-range image coordinates are handled when reading from an image. This can be set to kAddressRepeat, kAddressClampToEdge, kAddressClamp, and kAddressNone.

FilterMode: Specifies the type of filter that must be applied when reading an image. This can be kFilterNearest or kFilterLinear.

Lasterror is set.

A sampler object describes how to sample an image when the image is read in the kernel. The built-in functions to read from an image in a kernel take a sampler as an argument. The sampler arguments to the image read function can be sampler objects created using OpenCL functions and passed as argument values to the kernel or can be samplers declared inside a kernel. In this section we discuss how sampler objects are created using OpenCL functions.

24.10.5 Context as CLContextMBS

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Return the context specified when the sampler is created.

24.10.6 FilterMode as UInt32

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Return the value specified by filterMode argument to Constructor.

24.10.7 NormalizedCoords as Boolean

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Return the value specified by normalizedCoords argument to Constructor.

24.10.8 ReferenceCount as UInt32

Plugin Version: 11.2, Platform: macOS, Targets: All.

Function: Return the sampler reference count.
Notes: The reference count returned should be considered immediately stale. It is unsuitable for general use in applications. This feature is provided for identifying memory leaks.

24.10.9 Properties

24.10.10 Handle as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The internel object reference.
Notes: Not zero if this object is valid.

(Read and Write property)

24.10.11 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Notes: See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

24.10.12 Constants

Address mode constants

Constant	Value	Description
kAddressClamp	&h1132	
kAddressClampToEdge	&h1131	
kAddressNone	&h1130	
kAddressRepeat	&h1133	

Filter mode constants

Constant	Value	Description
kFilterLinear	&h1141	
kFilterNearest	&h1140	

24.11 module OpenCLMBS

24.11.1 module OpenCLMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The module for OpenCL. **Notes:** from wikipedia:

OpenCL (Open Computing Language) is a framework for writing programs that execute across heterogeneous platforms consisting of CPUs, GPUs, and other processors. OpenCL includes a language (based on C99) for writing kernels (functions that execute on OpenCL devices), plus APIs that are used to define and then control the platforms. OpenCL provides parallel computing using task-based and data-based parallelism.
Blog Entries

- MBS Xojo Plugins, version 22.5pr7
- Nearly 2000 new Functions in the 9.6 prerelease of MBS
- MBS REALbasic plug-in 9.6

Xojo Developer Magazine

- 7.6, page 8: News

24.11.2 Methods

24.11.3 AllDeviceCount(types as Int64) as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Queries number of devices with given types.
Example:

```
dim c as Integer = OpenCLMBS.AllDeviceCount(CLDeviceMBS.kDeviceTypeCPU)
dim g as Integer = OpenCLMBS.AllDeviceCount(CLDeviceMBS.kDeviceTypeGPU)
MsgBox str(c)+" CPU and "+str(g)+" GPU"
```

Notes: types: A bitfield that identifies the type of OpenCL device. The device_type can be used to query specific OpenCL devices or all OpenCL devices available. The valid values for device_type are specified in the following table.

Lasterror is set.

cl_device_type	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

24.11.4 AllDevices(types as Int64) as CLDeviceMBS()

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Queries devices with given types.
Example:

```
dim Devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)

for each p as CLDeviceMBS in Devices
MsgBox p.Name
next
```

Notes: types: A bitfield that identifies the type of OpenCL device. The device_type can be used to query specific OpenCL devices or all OpenCL devices available. The valid values for device_type are specified in the following table.

cl_device_type	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.

24.11.5 GetExtensionFunctionAddress(name as string) as ptr

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Returns the address of the extension function named by funcname.
Notes: The function GetExtensionFunctionAddress returns the address of the extension function named by funcname. The pointer returned should be cast to a function pointer type matching the extension function's definition defined in the appropriate extension specification and header file. A return value of nil indicates that the specified function does not exist for the implementation. A non-nil return value for GetExtensionFunctionAddress does not guarantee that an extension function is actually supported. The application must also make a corresponding query using CLPlatformMBS.Extensions or CLDeviceMBS.Extensions to determine if an extension is supported by the OpenCL implementation.

GetExtensionFunctionAddress may not be queried for core (non-extension) functions in OpenCL. For functions that are queryable with clGetExtensionFunctionAddress, implementations may choose to also export those functions statically from the object libraries implementing those functions. However, portable applications cannot rely on this behavior.

Since there is no way to qualify the query with a device, the function pointer returned must work for all implementations of that extension on different devices. The behavior of calling a device extension function on a device not supporting that extension is undefined.

24.11.6 GetPictureImageFormat(pic as picture, byref RowPitch as Integer) as CLImageFormatMBS

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Queries the image format this picture would need when creating a storage object with CLMemMBS.
Example:

```
dim p as new Picture(100,100,32)
dim rowbytes as Integer
dim format as CLImageFormatMBS = OpenCLMBS.GetPictureImageFormat(p, rowbytes)

MsgBox hex(format.ImageChannelOrder)+" "+hex(format.ImageChannelDataType)+" "+str(rowbytes)
// shows 10B7 and 10D2 and 416 on Mac OS X Carbon
```

Notes: As Xojo uses 4 bytes per pixel on Mac and Windows, the plugin returns ARGB (or other byte order). The alpha channel is not used as Xojo stores

24.11.7 isAvailable as boolean

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Whether OpenCL is available.
Example:

```
if not OpenCLMBS.isAvailable then
if TargetMachO and TargetX86 then
MsgBox "OpenCL not available. Please install Mac OS X 10.6 to use it."
else
MsgBox "OpenCL not available. You need a Mac with Intel processor running Mac OS X 10.6."
end if
end if
```

Notes: Should return true on Mac OS X 10.6 and false everywhere else.

24.11.8 PlatformCount as Int64

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Queries number of platforms available.
Example:

```
MsgBox str(OpenCLMBS.PlatformCount)
```

Notes: Typically you have two with modern Macs as you get both CPU and GPU listed.
Lasterror is set.

24.11.9 Platforms as CLPlatformMBS()

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Obtain the list of platforms available.
Example:

```
dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name
next
```

Notes: Lasterror is set.

24.11.10 UnloadCompiler

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Allows the implementation to release the resources allocated by the OpenCL compiler.
Example:

```
OpenCLMBS.UnloadCompiler
MsgBox OpenCLMBS.LastErrorMessage
```

Notes: This is a hint from the application and does not guarantee that the compiler will not be used in the future or that the compiler will actually be unloaded by the implementation. Calls to BuildProgram after UnloadCompiler will reload the compiler, if necessary, to build the appropriate program executable.
Lasterror is set.

24.11.11 WaitForEvents(events() as CLEventMBS)

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: Waits on the host thread for commands identified by event objects to complete.
Notes: events: The events specified in event_list act as synchronization points.

Waits on the host thread for commands identified by event objects in event_list to complete. A command is considered complete if its execution status is kCommandExecutionStatusComplete or a negative value.

Lasterror is set.

24.11.12 Properties

24.11.13 LastError as Integer

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The last error code.
Example:

```
MsgBox str(OpenCLMBS.LastError)
```

Notes: All the functions in all the OpenCL classes set this property, too.
(Read only property)

24.11.14 LastErrorMessage as string

Plugin Version: 11.1, Platform: macOS, Targets: All.

Function: The text message for the last error code.
Example:

MsgBox OpenCLMBS.LastErrorMessage

Notes: (Read only property)

24.11.15 Constants

Constants

Constant	Value	Description
kBuildProgramFailure	-11	One of the constants for OpenCL errors.
kCompilerNotAvailable	-3	One of the constants for OpenCL errors.
kDeviceNotAvailable	-2	One of the constants for OpenCL errors.
kDeviceNotFound	-1	One of the constants for OpenCL errors.
kImageFormatMismatch	-9	One of the constants for OpenCL errors.
kImageFormatNotSupported	-10	One of the constants for OpenCL errors.
kInvalidArgIndex	-49	One of the constants for OpenCL errors.
kInvalidArgSize	-51	One of the constants for OpenCL errors.
kInvalidArgValue	-50	One of the constants for OpenCL errors.
kInvalidBinary	-42	One of the constants for OpenCL errors.
kInvalidBufferSize	-61	One of the constants for OpenCL errors.
kInvalidBuildOptions	-43	One of the constants for OpenCL errors.
kInvalidCommandQueue	-36	One of the constants for OpenCL errors.
kInvalidContext	-34	One of the constants for OpenCL errors.
kInvalidDevice	-33	One of the constants for OpenCL errors.
kInvalidDeviceType	-31	One of the constants for OpenCL errors.
kInvalidEvent	-58	One of the constants for OpenCL errors.
kInvalidEventWaitList	-57	One of the constants for OpenCL errors.
kInvalidGlobalOffset	-56	One of the constants for OpenCL errors.
kInvalidGlObject	-60	One of the constants for OpenCL errors.
kInvalidHostPtr	-37	One of the constants for OpenCL errors.
kInvalidImageFormatDescriptor	-39	One of the constants for OpenCL errors.
kInvalidImageSize	-40	One of the constants for OpenCL errors.
kInvalidKernel	-48	One of the constants for OpenCL errors.
kInvalidKernelArgs	-52	One of the constants for OpenCL errors.
kInvalidKernelDefinition	-47	One of the constants for OpenCL errors.
kInvalidKernelName	-46	One of the constants for OpenCL errors.
kInvalidMemObject	-38	One of the constants for OpenCL errors.
kInvalidMipLevel	-62	One of the constants for OpenCL errors.
kInvalidOperation	-59	One of the constants for OpenCL errors.
kInvalidPlatform	-32	One of the constants for OpenCL errors.
kInvalidProgram	-44	One of the constants for OpenCL errors.
kInvalidProgramExecutable	-45	One of the constants for OpenCL errors.
kInvalidQueueProperties	-35	One of the constants for OpenCL errors.
kInvalidSampler	-41	One of the constants for OpenCL errors.
kInvalidValue	-30	One of the constants for OpenCL errors.
kInvalidWorkDimension	-53	One of the constants for OpenCL errors.
kInvalidWorkGroupSize	-54	One of the constants for OpenCL errors.
kInvalidWorkItemSize	-55	One of the constants for OpenCL errors.
kMapFailure	-12	One of the constants for OpenCL errors.
kMemCopyOverlap	-8	One of the constants for OpenCL errors.
kMemObjectAllocationFailure	-4	One of the constants for OpenCL errors.
kOutOfHostMemory	-6	One of the constants for OpenCL errors.
kOutOfResources	-5	One of the constants for OpenCL errors.
kProfilingInfoNotAvailable	-7	One of the constants for OpenCL errors.
kSuccess	0	One of the constants for OpenCL errors.

Chapter 25

Process

25.1 class NSXPCConnectionMBS

25.1.1 class NSXPCConnectionMBS

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The NSXPCConnection class provides a bi-directional communication channel between two processes.
Notes: This class is the primary means of creating and configuring the communication mechanism between two processes. Each process has one instance of this class to represent the endpoint in the communication channel.

Requires a setup with info.plist entries, correct permissions and code signing.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.2pr1

25.1.2 Methods

25.1.3 Available as boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether this class is available.

25.1.4 CallMethod(name as string, tag as Variant, params() as Variant)

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Calls method and passes parameters.
Notes: Returns array of variant.

25.1.5 Close

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Closes the connection.

25.1.6 Constructor(endpoint as NSXPCListenerEndpointMBS)

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Initializes an NSXPCConnection object to connect to an NSXPCListener object in another process, identified by an NSXPCListenerEndpoint object.
Notes: endpoint: The desired listener endpoint for the service.
Available in OS X v10.8 and later.
See also:

- 25.1.7 Constructor(MachOServiceName as string, flags as Integer) 1130
- 25.1.8 Constructor(ServiceName as string) 1131

25.1.7 Constructor(MachOServiceName as string, flags as Integer)

Plugin Version: 14.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Initializes an NSXPCConnection object to connect to a LaunchAgent or LaunchDaemon with a name advertised in a launchd.plist.
Notes: For example, if an agent is managed with launchd and has a launchd.plist in
textasciitilde /Library/LaunchAgents, this method would create a connection to that agent. The agent should use NSXPCListener to wait for new connections.

If the connection is being made to a process that is running in a privileged Mach bootstrap context (for example, a daemon started by a launchd property list in /Library/LaunchDaemons), then pass the NSXPC-ConnectionPrivileged option.

Available in OS X v10.8 and later.
See also:

25.1.8 Constructor(ServiceName as string)

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Initializes an NSXPCConnection object to connect to an NSXPCListener object in an XPC service, identified by a service name.
Notes: XPC services are helper processes that are usually part of your application bundle. The service should use NSXPCListener to wait for new connections.
Available in OS X v10.8 and later.
See also:

25.1.9 Destructor

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The destructor.

25.1.10 invalidate

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Invalidates the connection.
Notes: When you call this method, all outstanding reply blocks, error handling blocks, and invalidation blocks are called on the message handling queue. The connection must be invalidated before it is deallocated. After a connection is invalidated, no more messages may be sent or received.

25.1.11 resume

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Starts or resumes handling of messages on a connection.
Notes: All connections start suspended. You must resume them before they start processing received messages or sending messages through the remoteObjectProxy object.
Available in OS X v10.8 and later.

25.1.12 suspend

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Suspends the connection.
Notes: Suspends and resumes must be balanced before the connection may be invalidated.
Available in OS X v10.8 and later.

25.1.13 Properties

25.1.14 auditSessionIdentifier as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The BSM audit session identifier for the connecting process.
Notes: This attribute may be used by the listener delegate to accept or reject connections.
(Read only property)

25.1.15 effectiveGroupIdentifier as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The effective group ID (EGID) of the connecting process.
Notes: This attribute may be used by the listener delegate to accept or reject connections.
(Read only property)

25.1.16 effectiveUserIdentifier as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The effective user ID (EUID) of the connecting process.
Notes: This attribute may be used by the listener delegate to accept or reject connections.
(Read only property)

25.1.17 endpoint as NSXPCListenerEndpointMBS

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: If the connection was created with an NSXPCListenerEndpoint object, returns the endpoint object used.

Notes: (Read only property)

25.1.18 Handle as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

25.1.19 processIdentifier as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The process ID (PID) of the connecting process.
Notes: This attribute may be used by the listener delegate to accept or reject connections.
Available in OS X v10.8 and later.
(Read only property)

25.1.20 serviceName as String

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The name of the XPC service that this connection was configured to connect to.
Notes: (Read only property)

25.1.21 Events

25.1.22 CallMethodReturned(name as string, tag as Variant, Parameters() as Variant, Results() as Variant)

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: The event called when method returns.

25.1.23 ErrorHandler(error as NSErrorMBS)

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: The error event for errors happening when calling method.

25.1.24 InterruptionHandler

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: The event is called if the remote process exits or crashes.
Notes: It may be possible to re-establish the connection by simply sending another message. The handler is invoked on the same queue as reply messages and other handlers, and it is always executed after any other messages or reply block handlers (except for the invalidation handler).

25.1.25 InvalidationHandler

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: This event is invoked on the same queue as reply messages and other handlers, and is always executed last (after the interruption handler, if required).
Notes: You may not send messages over the connection from within an invalidation handler block.

25.1.26 Constants

Constants

Constant	Value	Description
NSXPCConnectionPrivileged	1	One of the options that you can pass to a connection. Use this option if connecting to a service in the privileged Mach bootstrap (for example, a daemon with a launchd.plist in /Library/LaunchDaemons). Available in OS X v10.8 and later.

25.2 class NSXPCListenerEndpointMBS

25.2.1 class NSXPCListenerEndpointMBS

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Class that ”names” a specific NSXPCListener object.
Notes: An instance may be retrieved from an NSXPCListener and sent over existing NSXPCConnections. A process may then use it to create a new NSXPCConnection to the original NSXPCListener.

This pattern is useful if you have a service which multiplexes work to other services. The service can act as an intermediate helper. The requesting application does not need to know specifically which service it is connecting to, just that it implements a known NSXPCInterface.
This is an abstract class. You can’t create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.2pr1

25.2.2 Methods

25.2.3 Available as boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether this class is available.

25.2.4 Constructor

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The private constructor.

25.2.5 Properties

25.2.6 Handle as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

25.3 class NSXPCListenerMBS

25.3.1 class NSXPCListenerMBS

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The NSXPCListener class and its delegate are responsible for waiting for new incoming connections, configuring them, and accepting or rejecting them.
Notes: Each XPC service, launchd agent, or launchd daemon typically has at least one NSXPCListener object that listens for connections to a specified service name.
When the listener receives a new connection request, it creates a new NSXPCConnection object, then asks the delegate to inspect, configure, and resume the connection object by calling the delegate's shouldAcceptNewConnection event.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.2pr1

25.3.2 Methods

25.3.3 Available as boolean

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Whether this class is available.

25.3.4 Close

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Closes listener.

25.3.5 Constructor(Anonymous as boolean = false)

Plugin Version: 14.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Creates a new listener connection.
Notes: If Anonymous is true: Initializes with a new anonymous listener connection.
If false: Initializes with the singleton listener used to listen for incoming connections in an XPC service.

see also:
https://developer.apple.com/library/mac/documentation/Foundation/Reference/NSXPCListener_reference/translated_content/NSXPCListener.html
See also:

25.3.6 Constructor(Name as string)

Plugin Version: 14.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Initializes a listener in a LaunchAgent or LaunchDaemon which has a name advertised in a launchd.plist file.
Notes: For example, you might use this in an agent launched by launchd with a launchd.plist contained in textasciitilde /Library/LaunchAgents, or a daemon launched by launchd with a launchd.plist contained in /Library/LaunchDaemons.

Available in OS X v10.8 and later.
See also:

- 25.3.5 Constructor(Anonymous as boolean = false) 1136

25.3.7 Destructor

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The destructor.

25.3.8 invalidate

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Invalidates the listener.
Notes: After calling this method, no more connections are created. Once a listener is invalidated it may not be resumed or suspended.
Available in OS X v10.8 and later.

25.3.9 resume

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Starts processing of incoming requests.
Notes: All listeners start suspended and must be resumed before they begin processing incoming requests.

If called on the serviceListener object, this method never returns. Therefore, you should call it as the last step inside the XPC service's main function after setting up any desired initial state and configuring the

listener itself.

If called on any other NSXPCListener, the connection is resumed, and the method returns immediately.
Available in OS X v10.8 and later.

25.3.10 suspend

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Suspends the listener.
Notes: Suspends and resumes must be balanced before the listener may be invalidated.
Available in OS X v10.8 and later.

25.3.11 Properties

25.3.12 endpoint as NSXPCListenerEndpointMBS

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: Returns an endpoint object that may be sent over an existing connection.
Notes: The receiver of the endpoint can use this object to create a new connection to this NSXPCListener object. The resulting NSXPCListenerEndpoint object uniquely names this listener object across connections.
(Read only property)

25.3.13 Handle as Integer

Plugin Version: 14.2, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

25.3.14 Events

25.3.15 CallMethod(Name as string, Parameters() as Variant) as Variant()

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: Called on the listener side when a method was called on the connection.
Notes: Return array of variant for the results.

25.3.16 shouldAcceptNewConnection(newConnection as NSXPCConnectionMBS) as boolean

Plugin Version: 14.2, Platform: macOS, Targets: .

Function: Accepts or rejects a new connection to the listener.
Notes: To accept the connection, first configure the connection if desired, then call resume on the new connection, then return true.
To reject the connect, return a value of false. This causes the connection object to be invalidated.
In this method, you can also set up properties on the connection object, such as its exported object and interfaces. Be sure to call resume when you are finished configuring the connection object and are ready for it to receive messages.

Chapter 26

QuickLook

26.1 control DesktopQLPreviewViewControlMBS

26.1.1 control DesktopQLPreviewViewControlMBS

Plugin Version: 21.5, Platform: macOS, Targets: Desktop only.

Function: The Xojo control for a QLPreviewViewMBS.
Blog Entries

- News from the MBS Xojo Plugins Version 23.3
- News from the MBS Xojo Plugins in version 21.5
- New desktop controls
- MBS Xojo / Real Studio Plugins, version 15.0pr8

26.1.2 Properties

26.1.3 View as QLPreviewViewMBS

Plugin Version: 21.5, Platform: macOS, Targets: Desktop only.

Function: The view this control shows.
Notes: (Read only property)

26.1.4 Events

26.1.5 BoundsChanged

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The event called when the bounds, but not the frame, changed.

26.1.6 didCloseContextualMenu(menu as NSMenuMBS, NSEvent as NSEventMBS)

Plugin Version: 24.1, Platform: macOS, Targets: .

Function: Did close contextual menu.
Notes: Allows you to restart any animation you may have stopped in the willShowContextualMenu event.

26.1.7 FocusLost

Plugin Version: 21.5, Platform: macOS, Targets: .

Function:

The control lost focus.
In older Xojo versions, this event is named LostFocus.
Notes:

This only fires if the control itself lost focus and not a sub control.

26.1.8 FocusReceived

Plugin Version: 21.5, Platform: macOS, Targets: .

Function:

The control itself got focus.
In older Xojo versions, this event is named GotFocus.
Notes:

This only fires if the control itself got focus and not a sub control.

26.1.9 FrameChanged

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The event called when the frame changed.
Notes: This event notifies you, that the control changed it's bounding frame, which is position and/or size.

26.1.10 MenuBarSelected

Plugin Version: 21.5, Platform: macOS, Targets: .

Function:

The event where you can enable menu items.
In older Xojo versions, this event is named EnableMenuItems.

26.1.11 MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The mouse button was pressed inside the control,Äôs region at the location passed in to x, y.
Notes: The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner or the Control.
Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

26.1.12 MouseDrag(x as Integer, y as Integer)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: This event fires continuously after the mouse button was pressed inside the Control.
Notes: Mouse location is local to the control passed in to x, y.
As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

26.1.13 MouseUp(x as Integer, y as Integer)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The mouse button was released.
Notes: Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

26.1.14 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: The backing store scale factor has changed.
Notes: Please invalidate any cached bitmaps or other relevant state.

26.1.15 willShowContextualMenu(menu as NSMenuMBS, NSEvent as NSEventMBS)

Plugin Version: 24.1, Platform: macOS, Targets: .

Function: Will show contextual menu.
Notes: Your chance to modify the menu before it is shown, e.g. to add menu entries.

26.2 class QLPreviewPanelMBS

26.2.1 class QLPreviewPanelMBS

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: The QLPreviewPanel class implements the Preview Panel - a user interface object that displays the preview of a list of items.
Notes: Every application only has on instance of QLPreviewPanel.

Use QLPreviewControllerMBS to do similar on iOS or WinPreviewControlMBS for previews on Windows.
Subclass of the NSPanelMBS class.
Blog Entries

- MBS Xojo Plugins, version 21.1pr1
- MBS Xojo Plugins, version 19.5pr7
- MBS Real Studio Plugins, version 11.2pr7
- MBS Plugins 10.3 Release Notes

26.2.2 Methods

26.2.3 Available as boolean

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: Whether this panel is available.
Notes: Returns true on Snow Leopard.

26.2.4 Constructor

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: The constructor for a new panel.

26.2.5 currentPreviewItem as folderitem

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: The currently previewed item in the preview panel or nil if there is none.

26.2.6 enterFullScreenMode(screen as NSScreenMBS)

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: Enters full screen mode.
Notes: If panel is not on-screen, the panel will go directly to full screen mode.

26.2.7 exitFullScreenMode

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: Exits full screen mode.

26.2.8 refreshCurrentPreviewItem

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: Asks the Preview Panel to recompute the preview of the currently previewed item.

26.2.9 reloadData

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: Asks the Preview Panel to reload its data from its data source.
Notes: This method does not refresh the visible item if it has not changed.

26.2.10 updateController

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: Asks the Preview Panel to update its current controller.
Notes: The Preview Panel automatically updates its controller (by searching the responder chain) whenever the main or key window changes. Invoke updateController if the responder chain changes without explicit notice.

26.2.11 Properties

26.2.12 currentPreviewItemIndex as Integer

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: The index of the currently previewed item in the preview panel or NSNotFound (-1) if there is none.
Notes: (Read and Write property)

26.2.13 inFullScreenMode as boolean

Plugin Version: 9.6, Platform: macOS, Targets: Desktop only.

Function: True if the panel is currently open and in full screen mode.
Notes: (Read only property)

26.2.14 PreviewView as QLPreviewViewMBS

Plugin Version: 14.2, Platform: macOS, Targets: Desktop only.

Function: Returns the preview view in the panel.
Notes: (Read only property)

26.2.15 Events

26.2.16 didLoadPreviewItem(file as folderitem)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: This event is called after an item has been loaded.

26.2.17 handleEvent(e as NSEventMBS) as boolean

Plugin Version: 9.6, Platform: macOS, Targets: .

Function: Invoked by the preview panel when it receives an event it doesn't handle.
Notes: Returns true if you did not handle this event.

26.2.18 numberOfPreviewItems as Integer

Plugin Version: 9.6, Platform: macOS, Targets: .

Function: The event called to ask you for the number of items that the preview panel should preview.

26.2.19 previewItemAtIndex(index as Integer) as folderitem

Plugin Version: 9.6, Platform: macOS, Targets: .

Function: The event is called to ask you for the item with the given index.

26.2.20 sourceFrameOnScreenForPreviewItem(file as folderitem) as NSRectMBS

Plugin Version: 9.6, Platform: macOS, Targets: .

Function: Invoked when the preview panel opens or closes to provide a zoom effect.
Notes: Return a zero rect if there is no origin point, this will produce a fade of the panel. The coordinates are screen based.

26.2.21 transitionImageForPreviewItem(file as folderitem, byref contentRect as NSRectMBS) as NSImageMBS

Plugin Version: 9.6, Platform: macOS, Targets: .

Function: Called to ask you for the transition image for a given preview item.
Notes: Invoked when the preview panel opens or closes to provide a smooth transition when zooming.

contentRect: The rect within the image that actually represents the content of the document. For example, for icons the actual rect is generally smaller than the icon itself.

Return an image the panel will crossfade with when opening or closing. You can specify the actual ”document” content rect in the image in contentRect.

26.2.22 willLoadPreviewItem(file as folderitem)

Plugin Version: 11.2, Platform: macOS, Targets: .

Function: This event is called before an item is loaded.

26.3 control QLPreviewViewControlMBS

26.3.1 control QLPreviewViewControlMBS

Plugin Version: 15.0, Platform: macOS, Targets: Desktop only.

Function: The Xojo control for a QuickLook preview view.
Notes: See QLPreviewViewMBS class.

See QLPreviewControllerMBS for iOS projects.
See WinPreviewControlMBS control for Windows targets.
Blog Entries

- News from the MBS Xojo Plugins Version 23.3
- News from the MBS Xojo Plugins in version 21.5
- New desktop controls
- MBS Xojo / Real Studio Plugins, version 15.0pr8

26.3.2 Properties

26.3.3 View as QLPreviewViewMBS

Plugin Version: 15.0, Platform: macOS, Targets: Desktop only.

Function: The view this control shows.
Notes: (Read only property)

26.3.4 Events

26.3.5 BoundsChanged

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The event called when the bounds, but not the frame, changed.

26.3.6 Close

Plugin Version: 15.0, Platform: macOS, Targets: .

Function:

The control is about to close.
In Xojo version 2021r3 and newer this event is named Closing.

26.3.7 ConstructContextualMenu(base as MenuItem, x as Integer, y as Integer) as Boolean

Plugin Version: 22.1, Platform: macOS, Targets: .

Function: This event is called when it is appropriate to display a contextual menu for the control.

26.3.8 ContextualMenuAction(hitItem as MenuItem) as Boolean

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: Called when a menuitem is choosen.
Notes: This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

26.3.9 didCloseContextualMenu(menu as NSMenuMBS, NSEvent as NSEventMBS)

Plugin Version: 24.1, Platform: macOS, Targets: .

Function: Did close contextual menu.
Notes: Allows you to restart any animation you may have stopped in the willShowContextualMenu event.

26.3.10 EnableMenuItems

Plugin Version: 17.1, Platform: macOS, Targets: .

Function:

The event where you can enable menu items.
In Xojo version 2021r3 and newer this event is named MenuBarSelected.

26.3.11 FrameChanged

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The event called when the frame changed.
Notes: This event notifies you, that the control changed it's bounding frame, which is position and/or size.

26.3.12 GotFocus

Plugin Version: 17.1, Platform: macOS, Targets: .

Function:

The control itself got focus.
In Xojo version 2021r3 and newer this event is named FocusReceived.
Notes:

This only fires if the control itself got focus and not a sub control.

26.3.13 LostFocus

Plugin Version: 17.1, Platform: macOS, Targets: .

Function:

The control lost focus.
In Xojo version 2021r3 and newer this event is named FocusLost.
Notes:

This only fires if the control itself lost focus and not a sub control.

26.3.14 MouseDown(x as Integer, y as Integer, Modifiers as Integer) As Boolean

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The mouse button was pressed inside the control,Äôs region at the location passed in to x, y.
Notes: The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner or the Control.
Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.
- You will receive the MouseDrag and MouseUp events.

If you return False, the system handles the MouseDown so the above event handlers do not get called.

26.3.15 MouseDrag(x as Integer, y as Integer)

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: This event fires continuously after the mouse button was pressed inside the Control.
Notes: Mouse location is local to the control passed in to x, y.
As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

26.3.16 MouseUp(x as Integer, y as Integer)

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The mouse button was released.
Notes: Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

26.3.17 Open

Plugin Version: 15.0, Platform: macOS, Targets: .

Function:

The control is about to was created and you can initialize it.
In Xojo version 2021r3 and newer this event is named Opening.

26.3.18 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 17.1, Platform: macOS, Targets: .

Function: The backing store scale factor has changed.
Notes: Please invalidate any cached bitmaps or other relevant state.

26.3.19 willShowContextualMenu(menu as NSMenuMBS, NSEvent as NSEventMBS)

Plugin Version: 24.1, Platform: macOS, Targets: .

Function: Will show contextual menu.
Notes: Your chance to modify the menu before it is shown, e.g. to add menu entries.

26.4 class QLPreviewViewMBS

26.4.1 class QLPreviewViewMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: The class for using a preview view from QuickLook in Xojo.
Notes: If you want to show previews of files in your application, use this view. For example if you not just want to show previews of pictures, but also from Movies, PDF, Office and iWork files.
Requires Mac OS X 10.6 or newer.

You can embed this view in a CustomNSViewMBS to get more events for mouse and keyboard.

Use QLPreviewViewControlMBS to have this view as a control.
See WinPreviewControlMBS for something similar on Windows.
Subclass of the NSViewMBS class.
Blog Entries

- MBS Real Studio Plugins, version 11.2pr8

26.4.2 Methods

26.4.3 Available as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Whether this class is available.
Notes: Returns true on Mac OS X 10.6 or newer.

26.4.4 close

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Closes the receiver, releasing the current preview item.
Notes: Once the receiver has closed, it will no longer accept preview items.

The application is required to call close when the receiver is no longer needed if shouldCloseWithWindow is false.
The close method will be called automatically when the window closes if shouldCloseWithWindow is true.

26.4.5 Constructor

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Creates a new quicklook preview view with size 100/100 and position 0/0
Example:

```
dim t as new QLPreviewViewMBS
```

Notes: On success the handle property is not zero.
See also:

- 26.4.6 Constructor(Handle as Integer) 1154
- 26.4.7 Constructor(left as Double, top as Double, width as Double, height as Double) 1154
- 26.4.8 Constructor(left as Double, top as Double, width as Double, height as Double, style as Integer) 1155

26.4.6 Constructor(Handle as Integer)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Creates an object based on the given QLPreviewView handle.
Example:

```
dim t as new QLPreviewViewMBS(0, 0, 100, 100)
dim v as new QLPreviewViewMBS(t.handle)

MsgBox str(v.Bounds.Width)+" x "+str(v.Bounds.Height)
```

Notes: The handle is casted to a QLPreviewView and the plugin retains this handle.
See also:

- 26.4.5 Constructor 1154
- 26.4.7 Constructor(left as Double, top as Double, width as Double, height as Double) 1154
- 26.4.8 Constructor(left as Double, top as Double, width as Double, height as Double, style as Integer) 1155

26.4.7 Constructor(left as Double, top as Double, width as Double, height as Double)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Creates a new QuickLook preview view with the given size and position.
Example:

```
dim x as new QLPreviewViewMBS(0, 0, 100, 100)
```

Notes: On success the handle property is not zero.
See also:

- 26.4.5 Constructor 1154
- 26.4.6 Constructor(Handle as Integer) 1154
- 26.4.8 Constructor(left as Double, top as Double, width as Double, height as Double, style as Integer) 1155

26.4.8 Constructor(left as Double, top as Double, width as Double, height as Double, style as Integer)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Creates a new QuickLook preview view with the given size and position.
Example:

```
dim view as new QLPreviewViewMBS(0, 0, 200, 200, QLPreviewViewMBS.StyleCompact)
```

Notes: On success the handle property is not zero.

On Mac OS X 10.7 or later we use the new style parameter to create a Preview view with the given style.
See also:

- 26.4.5 Constructor 1154
- 26.4.6 Constructor(Handle as Integer) 1154
- 26.4.7 Constructor(left as Double, top as Double, width as Double, height as Double) 1154

26.4.9 refreshPreviewItem

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Asks the Preview view to recompute the preview of the currently previewed item.

26.4.10 Properties

26.4.11 autostarts as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Whether playback of audio/video files automatically starts.
Notes: (Read and Write computed property)

26.4.12 previewItem as folderitem

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: The current visible item in the view.
Notes: (Read and Write computed property)

26.4.13 shouldCloseWithWindow as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop only.

Function: Set whether the receiver closes when its window closes.
Notes: See close method.
(Read and Write computed property)

26.4.14 Constants

Preview View Styles

Constant	Value	Description
StyleCompact	1	Use in inspectors.
StyleNormal	0	Use in full previews.

Chapter 27

Sharing Panel

27.1 class SharingPanelMBS

27.1.1 class SharingPanelMBS

Plugin Version: 21.4, Platform: iOS, Targets: Desktop & iOS.

Function: A view controller that you use to offer standard services from your app.
Notes: The system provides several standard services, such as copying items to the pasteboard, posting content to social media sites, sending items via email or SMS, and more. Apps can also define custom services.
Your app is responsible for configuring, presenting, and dismissing this view controller. Configuration for the view controller involves specifying the data objects on which the view controller should act. (You can also specify the list of custom services your app supports.)
Blog Entries

- News from the MBS Xojo Plugins Version 21.4
- MonkeyBread Software Releases the MBS Xojo Plugins in version 21.4
- MBS Xojo Plugins, version 21.4pr4

Xojo Developer Magazine

- 19.6, page 10: News

27.1.2 Methods

27.1.3 AddData(Data as MemoryBlock, subject as string = "")

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Add data to the list of items to share.

27.1.4 AddFile(File as FolderItem, subject as string = "")

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Add a file as URL to the list of items to share.

27.1.5 AddImage(image as NSImageMBS, subject as string = "")

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Add an image to the list of items to share.

27.1.6 AddPicture(pic as Picture, subject as string = "")

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Add an image to the list of items to share.

27.1.7 AddStyledText(text as NSAttributedStringMBS, subject as string = "")

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Add styled text to the list of items to share.
Notes: Subject is optional subject passed to email app.

27.1.8 AddText(text as string, subject as string = "")

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Add text to the list of items to share.
Notes: Subject is optional subject passed to email app.

27.1.9 AddURL(URL as string, subject as string = "")

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Add an URL to the list of items to share.

27.1.10 Constructor

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: The constructor.

27.1.11 Destructor

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: The destructor.

27.1.12 Dismiss

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Dismisses the controller.

27.1.13 ExcludedActivityTypes as String()

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Queries the list of excluded activity types.

27.1.14 Items as Variant()

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Copies the items to share.

27.1.15 Present

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Presents the controller.

27.1.16 SetExcludedActivityTypes(ActivityTypess() as String)

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Sets the list of excluded activity types.

27.1.17 SetItems(items() as Variant)

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: Sets the items to share with an variant array.

27.1.18 UIActivityTypeAddToReadingList as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that adds the URL to Safari,Äôs reading list.
When using this service, you can provide an URL whose contents uses the http or https scheme that points to the page to add.

27.1.19 UIActivityTypeAirDrop as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that makes the provided content available through AirDrop.
When using this service, you can provide String, NSAttributedStringMBS, picture, and URLs as data for the activity items. You may also provide Array or Dictionary objects that contain the listed data types.

27.1.20 UIActivityTypeAssignToContact as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that assigns the image to a contact.
When using this service, you can provide a picture object as data for the activity items.

27.1.21 UIActivityTypeCopyToPasteboard as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that posts the provided content to the pasteboard.

When using this service, you can provide string, picture, URL, color, and Dictionary objects as data for the activity items.

27.1.22 UIActivityTypeMail as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that posts the provided content to a new email message.

When using this service, you can provide string and picture objects and URLs pointing to local files as data for the activity items.
Optional subject for items are passed for email subject.

27.1.23 UIActivityTypeMarkupAsPDF as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that marks up the provided content as a PDF file.

27.1.24 UIActivityTypeMessage as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that posts the provided content to the Messages app.
When using this service, you can provide string and NSAttributedStringMBS objects as data for the activity items. You may also specify URLs whose contents use the sms scheme.
If the device has MMS or FaceTime enabled, you can provide picture, and URLs as data for the activity items.

27.1.25 UIActivityTypeOpenInIBooks as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that opens the content in iBooks.

27.1.26 UIActivityTypePostToFacebook as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that posts the provided content to the user,Äôs wall on Facebook.
When using this service, you can provide String, NSAttributedStringMBS, picture, and URLs as data for the activity items.

27.1.27 UIActivityTypePostToFlickr as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that posts the provided image to the user,Äôs Flickr account.
When using this service, you can provide picture and URLs whose contents use the file scheme and point to an image. You can also use MemoryBlock whose contents are image data as data for the activity items.

27.1.28 UIActivityTypePostToTencentWeibo as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that posts the provided content to the user,Äôs Tencent Weibo feed.
When using this service, you can provide String, NSAttributedStringMBS, picture, and URL as data for the activity items.

27.1.29 UIActivityTypePostToTwitter as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that posts the provided content to the user,Äôs Twitter feed.
When using this service, you can provide String, NSAttributedStringMBS, picture, and URL as data for the

activity items.

27.1.30 UIActivityTypePostToVimeo as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that posts the provided video to the user,Äôs Vimeo account.
When using this service, you can provide data from URL/folderItem whose contents use the file scheme and point to a video. You can use MemoryBlock objects whose contents are video data as data for the activty items.

27.1.31 UIActivityTypePostToWeibo as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that posts the provided content to the user,Äôs Weibo feed.
When using this service, you can provide picture and URLs whose contents use the file scheme and point to an image. You can also use MemoryBlock whose contents are image data as data for the activity items.

27.1.32 UIActivityTypePrint as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that prints the provided content.

When using this service, you can provide picture and MemoryBlock objects and URL/folderitem pointing to local files as data for the activity items.

27.1.33 UIActivityTypeSaveToCameraRoll as String

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: One of the activity types.
Notes: A type of activity that assigns the image or video to the user,Äôs camera roll.

When using this service, you can provide a picture as data for image-based activity items. For image and video items, you can provide an URL/file with a path to the video.

27.1.34 Properties

27.1.35 Handle as Integer

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: The internal object reference.
Notes: (Read and Write property)

27.1.36 isBeingPresented as Boolean

Plugin Version: 21.4, Platform: iOS, Targets: iOS only.

Function: A Boolean value indicating whether the view controller is being presented.
Notes: (Read only property)

27.1.37 Events

27.1.38 Completed(activityType as String, completed as Boolean, activityError as NSErrorMBS)

Plugin Version: 21.4, Platform: iOS, Targets: .

Function: The event called after the activity view controller is dismissed.
Notes: Upon the completion of an activity, or the dismissal of the activity view controller, the view controller,Äôs completion block is executed. You can use this block to execute any final code related to the service. The parameters of this block are as follows:

activityType: The type of the service that was selected by the user. For custom services, this is the value returned by the activityType method of a UIActivity object. For system-defined activities, it is one of the strings listed in "Built-in Activity Types,Äù in UIActivity.
completed: True if the service was performed or false if it was not. This parameter is also set to false when the user dismisses the view controller without selecting a service.
activityError: An error object if the activity failed to complete, or nil if the the activity completed normally.

Chapter 28

Social

28.1 class CustomNSSharingServiceMBS

28.1.1 class CustomNSSharingServiceMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The class for a custom sharing service.
Notes: You only use it to get your own service inside your app into sharing picker.

Please call Close method when you want to stop the service.
Subclass of the NSSharingServiceMBS class.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.2pr9
- MBS Real Studio Plugins, version 13.1pr1
- MBS Real Studio Plugins, version 12.3pr15

28.1.2 Methods

28.1.3 Constructor(title as string, image as NSImageMBS, alternateImage as NSImageMBS = nil, DelegateHandler as NSSharingServiceDelegateMBS = nil, tag as Variant = nil)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Creates a custom sharing service object.
Notes: title: The custom sharing service name.

image: The image that represents the sharing service
alternateImage: The alternate image that represents the sharing service
Delegate: The delegate where events are called for this service.

Custom sharing services can be added to the NSSharingServicePicker with the sharingServicesForItems event. Available in OS X v10.8 and later.

Please call Close method when you want to stop the service.

28.1.4 Events

28.1.5 performCustomService(tag as Variant)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Called when user selected this service and you need to perform your work.

28.2 class NSSharingServiceDelegateMBS

28.2.1 class NSSharingServiceDelegateMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The NSSharingServiceDelegate protocol allows customization of the position and animation of the share sheet as well as be notified of the success or failure of the item being shared.
Notes: Available in OS X v10.8 and later.
Blog Entries

- News from the MBS Xojo Plugins in version 21.5
- MBS Xojo Plugins, version 21.5pr3
- MBS Xojo Plugins, version 21.5pr2
- MBS Real Studio Plugins, version 12.4pr1

28.2.2 Methods

28.2.3 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

28.2.4 Destructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The destructor.

28.2.5 Properties

28.2.6 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

28.2.7 Events

28.2.8 didCompleteForItems(service as NSSharingServiceMBS, items as NSSharingServiceItemsMBS, error as NSErrorMBS)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Sharing did complete.
Notes: When an NSSharingServiceNameCloudSharing sharing service is dismissed it will invoke this method on the delegate, with an error if there was any. If the delegate implements this method, NSSharingServiceNameCloudSharing will not send didFailToShareItems or didShareItems events.

28.2.9 didFailToShareItems(service as NSSharingServiceMBS, items as NSSharingServiceItemsMBS, error as NSErrorMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Invoked when the sharing service encountered an error when sharing items.
Notes: sharingService: The sharing service.
items: The items being shared.
error: The error that was encountered when trying to share the item. If the error is NSUserCancelledError, the user simply cancelled the error.

Available in OS X v10.8 and later.

28.2.10 didSaveShare(service as NSSharingServiceMBS, share as Variant)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Cloud sharing did save.
Notes: When an NSSharingServiceNameCloudSharing sharing service successfully saves modifications to the CKShare, it will invoke this method on the delegate with the last-known state of the CKShareMBS on the server.

28.2.11 didShareItems(service as NSSharingServiceMBS, items as NSSharingServiceItemsMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Invoked when the sharing service has finished sharing the items.
Notes: sharingService: The sharing service.

items: The items being shared.

Available in OS X v10.8 and later.

28.2.12 didStopSharing(service as NSSharingServiceMBS, share as Variant)

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Cloud sharing did stop.
Notes: When an NSSharingServiceNameCloudSharing sharing service stops sharing it will delete the CKShare from the server, then invoke this method on the delegate with the last-known state of the CKShareMBS.

28.2.13 optionsForSharingService(service as NSSharingServiceMBS, provider as Variant) as Integer

Plugin Version: 21.5, Platform: macOS, Targets: .

Function: Queries what options are allowed for the share.
Notes: The options returned by this method describe how the user is allowed to configure the share: whether the share is public or private, and whether participants have read-only or read/write permissions. If this method is not implemented, NSCloudKitSharingServiceStandard is assumed.

28.2.14 sourceFrameOnScreenForShareItem(service as NSSharingServiceMBS, item as Variant) as NSRectMBS

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Invoked when the sharing service is performed and the sharing window is displayed, to present a transition between the original items and the sharing window.
Notes: sharingService: The sharing service.
item: The item being shared.

Return the rectangle, in screen coordinates, to display the transition.

28.2.15 sourceWindowForShareItems(service as NSSharingServiceMBS, items as NSSharingServiceItemsMBS, scope as Integer) as NSWindowMBS

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Returns the window that contained the share items.
Notes: sharingService: The sharing service.
items: The items being shared.
sharingContentScope: The sharing content scope. The sharing scope can be modified from the default value of NSSharingContentScopeItem by setting a different value in the out parameter sharingContentScope.

Return the window of the shared items.

28.2.16 transitionImageForShareItem(service as NSSharingServiceMBS, item as Variant, contentRect as NSRectMBS) as NSImageMBS

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Invoked to allow returning a custom transition image when sharing an item.
Notes: sharingService: The sharing service.
item: The shared item.
contentRect: The content rectangle is the frame of the actual content inside the transition image, excluding all decorations. For example, if the transition image is a QuickLook thumbnail, the value would be QLThumbnailGetContentRect.

Return the image to display for the sharing transition. Its size should exactly match that of the original image.

28.2.17 willShareItems(service as NSSharingServiceMBS, items as NSSharingServiceItemsMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Invoked when the sharing service will share the specified items.
Notes: sharingService: The sharing service.
items: The items being shared.
Available in OS X v10.8 and later.

28.2.18 Constants

Cloud Sharing Service Options

Constant	Value	Description
NSCloudKitSharingServiceAllowPrivate	2	The user is allowed to share privately.
NSCloudKitSharingServiceAllowPublic	1	The user is allowed to share publicly.
NSCloudKitSharingServiceAllowReadOnly	16	The user is allowed to grant participants read-only permissions.
NSCloudKitSharingServiceAllowReadWrite	32	The user is allowed to grant participants read/write permissions.
NSCloudKitSharingServiceStandard	0	Allow the user to configure the share with the standard set of optic

Sharing Scope Constants

Constant	Value	Description
NSSharingContentScopeFull	2	Used when sharing the whole content of the current document, for example, the URL of the webpage. Available in OS X v10.8 and later.
NSSharingContentScopeItem	0	Used when sharing a clearly identified item, for example, a file represented by its icon. Available in OS X v10.8 and later.
NSSharingContentScopePartial	1	Used when sharing a portion of a more global content, for example, part of a webpage. Available in OS X v10.8 and later.

28.3 class NSSharingServiceItemsMBS

28.3.1 class NSSharingServiceItemsMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: A collection class for files, images, texts and URLs.
Example:

```
dim p as Picture = LogoMBS(500)
dim t as new NSSharingServiceItemsMBS
dim image as new NSImageMBS(p)
t.AddImage image
t.AddText "Hello World. This is a great app!"
```

Notes: Create an object from this class, add some items and pass to the share methods.

28.3.2 Methods

28.3.3 AddAttributedString(AttributedString as NSAttributedStringMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds one attributed string to the collection.
See also:

- 28.3.4 AddAttributedString(AttributedStrings() as NSAttributedStringMBS) 1172

28.3.4 AddAttributedString(AttributedStrings() as NSAttributedStringMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds attributed strings to the collection.
See also:

- 28.3.3 AddAttributedString(AttributedString as NSAttributedStringMBS) 1172

28.3.5 AddFile(file as folderitem)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds one file to the collection.

28.3.6 AddFiles(files() as folderitem)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds an array of files to the collection.

28.3.7 AddImage(image as NSImageMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds one image to the collection.

28.3.8 AddImages(images() as NSImageMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds an array of images to the collection.

28.3.9 AddText(text as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds one text to the collection.
See also:

- 28.3.10 AddText(texts() as string) 1173

28.3.10 AddText(texts() as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds an array of texts to the collection.
See also:

- 28.3.9 AddText(text as string) 1173

28.3.11 AddURL(URL as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Add one URL to the collection.
See also:

28.3.12 AddURL(URLs() as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Adds an array of URLs to the collection.
See also:

- 28.3.11 AddURL(URL as string) 1173

28.3.13 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

28.3.14 count as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns the number of items in this collection.

28.3.15 Images as NSImageMBS()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns all images in the collection.

28.3.16 objectAtIndex(index as Integer) as Variant

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns object at the given index.
Notes: Index is from 0 to count-1.
Returns URLs and files as string with URL.

28.3.17 Texts as string()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns array with all texts in this collection.

28.3.18 URLs as string()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns array with all URLs.
Notes: As files are also handled as URLs, the array contains also files in the collections as URLs.

28.3.19 Properties

28.3.20 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

28.4 class NSSharingServiceMBS

28.4.1 class NSSharingServiceMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The NSSharingService class is used to provide a consistent user experience when sharing items on OS X.
Notes: For example, items can be: NSURL objects, NSString objects, NSImage objects, video (through file URLs), or any object which implements the NSPasteboardWriting protocol.

For any item or group of items, the NSSharingServiceMBS will display a sharing sheet to allow the user to pre-visualize what will be shared to the service. A sharing service can: create a post on a social network like Twitter or Facebook, send a message by email or iMessage, upload videos to viewing services, or send a file by AirDrop.
Blog Entries

- News from the MBS Xojo Plugins Version 21.3
- News from the MBS Xojo Plugins Version 21.2
- MonkeyBread Software Releases the MBS Xojo Plugins in version 21.2
- MBS Xojo Plugins, version 21.2pr1

28.4.2 Methods

28.4.3 attachmentFileURLs as String()

Plugin Version: 21.2, Platform: macOS, Targets: Desktop only.

Function: Array of file URLs representing the files that were shared.

28.4.4 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Whether sharing services are available.
Notes: Returns true on Mac OS X 10.8.

28.4.5 canPerformWithItems(items as NSSharingServiceItemsMBS) as Boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns whether the service can share all the specified items.
Notes: items: The items to share.

Return true if the service can share all the items; false otherwise. If items is nil, the method will return true when the service is configured.

This method can be used to validate a custom user interface such as a dedicated Twitter button. Therefore you could call it once at launch time with nil items to check whether to display the button or not, and then with real items to enable and disable the button depending on the context or selection.

Available in OS X v10.8 and later.

28.4.6 Close

Plugin Version: 14.2, Platform: macOS, Targets: Desktop only.

Function: Closes the sharing services.
Notes: Same as destructor, but closes now, not later.

28.4.7 Constructor(name as string)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Create a sharing service instance representing the specified service name.
Notes: name: The service name. See NSSharingServiceName* methods.

28.4.8 Destructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The destructor.

28.4.9 NSSharingServiceNameAddToAperture as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Adds the content to Aperture.
Available in OS X v10.8 and later.

28.4.10 NSSharingServiceNameAddToIPhoto as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Adds the content to iPhoto.
Available in OS X v10.8 and later.

28.4.11 NSSharingServiceNameAddToSafariReadingList as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Add the content to the Safari Reading List.
Available in OS X v10.8 and later.

28.4.12 NSSharingServiceNameCloudSharing as string

Plugin Version: 21.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Share via iCloud.
Available in macOS 10.12 and later.

28.4.13 NSSharingServiceNameComposeEmail as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Creates an email messages with the content.
Available in OS X v10.8 and later.

28.4.14 NSSharingServiceNameComposeMessage as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Creates a Messages methods with the content.
Available in OS X v10.8 and later.

28.4.15 NSSharingServiceNamePostImageOnFlickr as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Posts the image on Flickr.
Available in OS X v10.8 and later.

28.4.16 NSSharingServiceNamePostOnFacebook as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Post the content to Facebook.
Available in OS X v10.8 and later.

28.4.17 NSSharingServiceNamePostOnSinaWeibo as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Posts the content on a Sina Weibo, Chinese microblogging (weibo) website. Akin to a hybrid of Twitter and Facebook.
Available in OS X v10.8 and later.

28.4.18 NSSharingServiceNamePostOnTwitter as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Posts the content on Twitter.
Available in OS X v10.8 and later.

28.4.19 NSSharingServiceNamePostVideoOnTudou as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Posts the video on the video sharing service Tudou, based in the People's Republic of China.
Available in OS X v10.8 and later.

28.4.20 NSSharingServiceNamePostVideoOnVimeo as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Posts the video on the video sharing service Vimeo.
Available in OS X v10.8 and later.

28.4.21 NSSharingServiceNamePostVideoOnYouku as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Posts the video on the video sharing service Youku, based in the People's Republic of China.
Available in OS X v10.8 and later.

28.4.22 NSSharingServiceNameSendViaAirDrop as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Sends the file via Air Drop.
Available in OS X v10.8 and later.

28.4.23 NSSharingServiceNameUseAsDesktopPicture as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Replaces the user's desktop image with the content.
Available in OS X v10.8 and later.

28.4.24 NSSharingServiceNameUseAsTwitterProfileImage as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: One of the sharing service names.
Notes: Replaces the Twitter profile image with the content.
Available in OS X v10.8 and later.

28.4.25 performWithItems(items as NSSharingServiceItemsMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Manually performs the service on the provided items.
Notes: items: The items to share.

In most cases this will display a sharing window.
Available in OS X v10.8 and later.

28.4.26 recipients as String()

Plugin Version: 21.2, Platform: macOS, Targets: Desktop only.

Function: The list of recipients.

28.4.27 SetDelegate(DelegateHandler as NSSharingServiceDelegateMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies the delegate of the sharing service.

28.4.28 setRecipients(recipients() as String)

Plugin Version: 21.2, Platform: macOS, Targets: Desktop only.

Function: Sets the list of recipients.
Example:

```
// compose email
Dim items As New NSSharingServiceItemsMBS

// styled text from text area control
Dim tv As NSTextViewMBS = TextArea1.NSTextViewMBS
items.AddAttributedString tv.textStorage

// find service
Dim service As New NSSharingServiceMBS("com.apple.share.Mail.compose")

service.subject = "Test Email"
service.setRecipients Array("test@test.test")

service.performWithItems items
```

Notes: List of emails for sending an email message.

28.4.29 sharingServiceNamed(name as string) as NSSharingServiceMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns a sharing service instance representing the specified service name.
Notes: serviceName: The service name. See NSSharingServiceName* methods.

Returns an instance of NSSharingService for the specified service name.
Available in OS X v10.8 and later.

28.4.30 sharingServicesForItems(items as NSSharingServiceItemsMBS) as NSSharingServiceMBS()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns a list of sharing services which could share all the provided items together.
Example:

```
// get an image
dim logo as Picture = LogoMBS(500)
Dim nsi as new NSImageMBS( logo )

// make items object
Dim nshi as new NSSharingServiceItemsMBS
nshi.AddImage nsi

// query services which are supported
Dim ssl(-1) as NSSharingServiceMBS = NSSharingServiceMBS.sharingServicesForItems( nshi )

// show services
for each s as NSSharingServiceMBS in ssl
msgBox s.title
next
```

Notes: items: The items to share.

Returns an array of sharing services to allow for items.

This method can be used to build a custom user interface or to populate a contextual menu.
Available in OS X v10.8 and later.

28.4.31 Properties

28.4.32 accountName as String

Plugin Version: 21.2, Platform: macOS, Targets: Desktop only.

Function: Account name used for sending on Twitter or Sina Weibo
Notes: (Read only property)

28.4.33 alternateImage as NSImageMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The alternate image representing the sharing service. (read-only)
Notes: Available in OS X v10.8 and later.
(Read only property)

28.4.34 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

28.4.35 image as NSImageMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The primary image representing the sharing service. (read-only)
Notes: (Read only property)

28.4.36 menuItemTitle as String

Plugin Version: 21.2, Platform: macOS, Targets: Desktop only.

Function: Title of the service in the Share menu.
Notes: Can be modified.

(Read and Write property)

28.4.37 messageBody as String

Plugin Version: 21.2, Platform: macOS, Targets: Desktop only.

Function: Message body as string.
Notes: (Read only property)

28.4.38 permanentLink as String

Plugin Version: 21.2, Platform: macOS, Targets: Desktop only.

Function: URL to access the post on Facebook, Twitter, Sina Weibo, etc. (also known as permalink)
Notes: (Read only property)

28.4.39 subject as String

Plugin Version: 21.2, Platform: macOS, Targets: Desktop only.

Function: Subject for email or text message.
Example:

```
// compose email
Dim items As New NSSharingServiceItemsMBS

// styled text from text area control
Dim tv As NSTextViewMBS = TextArea1.NSTextViewMBS
items.AddAttributedString tv.textStorage

// find service
Dim service As New NSSharingServiceMBS("com.apple.share.Mail.compose")

service.subject = "Test Email"
service.setRecipients Array("test@test.test")

service.performWithItems items
```

Notes: (Read and Write property)

28.4.40 title as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The title of the sharing service. (read-only)
Example:

```
// get an image
dim logo as Picture = LogoMBS(500)
Dim nsi as new NSImageMBS( logo )

// make items object
Dim nshi as new NSSharingServiceItemsMBS
nshi.AddImage nsi

// query services which are supported
Dim ssl(-1) as NSSharingServiceMBS = NSSharingServiceMBS.sharingServicesForItems( nshi )

// show services
for each s as NSSharingServiceMBS in ssl
msgBox s.title
next
```

Notes: (Read only property)

28.5 class NSSharingServicePickerMBS

28.5.1 class NSSharingServicePickerMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The NSSharingServicePicker class presents a list of sharing services, so that the user can choose a service to share an item.
Notes: When a service is chosen, the picker automatically executes it, which presents the sharing window.

The events in this class allows customizing the picker's available services, where it appears, and allows assigning the delegate object for the NSSharingService delegate.

Available in OS X v10.8 and later.

28.5.2 Methods

28.5.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Whether sharing services are available.
Notes: Returns true on Mac OS X 10.8.

28.5.4 Constructor(items as NSSharingServiceItemsMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Initializes a new sharing service picker for the selected items.
Notes: Available in OS X v10.8 and later.

28.5.5 Destructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The destructor.

28.5.6 showRelativeToRect(r as NSRectMBS, view as NSViewMBS, preferredEdge as Integer)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Shows the picker, populated with sharing services related to the instance items.
Notes: rect: The rectangle the picker should be shown relative to. The coordinates are in the view coordinate system. Passing NSRectMBS.Zero causes the view bounds to be used.
view: The view.
preferredEdge: The preferred edge of the view to display the picker. See edge constants for the possible values.

When the user selects one of the sharing services, the sharing service will be performed. This method must be called on mouseDown.

Available in OS X v10.8 and later.

28.5.7 Properties

28.5.8 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

28.5.9 Events

28.5.10 delegateForSharingService(service as NSSharingServiceMBS) as NSSharingServiceDelegateMBS

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Invoked to provide the delegate to the sharing service when the user has selected a service.
Notes: sharingServicePicker: The sharing service picker.
sharingService: The selected sharing service.

Return a NSSharingServiceDelegateMBS object the sharing service should use for this item's transfer.
Available in OS X v10.8 and later.

28.5.11 didChooseSharingService(service as NSSharingServiceMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Invoked when the user has selected a service and before it is executed.
Notes: sharingServicePicker: The sharing service picker.
service: The sharing service the user selected. Invoked to give the delegate to the sharing service that is about to be executed.

Available in OS X v10.8 and later.

28.5.12 sharingServicesForItems(items as NSSharingServiceItemsMBS, proposedServices() as NSSharingServiceMBS) as NSSharingServiceMBS()

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Invoked to allow the delegate to customize exactly what appears in the sharing service picker before it is presented.
Notes: sharingServicePicker: The sharing service picker.
items: The items to share.
proposedServices: The proposed services to share the content.

Return the sharing services to use.
If you have no code in the event, the proposedServices are returned automatically.

The delegate can reorder, remove default services or add custom services before the picker is presented. It's possible to add custom services by mutating the proposedSharingServices array and adding new NSSharingService instances.

Available in OS X v10.8 and later.

28.5.13 Constants

Edge Constants

Constant	Value	Description
NSMaxXEdge	2	the maximum X edge. Typically right side.
NSMaxYEdge	3	The maximum Y edge. Topically the top edge of a window.
NSMinXEdge	0	the minimum X edge. Typically left side.
NSMinYEdge	1	Minimum Y. As coordinates are upside down in the Cocoa world, this is the bottom edge of a window.

Chapter 29

SpeechRecognition

29.1 class SFAcousticFeatureMBS

29.1.1 class SFAcousticFeatureMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The value of a voice analysis metric.
Notes: Requires MacOS 10.15 or later.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Playing with SpeechRecognition

29.1.2 Methods

29.1.3 acousticFeatureValuePerFrame as Double()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of feature values, one value per audio frame, corresponding to a transcript segment of recorded audio.

29.1.4 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

29.1.5 copy as SFAcousticFeatureMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

29.1.6 Properties

29.1.7 frameDuration as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The duration of the audio frame.
Notes: In seconds.
(Read only property)

29.1.8 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Internal object reference.
Notes: (Read and Write property)

29.2 class SFSpeechAudioBufferRecognitionRequestMBS

29.2.1 class SFSpeechAudioBufferRecognitionRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A request to recognize speech from captured audio content, such as audio from the device's microphone.
Notes: Use an SFSpeechAudioBufferRecognitionRequestMBS object to perform speech recognition on live audio, or on a set of existing audio buffers. For example, use this request object to route audio from a device's microphone to the speech recognizer.

The request object contains no audio initially. As you capture audio, call appendAudioPCMBuffer or appendAudioSampleBuffer to add audio samples to the request object. The speech recognizer continuously analyzes the audio you appended, stopping only when you call the endAudio method. (You must call endAudio explicitly to stop the speech recognition process.)

Requires MacOS 10.15 or later.
Subclass of the SFSpeechRecognitionRequestMBS class.
Blog Entries

- Playing with SpeechRecognition

29.2.2 Methods

29.2.3 appendAudioPCMBuffer(audioPCMBuffer as Variant)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Appends audio in the PCM format to the end of the recognition request.
Notes: audioPCMBuffer: An audio buffer (AVAudioPCMBufferMBS class) that contains audio in the PCM format.

The audio must be in a native format and uncompressed.

29.2.4 appendAudioSampleBuffer(sampleBuffer as Variant)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Appends audio to the end of the recognition request.
Notes: sampleBuffer: A buffer of audio. Must be CMSampleBufferMBS class.

The audio must be in a native format.

29.2.5 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

29.2.6 endAudio

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Marks the end of audio input for the recognition request.
Notes: Call this method explicitly to let the speech recognizer know that no more audio input is coming.

29.2.7 Properties

29.2.8 nativeAudioFormat as Variant

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The preferred audio format for optimal speech recognition.
Notes: Use the audio format in this property as a hint for optimal recording, but don't depend on the value remaining unchanged.
Value is an AVAudioFormatMBS object.
(Read only property)

29.3 class SFSpeechRecognitionRequestMBS

29.3.1 class SFSpeechRecognitionRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An abstract class representing a request to recognize speech from an audio source.
Notes: Do not create SFSpeechRecognitionRequestMBS objects directly. Create an SFSpeechURLRecognitionRequestMBS or SFSpeechAudioBufferRecognitionRequestMBS object instead. Use the properties of this class to configure various aspects of your request object before you start the speech recognition process. For example, use the shouldReportPartialResults property to specify whether you want partial results or only the final result of speech recognition.

Requires MacOS 10.15 or later.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
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29.3.2 Methods

29.3.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

29.3.4 contextualStrings as String()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of phrases that should be recognized, even if they are not in the system vocabulary.
Notes: Use this property to specify short custom phrases that are unique to your app. You might include phrases with the names of characters, products, or places that are specific to your app. You might also include domain-specific terminology or unusual or made-up words. Assigning custom phrases to this property improves the likelihood of those phrases being recognized.
Keep phrases relatively brief, limiting them to one or two words whenever possible. Lengthy phrases are less likely to be recognized. In addition, try to limit each phrase to something the user can say without pausing. Limit the total number of phrases to no more than 100.

29.3.5 setContextualStrings(contextualStrings() as String)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Sets array of phrases that should be recognized, even if they are not in the system vocabulary.
Notes: Use this property to specify short custom phrases that are unique to your app. You might include phrases with the names of characters, products, or places that are specific to your app. You might also include domain-specific terminology or unusual or made-up words. Assigning custom phrases to this property improves the likelihood of those phrases being recognized.
Keep phrases relatively brief, limiting them to one or two words whenever possible. Lengthy phrases are less likely to be recognized. In addition, try to limit each phrase to something the user can say without pausing. Limit the total number of phrases to no more than 100.

29.3.6 Properties

29.3.7 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Internal object reference.
Notes: (Read and Write property)

29.3.8 interactionIdentifier as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An identifier string that you use to describe the type of interaction associated with the speech recognition request.
Notes: If different parts of your app have different speech recognition needs, you can use this property to identify the part of your app that is making each request. For example, if one part of your app lets users speak phone numbers and another part lets users speak street addresses, consistently identifying the part of the app that makes a recognition request may help improve the accuracy of the results.
(Read and Write property)

29.3.9 requiresOnDeviceRecognition as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean value that determines whether a request must keep its audio data on the device.
Notes: Set this property to true to prevent an SFSpeechRecognitionRequestMBS from sending audio over the network. However, on-device requests won,Äôt be as accurate.

The request only honors this setting if the supportsOnDeviceRecognition (SFSpeechRecognizerMBS) property is also YES.
(Read and Write property)

29.3.10 shouldReportPartialResults as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether you want intermediate results returned for each utterance.
Notes: The default value of this property is true. If you want only final results (and you don't care about intermediate results), set this property to false to prevent the system from doing extra work.
(Read and Write property)

29.3.11 taskHint as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A value that indicates the type of speech recognition being performed.
Notes: The default value of this property is kTaskHintUnspecified. See SFSpeechRecognitionResultMBS for constants.
(Read and Write property)

29.4 class SFSpeechRecognitionResultMBS

29.4.1 class SFSpeechRecognitionResultMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An object containing the partial or final results of a speech recognition request.
Notes: Use an SFSpeechRecognitionResultMBS object to retrieve the results of a speech recognition request. You do not create these objects directly. Instead, the Speech framework creates them and passes them to the handler block or delegate object you specified when starting your speech recognition task.
A speech recognition result object contains one or more transcriptions of the current utterance. Each transcription has a confidence rating indicating how likely it is to be correct. (You can also get the transcription with the highest rating directly from the bestTranscription property.)
If you requested partial results from the speech recognizer, the transcriptions may represent only part of the total audio content. Use the final property to determine if the request contains partial or final results.

Requires MacOS 10.15 or later.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
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29.4.2 Methods

29.4.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

29.4.4 copy as SFSpeechRecognitionResultMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

29.4.5 transcriptions as SFTranscriptionMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of potential transcriptions, sorted in descending order of confidence.
Notes: All transcriptions correspond to the same utterance, which can be a partial or final result of the

overall request. The first transcription in the array has the highest confidence rating, followed by transcriptions with decreasing confidence ratings.

29.4.6 Properties

29.4.7 bestTranscription as SFTranscriptionMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The transcription with the highest confidence level.
Notes: (Read only property)

29.4.8 final as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether speech recognition is complete and whether the transcriptions are final.
Notes: When a speech recognition request is final, its transcriptions do not change.
(Read only property)

29.4.9 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Internal object reference.
Notes: (Read and Write property)

29.4.10 Constants

Task Hints

Constant	Value	Description
kTaskHintConfirmation	3	A task that uses captured speech for short, confirmation-style requests. Use this hint type when you are using speech recognition to handle confirmation commands, such as ”yes,” ”no,” or ”maybe.”
kTaskHintDictation	1	A task that uses captured speech for text entry. Use this hint type when you are using speech recognition for a task that’s similar to the keyboard’s built-in dictation function.
kTaskHintSearch	2	A task that uses captured speech to specify seach terms. Use this hint type when you are using speech recognition to identify search terms.
kTaskHintUnspecified	0	An unspecified type of task. Use this hint type when the intended use for captured speech does not match the other task types.

29.5 class SFSpeechRecognitionTaskMBS

29.5.1 class SFSpeechRecognitionTaskMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A task object that you use to monitor the speech recognition progress.
Notes: Use an SFSpeechRecognitionTaskMBS object to determine the state of a speech recognition task, to cancel an ongoing task, or to signal the end of the task.
You do not create speech recognition task objects directly. Instead, you receive one of these objects after calling recognitionTaskWithRequest.

Requires MacOS 10.15 or later.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
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29.5.2 Methods

29.5.3 Cancel

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Cancels the current speech recognition task.
Notes: You can cancel recognition tasks for both prerecorded and live audio input. For example, you might cancel a task in response to a user action or because the recording was interrupted.
When canceling a task, be sure to release any resources associated with the task, such as the audio input resources you are using to capture audio samples.

29.5.4 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

29.5.5 Finish

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Stops accepting new audio and finishes processing on the audio input that has already been accepted.
Notes: For audio buffer–based recognition, recognition does not finish until this method is called, so be sure

to call it when the audio source is exhausted.

29.5.6 Properties

29.5.7 Cancelled as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether the speech recognition task was canceled.
Notes: By default, the value of this property is false.
(Read only property)

29.5.8 Error as NSErrorMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An error object that specifies the error that occurred during a speech recognition task.
Notes: (Read only property)

29.5.9 Finishing as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether audio input has stopped.
Notes: By default, the value of this property is false.
(Read only property)

29.5.10 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Internal object reference.
Notes: (Read and Write property)

29.5.11 State as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The current state of the speech recognition task.
Notes: Check the value of this property to get the state of the in-progress speech recognition session. For

valid values, see constants.
(Read only property)

29.5.12 Constants

States

Constant	Value	Description
kStateCanceling	3	Delivery of recognition results has finished, but audio recording may be ongoing.
kStateCompleted	4	Delivery of recognition requests has finished and audio recording has stopped.
kStateFinishing	2	Audio recording has stopped, but delivery of recognition results may continue.
kStateRunning	1	Speech recognition (potentially including audio recording) is in progress.
kStateStarting	0	Speech recognition (potentially including audio recording) has not yet started.

29.6 class SFSpeechRecognizerMBS

29.6.1 class SFSpeechRecognizerMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An object you use to check for the availability of the speech recognition service, and to initiate the speech recognition process.
Notes: An SFSpeechRecognizerMBS object is the central object for managing the speech recognizer process. Use this object to:

- Request authorization to use speech recognition services.
- Specify the language to use during the recognition process.
- Initiate new speech recognition tasks.

Set Up Speech Recognition
Each speech recognizer supports only one language, which you specify at creation time. The successful creation of a speech recognizer does not guarantee that speech recognition services are available. For some languages, the recognizer might require an Internet connection. Use the available property to find out if speech recognition services are available for the current language.

To initiate the speech recognition process, do the following:

- Request authorization to use speech recognition.
- Create an SFSpeechRecognizerMBS object.
- Verify the availability of services using the available property of your speech recognizer object.
- Prepare your audio content.
- Create a recognition request object—an object that descends from SFSpeechRecognitionRequest.
- Call the recognitionTaskWithRequest method to begin the recognition process.

The type of recognition request object you create depends on whether you are processing an existing audio file or an incoming stream of audio. For existing audio files, create a SFSpeechURLRecognitionRequestMBS object. For audio streams, create a SFSpeechAudioBufferRecognitionRequestMBS object.

Create a Great User Experience for Speech Recognition
Here are some tips to consider when adding speech recognition support to your app.

- Be prepared to handle failures caused by speech recognition limits. Because speech recognition is a network-based service, limits are enforced so that the service can remain freely available to all apps. Individual devices may be limited in the number of recognitions that can be performed per day, and each app may be throttled globally based on the number of requests it makes per day. If a recognition request fails quickly (within a second or two of starting), check to see if the recognition service became unavailable. If it is, you may want to ask users to try again later.

- Plan for a one-minute limit on audio duration. Speech recognition places a relatively high burden on battery life and network usage. To minimize this burden, the framework stops speech recognition tasks that last longer than one minute. This limit is similar to the one for keyboard-related dictation.

- Remind the user when your app is recording. For example, display a visual indicator and play sounds at the beginning and end of speech recognition to help users understand that they're being actively recorded. You can also display speech as it is being recognized so that users understand what your app is doing and see any mistakes made during the recognition process.

- Do not perform speech recognition on private or sensitive information. Some speech is not appropriate for recognition. Don't send passwords, health or financial data, and other sensitive speech for recognition.

Requires MacOS 10.15 or later.
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29.6.2 Methods

29.6.3 authorizationStatus as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Returns your app's current authorization to perform speech recognition.
Notes: The user can reject your app's request to perform speech recognition, but your request can also be denied if speech recognition is not supported on the device. The app can also change your app's authorization status at any time from the Settings app.

29.6.4 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether the Speech Framework was loaded.
Notes: Returns true on MacOS 10.15 or newer.

29.6.5 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a speech recognizer associated with the user's default language settings.
Notes: Returns an initialized speech recognizer object, or nil if there was a problem creating the object.

If the user's default language is not supported for speech recognition, this method attempts to fall back to the language used by the keyboard for dictation. If that fails, this method returns nil.
Even if this method returns a valid speech recognizer object, the speech recognition services may be temporarily unavailable. To determine whether speech recognition services are available, check the available property.
See also:

- 29.6.6 Constructor(locale as NSLocaleMBS) 1204

29.6.6 Constructor(locale as NSLocaleMBS)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a speech recognizer associated with the specified locale.
Notes: locale: The locale object representing the language you want to use for speech recognition. For a list of languages supported by the speech recognizer, see supportedLocales.

Returns an initialized speech recognizer object, or nil if the specified language was not supported.

If you specify a language that is not supported by the speech recognizer, this method attempts to fall back to the language used by the keyboard for dictation. If that fails, this method returns nil.
Even if this method returns a valid speech recognizer object, the speech recognition services may be temporarily unavailable. To determine whether speech recognition services are available, check the available property.
See also:

- 29.6.5 Constructor 1204

29.6.7 Destructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The destructor.

29.6.8 recognitionTaskWithRequest(request as SFSpeechRecognitionRequestMBS) as SFSpeechRecognitionTaskMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Recognizes speech from the audio source associated with the specified request, using the specified events to manage the results.
Notes: request: A request (encapsulated in an SFSpeechRecognitionRequestMBS object) to recognize speech from an audio source.

Returns the task object you can use to manage an in-progress recognition request.

Use this method to initiate the speech recognition process on the audio contained in the request object. This method executes asynchronously and returns a SFSpeechRecognitionTaskMBS object that you can use to cancel or finalize the recognition process later. As results become available, the method calls the methods of the provided delegate object.
Note that the SFSpeechRecognitionTaskMBS object returned by this method does not retain your delegate object. You must maintain a strong reference to your delegate while speech recognition is in progress.
See also:

- 29.6.9 recognitionTaskWithRequest(request as SFSpeechRecognitionRequestMBS, delegateHandler as recognitionTaskWithRequestCompletedMBS, tag as Variant = nil) as SFSpeechRecognitionTaskMBS 1205

29.6.9 recognitionTaskWithRequest(request as SFSpeechRecognitionRequestMBS, delegateHandler as recognitionTaskWithRequestCompletedMBS, tag as Variant = nil) as SFSpeechRecognitionTaskMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Executes the speech recognition request and delivers the results to the specified handler delegate.
Notes: request: A request (in an SFSpeechRecognitionRequestMBS object) to recognize speech from an audio source.
delegateHandler: The method to call when partial or final results are available, or when an error occurs. If the shouldReportPartialResults property is true, this event may be called multiple times to deliver the partial and final results.

The delegare has no return value and takes the following parameters:
result: A SFSpeechRecognitionResultMBS containing the partial or final transcriptions of the audio content.
error: An error object if a problem occurred. This parameter is nil if speech recognition was successful.

Request and Tag parameters are passed through to delegate.

Returns the task object you can use to manage an in-progress recognition request.

Use this method to initiate the speech recognition process on the audio contained in the request object. This method executes asynchronously and returns a SFSpeechRecognitionTaskMBS object that you can use to cancel or finalize the recognition process later. As results become available, the method calls the delegate in the delegateHandler parameter.
See also:

- 29.6.8 recognitionTaskWithRequest(request as SFSpeechRecognitionRequestMBS) as SFSpeechRecognitionTaskMBS 1205

29.6.10 requestAuthorization(delegateHandler as requestAuthorizationCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Asks the user to allow your app to perform speech recognition.
Notes: delegateHandler: The delegate to execute when your app's authorization status is known. The status parameter of the delegate contains your app's authorization status.

Call this method before performing any other tasks associated with speech recognition. This method executes asynchronously, returning shortly after you call it. At some point later, the system calls the provided handler block with the results.
When your app's authorization status is SFSpeechRecognizerAuthorizationStatusNotDetermined, this method causes the system to prompt the user to grant or deny permission for your app to use speech recognition. The prompt includes the custom message you specify in the NSSpeechRecognitionUsageDescription key of your app's Info.plist file. The user's response is saved so that future calls to this method do not prompt the user again.

Your app's Info.plist file must contain the NSSpeechRecognitionUsageDescription key with a valid usage description. If this key is not present, your app will crash when you call this method.
For more information about requesting authorization, see Asking Permission to Use Speech Recognition.

29.6.11 supportedLocales as NSLocaleMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Returns the set of locales that are supported by the speech recognizer.
Notes: This method returns the locales for which speech recognition is supported. Support for a locale does not guarantee that speech recognition is currently possible for that locale. For some locales, the speech recognizer requires an active Internet connection to communicate with Apple's servers. If the speech recognizer is currently unable to process requests, available returns NO.
Speech recognition supports the same locales that are supported by the keyboard's dictation feature. For a list of these locales, see QuickType Keyboard: Dictation.

29.6.12 Properties

29.6.13 defaultTaskHint as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A hint that indicates the type of speech recognition being requested.
Example:

```
dim recognizer as New MySFSpeechRecognizer
recognizer.defaultTaskHint = SFSpeechRecognitionResultMBS.kTaskHintDictation
```

Notes: By default, the value of this property overrides the SFSpeechRecognitionTaskHintUnspecified value for requests.
(Read and Write property)

29.6.14 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Internal object reference.
Notes: (Read and Write property)

29.6.15 isAvailable as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether the speech recognizer is currently available.
Notes: When the value of this property is true, you may create new speech recognition tasks. When value of this property is false, speech recognition services are not available.
(Read only property)

29.6.16 locale as NSLocaleMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The locale of the speech recognizer.
Notes: The locale of the speech recognizer is an NSLocaleMBS object. The default value of this property is the system locale (that is, systemLocale).
(Read only property)

29.6.17 supportsOnDeviceRecognition as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean value that indicates whether the speech recognizer can operate without network access.
Notes: An SFSpeechRecognitionRequestMBS can only honor its requiresOnDeviceRecognition property if supportsOnDeviceRecognition is true. If supportsOnDeviceRecognition is false, the SFSpeechRecognizer requires a network in order to recognize speech.
(Read only property)

29.6.18 Events

29.6.19 availabilityDidChange(available as Boolean)

Plugin Version: 19.4, Platform: macOS, Targets: .

Function: Tells you that the availability of its associated speech recognizer changed.
Notes: available: A Boolean value that indicates the new availability of the speech recognizer.

29.6.20 didDetectSpeech(task as SFSpeechRecognitionTaskMBS)

Plugin Version: 19.4, Platform: macOS, Targets: .

Function: Tells you when the task first detects speech in the source audio.
Notes: task: The speech recognition task (an SFSpeechRecognitionTaskMBS object) that represents the request.

29.6.21 TaskDidFinishRecognition(task as SFSpeechRecognitionTaskMBS, recognitionResult as SFSpeechRecognitionResultMBS)

Plugin Version: 19.4, Platform: macOS, Targets: .

Function: Tells you when the final utterance is recognized.
Notes: task: The speech recognition task (an SFSpeechRecognitionTaskMBS object) that represents the request.
recognitionResult: A recognized utterance that contains one or more transcription hypotheses in an SFSpeechRecognitionResultMBS object.

When this method is called, the delegate should expect no further information about the utterance to be reported.

29.6.22 TaskDidFinishSuccessfully(task as SFSpeechRecognitionTaskMBS, successfully as boolean)

Plugin Version: 19.4, Platform: macOS, Targets: .

Function: Tells you when the recognition of all requested utterances is finished.
Notes: task: The speech recognition task (an SFSpeechRecognitionTaskMBS object) that represents the request.
successfully: A Boolean value that indicates whether the task was successful. When this parameter is false, use the error property of the task to get information about why the task was unsuccessful.

29.6.23 TaskDidHypothesizeTranscription(task as SFSpeechRecognitionTaskMBS, transcription as SFTranscriptionMBS)

Plugin Version: 19.4, Platform: macOS, Targets: .

Function: Tells you that a hypothesized transcription is available.
Notes: task: The speech recognition task (an SFSpeechRecognitionTaskMBS object) that represents the request.
transcription: The hypothesized transcription in an SFTranscriptionMBS object.

This method is called for all recognitions, including partial recognitions.

29.6.24 TaskFinishedReadingAudio(task as SFSpeechRecognitionTaskMBS)

Plugin Version: 19.4, Platform: macOS, Targets: .

Function: Tells you when the task is no longer accepting new audio input, even if final processing is in progress.
Notes: task: The speech recognition task (an SFSpeechRecognitionTask object) that represents the request.

29.6.25 TaskWasCancelled(task as SFSpeechRecognitionTaskMBS)

Plugin Version: 19.4, Platform: macOS, Targets: .

Function: Tells you that the task has been canceled.
Notes: task: The speech recognition task (an SFSpeechRecognitionTaskMBS object) that represents the request.

A speech recognition task can be canceled by the user, by your app, or by the system.

29.6.26 Constants

AuthorizationStatus

Constant	Value	Description
kAuthorizationStatusAuthorized	3	The user granted your app's request to perform speech recognition.
kAuthorizationStatusDenied	1	The user denied your app's request to perform speech recognition.
kAuthorizationStatusNotDetermined	0	The app's authorization status has not yet been determined.
kAuthorizationStatusRestricted	2	The device prevents your app from performing speech recognition.

29.6.27 Delegates

29.6.28 recognitionTaskWithRequestCompletedMBS(request as SFSpeechRecognitionRequestMBS, result as SFSpeechRecognitionResultMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The delegate for the callback when recognition is done.

29.6.29 requestAuthorizationCompletedMBS(status as integer, tag as Variant)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The delegate to call when authorization request finished.

29.7 class SFSpeechURLRecognitionRequestMBS

29.7.1 class SFSpeechURLRecognitionRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A request to recognize speech in a recorded audio file.
Notes: Use an SFSpeechURLRecognitionRequest object to perform speech recognition on the contents of an existing audio file.

Requires MacOS 10.15 or later.
Subclass of the SFSpeechRecognitionRequestMBS class.
Blog Entries

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29.7.2 Methods

29.7.3 Constructor(File as FolderItem)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a speech recognition request, initialized with the specified folderitem.
Notes: Use this method to create a request to recognize speech in a recorded audio file that resides at the specified URL. Pass the request to the recognizer's recognitionTaskWithRequest method to start recognition.
See also:

- 29.7.4 Constructor(URL as String) 1211

29.7.4 Constructor(URL as String)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a speech recognition request, initialized with the specified URL.
Notes: Use this method to create a request to recognize speech in a recorded audio file that resides at the specified URL. Pass the request to the recognizer's recognitionTaskWithRequest method to start recognition.
See also:

- 29.7.3 Constructor(File as FolderItem) 1211

29.7.5 Properties

29.7.6 File as FolderItem

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The folderitem of the audio file.
Notes: (Read only property)

29.7.7 URL as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The URL of the audio file.
Notes: (Read only property)

29.8 class SFTranscriptionMBS

29.8.1 class SFTranscriptionMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A textual representation of the given speech it its entirety, as recognized by the speech recognizer.
Notes: Use SFTranscriptionMBS to obtain all the recognized utterances from your audio content. An utterance is a vocalized word or group of words that represent a single meaning to the speech recognizer (SFSpeechRecognizerMBS).
Use the formattedString property to retrieve the entire transcription of utterances, or use the segments property to retrieve an individual utterance (SFTranscriptionSegmentMBS).
You don,Äôt create an SFTranscriptionMBS directly. Instead, you retrieve it from an SFSpeechRecognitionResultMBS instance. The speech recognizer sends a speech recognition result to your app in one of two ways, depending on how your app started a speech recognition task.
You can start a speech recognition task by using the speech recognizer,Äôs recognitionTaskWithRequest method. When the task is complete, the speech recognizer sends an SFSpeechRecognitionResult instance to your resultHandler closure. Alternatively, you can use the speech recognizer,Äôs recognitionTaskWithRequest method to start a speech recognition task. When the task is complete, the speech recognizer uses events to send a SFSpeechRecognitionResultMBS by using the TaskDidFinishRecognition event.
An SFTranscriptionMBS represents only a potential version of the speech. It might not be an accurate representation of the utterances.

Requires MacOS 10.15 or later.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

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29.8.2 Methods

29.8.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

29.8.4 copy as SFTranscriptionMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

29.8.5 segments as SFTranscriptionSegmentMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of transcription segments that represent the parts of the transcription, as identified by the speech recognizer.
Notes: The order of the segments in the array matches the order in which the corresponding utterances occur in the spoken content.

29.8.6 Properties

29.8.7 averagePauseDuration as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The average pause duration between words, measured in seconds.
Notes: (Read only property)

29.8.8 formattedString as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The entire transcription of utterances, formatted into a single, user-displayable string.
Notes: (Read only property)

29.8.9 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Internal object reference.
Notes: (Read and Write property)

29.8.10 speakingRate as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The number of words spoken per minute.
Notes: (Read only property)

29.9 class SFTranscriptionSegmentMBS

29.9.1 class SFTranscriptionSegmentMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A discrete part of an entire transcription, as identified by the speech recognizer.
Notes: Use SFTranscriptionSegmentMBS to get details about a part of an overall SFTranscriptionMBS. An SFTranscriptionSegmentMBS represents an utterance, which is a vocalized word or group of words that represent a single meaning to the speech recognizer (SFSpeechRecognizerMBS).

You don,Äôt create transcription object segments directly. Instead, you access them from a transcription,Äôs segments property.
A transcription segment includes the following information:

- The text of the utterance, plus any alternative interpretations of the spoken word.
- The character range of the segment within the formattedString of its parent SFTranscriptionMBS.
- A confidence value, indicating how likely it is that the specified string matches the audible speech.
- A timestamp and duration value, indicating the position of the segment within the provided audio stream.
- A voiceAnalytics metric, indicating the likelihood of a voice in a segment, and that voice,Äôs pitch, jitter, and shimmer properties.

Requires MacOS 10.15 or later.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Playing with SpeechRecognition

29.9.2 Methods

29.9.3 alternativeSubstrings as String()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of alternate interpretations of the utterance in the transcription segment.

29.9.4 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

29.9.5 copy as SFTranscriptionSegmentMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

29.9.6 Properties

29.9.7 confidence as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The level of confidence the speech recognizer has in its recognition of the speech transcribed for the segment.
Notes: This property reflects the overall confidence in the recognition of the entire phrase. The value is 0 if there was no recognition, and it is closer to 1 when there is a high certainty that a transcription matches the user's speech exactly. For example, a confidence value of 0.94 represents a very high confidence level, and is more likely to be correct than a transcription with a confidence value of 0.72.
(Read only property)

29.9.8 duration as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The number of seconds it took for the user to speak the utterance represented by the segment.
Notes: (Read only property)

29.9.9 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Internal object reference.
Notes: (Read and Write property)

29.9.10 substring as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The string representation of the utterance in the transcription segment.
Notes: (Read only property)

29.9.11 substringRange as NSRangeMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The range information for the transcription segment,Äôs substring, relative to the overall transcription.
Notes: Use the range information to find the position of the segment within the formattedString property of the SFTranscription object containing this segment.
(Read only property)

29.9.12 timestamp as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The start time of the segment in the processed audio stream.
Notes: The timestamp is the number of seconds between the beginning of the audio content and when the user spoke the word represented by the segment. For example, if the user said the word ,Äútime,Äù one second into the transcription ,ÄúWhat time is it,Äù, the timestamp would be equal to 1.0.
(Read only property)

29.9.13 voiceAnalytics as SFVoiceAnalyticsMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An analysis of the transcription segment,Äôs vocal properties.
Notes: (Read only property)

29.10 class SFVoiceAnalyticsMBS

29.10.1 class SFVoiceAnalyticsMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A collection of vocal analysis metrics.
Notes: Requires MacOS 10.15 or later.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Playing with SpeechRecognition

29.10.2 Methods

29.10.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

29.10.4 copy as SFVoiceAnalyticsMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

29.10.5 Properties

29.10.6 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Internal object reference.
Notes: (Read and Write property)

29.10.7 jitter as SFAcousticFeatureMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The variation in pitch in each frame of a transcription segment, expressed as a percentage of the frame,Äôs fundamental frequency.
Notes: (Read only property)

29.10.8 pitch as SFAcousticFeatureMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The highness or lowness of the tone (fundamental frequency) in each frame of a transcription segment, expressed as a logarithm.
Notes: The value is a logarithm (base e) of the normalized pitch estimate for each frame.
(Read only property)

29.10.9 shimmer as SFAcousticFeatureMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The variation in vocal volume stability (amplitude) in each frame of a transcription segment, expressed in decibels.
Notes: (Read only property)

29.10.10 voicing as SFAcousticFeatureMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The likelihood of a voice in each frame of a transcription segment, expressed as a probability in the range [0.0, 1.0] .
Notes: (Read only property)

Chapter 30

User Notifications

30.1 class NSUserNotificationActionMBS

30.1.1 class NSUserNotificationActionMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use UNNotificationActionMBS class instead. **Function:** An action shown to the user as part of a NSUserNotification in the additionalActions property.
Notes: Available on Mac OS X 10.10 and newer.
Blog Entries

- MBS Xojo Plugins, version 20.6pr1
- MBS Xojo Plugins, version 19.2pr4
- New for Mac OS X 10.10 in MBS Xojo Plugins

30.1.2 Methods

30.1.3 Available as boolean

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Whether this class is available.
Notes: Returns true on Mac OS X 10.10 or newer. False in all other cases.

30.1.4 Constructor(identifier as string, title as string)

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.

30.1.5 copy as NSUserNotificationActionMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Creates a copy of this object.

30.1.6 Properties

30.1.7 Handle as Integer

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

30.1.8 Identifier as String

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The internal identifier for this action.
Notes: (Read only property)

30.1.9 Title as String

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: The localized title of the action.
Notes: (Read only property)

30.2 class NSUserNotificationCenterDelegateMBS

30.2.1 class NSUserNotificationCenterDelegateMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use UNUserNotificationCenterMBS class instead. **Function:** This class allows you to react to events from the user notification center. **Notes:** This is for sending user notifications to the Mac your Xojo application runs on. Not for remote notifications or notifications to iOS devices.
Blog Entries

- Mac OS X 10.8 User Notifications with Filemaker and Real Studio

30.2.2 Methods

30.2.3 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.
Notes: Must be called to have the class register itself.

30.2.4 Destructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The destructor.

30.2.5 Properties

30.2.6 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

30.2.7 Events

30.2.8 didActivateNotification(center as NSUserNotificationCenterMBS, notification as NSUserNotificationMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Sent to the delegate when a user clicks on a user notification presented by the user notification center.
Example:

```
Sub applicationDidFinishLaunching(Notification as NSNotificationMBS)
dim userInfo as Dictionary = Notification.userInfo
dim key as string = NSApplicationMBS.NSApplicationLaunchUserNotificationKey
dim UserNotification as NSUserNotificationMBS = userInfo.Lookup(key, nil)

if UserNotification <>nil then
MsgBox UserNotification.identifier+": "+UserNotification.informativeText
end if
End Sub
```

Notes: center: The user notification center.
notification: The user notification object.

This would be a good time to take action in response to user interacting with a specific notification.

To take an action when your application is launched as a result of a user clicking on a notification, be sure to implement the applicationDidFinishLaunching method in the application class that implements the NSApplicationDelegateMBS class. The notification parameter to that method has a userInfo dictionary, and if that dictionary has the NSApplicationLaunchUserNotificationKey key. The value of that key is the NSUserNotification object that caused the application to launch. The NSUserNotification object is delivered to the NSApplication delegate because that message will be sent before your application has a chance to set a delegate for the NSUserNotificationCenter.

Available in OS X v10.8 and later.

30.2.9 didDeliverNotification(center as NSUserNotificationCenterMBS, notification as NSUserNotificationMBS)

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Sent to the delegate when a notification delivery date has arrived.
Notes: center: The user notification center.

notification: The user notification object.

This method is always called, regardless of your application state and even if you deliver the user notification yourself using deliverNotification:.

This event is invoked before the shouldPresentNotification event.
Available in OS X v10.8 and later.

30.2.10 shouldPresentNotification(center as NSUserNotificationCenterMBS, notification as NSUserNotificationMBS) as boolean

Plugin Version: 12.3, Platform: macOS, Targets: .

Function: Sent to the delegate when the user notification center has decided not to present your notification.
Notes: center: The user notification center.
notification: The user notification object.

Return true if the user notification should be displayed regardless; false otherwise.
Available in OS X v10.8 and later.

30.3 class NSUserNotificationCenterMBS

30.3.1 class NSUserNotificationCenterMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use UNUserNotificationCenterMBS class instead. **Function:** The NSUserNotificationCenterMBS class delivers user notifications to the user from applications or helper applications.
Example:

```
dim u as new NSUserNotificationMBS

u.Title = "Hello World"
u.subtitle = "from Xojo."
u.informativeText = "Our first Notification from Xojo."

dim d as new date
d.Second = d.Second + 10
u.deliveryDate = d

dim c as new NSUserNotificationCenterMBS
c.scheduleNotification u
```

Notes: When a user notifications is delivery date has been reached, or it is manually delivered, the notification center it may display the notification to the user. The user notification center reserves the right to decide if a delivered user notification is presented to the user. For example, it may suppress the notification if the application is already frontmost (the delegate can override this action). The application can check the result of this decision by examining the presented property of a delivered user notification.

NSUserNotificationMBS instances the NSUserNotificationCenterMBS are tracking will be in one of two states: scheduled or delivered. A scheduled user notification has a deliveryDate. On that delivery date, the notification will move from being scheduled to being delivered. Note that the user notification may be displayed later than the delivery date depending on a number of factors.

A delivered user notification has an actualDeliveryDate. That is the date when it moved from being scheduled to delivered, or when it was manually delivered using the deliverNotification method.

The application and the user notification center are both ultimately subject to the user's preferences. If the user decides to hide all alerts from your application, the presented property will still behave as above, but the user will not see any animation or hear any sound.

The NSUserNotificationCenterDelegateMBS class provides more information about the delivered user notification and allows forcing the display of a user notification even if the application is frontmost.

Note: It the user wakes more than 15 minutes after a scheduled notification is scheduled to fire, it is discarded. If the notification repeats with an interval less than 15 minutes, then it expires in 1 minute. Expired notifications are just discarded, unless they repeat, in which case, they stay in the scheduled list and just fire again later.
Important Many of the NSUserNotificationCenterMBS class's methods involve talking to a server process, so calling them repeatedly can have a negative effect on performance.

This is for sending user notifications to the Mac your Xojo application runs on. Not for remote notifications or notifications to iOS devices.

The NSUserNotificationCenterMBS class and the NSUserNotificationMBS class are both thread safe.
Blog Entries

- MBS Xojo Plugins, version 20.6pr1
- MBS Xojo Plugins, version 19.2pr3
- Mac OS X 10.8 User Notifications with Filemaker and Real Studio

30.3.2 Methods

30.3.3 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Whether user notification framework is available.
Notes: Returns true on Mac OS X 10.8 and false otherwise.

30.3.4 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor.
Notes: Initializes this object to point to the default user notification center.
Available in OS X v10.8 and later.

30.3.5 defaultUserNotificationCenter as NSUserNotificationCenterMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Returns the default user notification center.
Notes: Available in OS X v10.8 and later.

30.3.6 deliveredNotifications as NSUserNotificationMBS()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: An array of all user notifications delivered to the notification center.
Notes: The number of notifications the user actually sees in the user interface may be less than the size of this array.

Note that these may or may not have been actually presented to the user. See the presented property in the NSUserNotificationMBS class.

Note: A scheduled user notification that specifies a deliveryRepeatInterval remains in the scheduledNotifications list, even though it has been delivered. The item that goes into the deliveredNotifications list is a copy of the user notification item.

Available in OS X v10.8 and later.

30.3.7 deliverNotification(notification as NSUserNotificationMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Deliver the specified user notification.
Example:

```
dim u as new NSUserNotificationMBS

u.Title = "Hello World"
u.subtitle = "just a test"

dim c as new NSUserNotificationCenterMBS
c.deliverNotification u
```

Notes: notification: The user notification.

The notification will be presented to the user (subject to the user's preferences). The presented property of the NSUserNotification object will always be set to true if a notification is delivered using this method.

Available in OS X v10.8 and later.

30.3.8 removeAllDeliveredNotifications

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Remove all delivered user notifications from the user notification center.
Notes: Available in OS X v10.8 and later.

30.3.9 removeAllScheduledNotifications

Plugin Version: 19.2, Platform: macOS, Targets: Desktop only.

Function: Remove all scheduled user notifications from the user notification center.
Notes: Available in OS X v10.8 and later.

30.3.10 removeDeliveredNotification(notification as NSUserNotificationMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Remove a delivered user notification from the user notification center.
Notes: notification: The user notification.

If the user notification is not in deliveredNotifications, nothing happens.

Available in OS X v10.8 and later.

30.3.11 removeScheduledNotification(notification as NSUserNotificationMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Removes the specified user notification for the scheduled notifications.
Notes: notification: The user notification.

If the user notification's deliveryDate occurs before the cancellation finishes, the notification may still be delivered.
If the notification is not in the scheduled list, nothing happens.

Available in OS X v10.8 and later.

30.3.12 scheduledNotifications as NSUserNotificationMBS()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies an array of scheduled user notifications that have not yet been delivered.
Notes: Newly scheduled notifications are added to the end of the array. You may also bulk-schedule notifications by setting this array. Bulk setting new scheduled notifications unschedules existing notifications.

Note: The scheduled user notification could be changing to a delivered notification at the time you are calling this method. and if that case the user notification will still be delivered.

Available in OS X v10.8 and later.

30.3.13 scheduleNotification(notification as NSUserNotificationMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Schedules the specified user notification.
Notes: notification: The user notification.

Scheduled notifications are added to the end of the notification queue.
Available in OS X v10.8 and later.

30.3.14 Properties

30.3.15 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

30.4 class NSUserNotificationMBS

30.4.1 class NSUserNotificationMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Deprecated: This item is deprecated and should no longer be used. You can use UNNotificationMBS class instead. **Function:** The NSUserNotificationMBS class is used to configure a notification that is scheduled for display by the NSUserNotificationCenterMBS class.
Example:

```
dim u as new NSUserNotificationMBS

u.Title = "Hello World"
u.subtitle = "from Xojo."
u.informativeText = "Our first Notification from Xojo."

dim d as new date
d.Second = d.Second + 10
u.deliveryDate = d

dim c as new NSUserNotificationCenterMBS
c.scheduleNotification u
```

Notes: The NSUserNotificationMBS object not only configures the notification, when the notification is delivered information about when the notification was actually presented to the user (if at all) and other details are provided in the notification object. User applications can create NSUserNotification objects and register them with the NSUserNotificationCenterMBS object to notify the user when an application requires attention.

See NSUserNotificationCenterMBS Class Reference for more information.

Threading Information
The NSUserNotificationCenterMBS class and the NSUserNotificationMBS class are both thread safe.

This is for sending user notifications to the Mac your Xojo application runs on. Not for remote notifications or notifications to iOS devices.
Blog Entries

- Cleanup Xojo Plugins
- MBS Xojo Plugins, version 20.6pr1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 19.1
- MBS Xojo Plugins, version 19.1pr1

- MBS Xojo Plugins 17.2
- New for Mac OS X 10.10 in MBS Xojo Plugins
- MBS Xojo / Real Studio plug-ins in version 13.5
- MBS Xojo / Real Studio Plugins, version 13.5pr1
- Mac OS X 10.8 User Notifications with Filemaker and Real Studio

Xojo Developer Magazine

- 17.3, page 11: News
- 15.4, page 9: News

30.4.2 Methods

30.4.3 additionalActions as NSUserNotificationActionMBS()

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Queries the array of additional actions.
Notes: For Mac OS X 10.10 and newer. Will not cause exception if called on older versions, but simply return empty array.

An array of NSUserNotificationActionMBS objects that describe the different actions that can be taken on a notification in addition to the default action described by actionButtonTitle.

30.4.4 Available as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Whether this class is available.
Notes: Returns true on Mac OS X 10.8 and newer.
Returns false on other operation systems, e.g. older OS X, Windows or Linux.

30.4.5 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The constructor to create a new notification.

30.4.6 copy as NSUserNotificationMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Creates a clone of the notification object.

30.4.7 NSUserNotificationDefaultSoundName as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The default sound played by the user notification center for this notification.
Notes: The default notification sound.
Available in OS X v10.8 and later.

30.4.8 Print

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Prints description of notification object to console for debugging.

30.4.9 setAdditionalActions(additionalActions() as NSUserNotificationActionMBS)

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Sets the array of additional actions.
Notes: For Mac OS X 10.10 and newer. Will not cause exception if called on older versions.

An array of NSUserNotificationActionMBS objects that describe the different actions that can be taken on a notification in addition to the default action described by actionButtonTitle.

30.4.10 Properties

30.4.11 actionButtonTitle as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies the title of the action button displayed in the notification.
Notes: This value should localized as it will be presented to the user. The string will be truncated to a length appropriate for display and the property will be modified to reflect the truncation.

Available in OS X v10.8 and later.
(Read and Write property)

30.4.12 activationType as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies what caused a user notification to occur.
Notes: This property specifies why the user notification was sent to to the NSUserNotificationCenterDelegateMBS didActivateNotification event. The supported values are described in constants.

Available in OS X v10.8 and later.
(Read only property)

30.4.13 actualDeliveryDate as date

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The date this notification was actually delivered.
Notes: The notification center will set this value if a notification is put in the scheduled list and the delivery time arrives.

If the notification is delivered directly using the deliverNotification: method of the NSUserNotificationCenterMBS class, this value will be set to the deliveryDate value. If the deliveryDate value nil this value is set to the current date.

This value is used to sort the list of notifications in the user interface.

Available in OS X v10.8 and later.
(Read only property)

30.4.14 actualDeliveryDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: Desktop only.

Function: The date this notification was actually delivered.
Notes: The notification center will set this value if a notification is put in the scheduled list and the delivery time arrives.

If the notification is delivered directly using the deliverNotification: method of the NSUserNotificationCen-

terMBS class, this value will be set to the deliveryDate value. If the deliveryDate value nil this value is set to the current date.

This value is used to sort the list of notifications in the user interface.

Available in OS X v10.8 and later.
(Read only property)

30.4.15 additionalActivationAction as NSUserNotificationActionMBS

Plugin Version: 14.3, Platform: macOS, Targets: Desktop only.

Function: Queries which additional action was selected.
Notes: For Mac OS X 10.10 and newer. Will not cause exception if called on older versions, but always return nil.

When a user selects an additional action that action will be set on the notification's additionalActivation-Action property when passed into the delegate event didActivateNotification.
(Read only property)

30.4.16 contentImage as NSImageMBS

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: Image shown in the content of the notification.
Notes: (Read and Write property)

30.4.17 deliveryDate as date

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies when the notification should be delivered.
Notes: The delivery date is specified in an absolute time.
After a notification is delivered, it may be presented to the user.
Available in OS X v10.8 and later.
(Read and Write property)

30.4.18 deliveryDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: Desktop only.

Function: Specifies when the notification should be delivered.
Notes: The delivery date is specified in an absolute time.
After a notification is delivered, it may be presented to the user.
Available in OS X v10.8 and later.
(Read and Write property)

30.4.19 deliveryRepeatInterval as NSDateComponentsMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies the date components that control how often a user notification is repeated.
Notes: This value may be nil if the notification should not repeat.

The date component values are relative to the date the notification was delivered.

If the calendar value of the deliveryRepeatInterval is nil, the current calendar will be used to calculate the repeat interval. For example, if a notification should repeat every hour, set the hour property of the deliveryRepeatInterval to 1.

This value is ignored unless the user notification is scheduled with the NSUserNotificationCenterMBS object.
Available in OS X v10.8 and later.
(Read and Write property)

30.4.20 deliveryTimeZone as NSTimeZoneMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specify the time zone to interpret the delivery date in.
Notes: If this value is nil and the user switches time zones, the notification center will adjust the time of presentation to account for the time zone change.

If a notification should be delivered at a time in a specific time zone (regardless of whether the user switches time zones), set this value to the specific time zone, for example the current time zone.

Available in OS X v10.8 and later.
(Read and Write property)

30.4.21 description as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Description of notification object for debugging.
Notes: (Read only property)

30.4.22 Handle as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The internal object reference.
Notes: (Read and Write property)

30.4.23 hasActionButton as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies whether the notification displays an action button.
Notes: Set to false if the notification has no action button. This will be the case for notifications that are purely for informational purposes and have no user action.

The default value is true.

Available in OS X v10.8 and later.
(Read and Write property)

30.4.24 hasReplyButton as boolean

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: Set to true if the notification has a reply button.
Notes: The default value is false. If both this and hasActionButton are true, the reply button will be shown.
(Read and Write property)

30.4.25 identifier as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: This identifier is used to uniquely identify a notification.
Notes: A notification delivered with the same identifier as an existing notification will replace that notification, rather then display a new one.

Available in OS X 10.9 and newer.
(Read and Write property)

30.4.26 informativeText as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: The body text of the notification.
Notes: This value should localized as it will be presented to the user. The string will be truncated to a length appropriate for display and the property will be modified to reflect the truncation.
Available in OS X v10.8 and later.
(Read and Write property)

30.4.27 otherButtonTitle as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies a custom title for the close button in an alert-style notification.
Notes: This value should localized as it will be presented to the user. The string will be truncated to a length appropriate for display and the property will be modified to reflect the truncation.

An empty string will cause the default localized text to be used.

Available in OS X v10.8 and later.
(Read and Write property)

30.4.28 Presented as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies whether the user notification has been presented.
Notes: In some cases, for example when your application is frontmost, the notification center may decide not to actually present a delivered notification. In that case, the value of this property will be false. It will be set to true if the notification was presented according to user preferences.

Available in OS X v10.8 and later.
(Read only property)

30.4.29 remote as boolean

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies whether the remote was generated by a push notification.
Notes: If this property is true then the user notification was generated by a push notification (that is, remotely); if false it was generated locally.
Available in OS X v10.8 and later.
(Read only property)

30.4.30 response as NSAttributedStringMBS

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: The response text.
Notes: When a notification has been responded to, the NSUserNotificationCenter event didActivateNotification will be called with the notification with the activationType set to NSUserNotificationActivationTypeReplied and the response set on the response property.
(Read only property)

30.4.31 responsePlaceholder as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop only.

Function: Optional placeholder for inline reply field.
Notes: (Read and Write property)

30.4.32 soundName as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies the name of the sound to play when the notification is delivered.
Notes: Passing the NSUserNotificationDefaultSoundName constant causes the default notification center sound to be played.
A value of nil means no sound is played.
Available in OS X v10.8 and later.
(Read and Write property)

30.4.33 subtitle as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies the subtitle of the notification.
Notes: This value should localized as it will be presented to the user. The string will be truncated to a length appropriate for display and the property will be modified to reflect the truncation.
Available in OS X v10.8 and later.
(Read and Write property)

30.4.34 title as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Specifies the title of the notification.
Notes: This value should localized as it will be presented to the user. The string will be truncated to a length appropriate for display and the property will be modified to reflect the truncation.
Available in OS X v10.8 and later.
(Read and Write property)

30.4.35 userInfo as dictionary

Plugin Version: 12.3, Platform: macOS, Targets: Desktop only.

Function: Application-specific user info that can be attached to the notification.
Example:

```
dim u as new NSUserNotificationMBS
dim d as new dictionary
d.value("Key") = "Value"
u.userinfo = d
```

Notes: All items must be property list types or an exception will be thrown.
The userInfo content must be of reasonable serialized size (less than 1k) or an exception will be thrown.
Available in OS X v10.8 and later.
(Read and Write property)

30.4.36 Constants

Constants

Constant	Value	Description
NSUserNotificationActivationTypeReplied	3	The activation type for a notification which got a reply.

Activation Type Constant

Constant	Value	Description
NSUserNotificationActivationTypeActionButtonClicked	2	The user clicked on the action button of the notifica Available in OS X v10.8 and later.
NSUserNotificationActivationTypeAdditionalActionClicked	4	User did select an additional action. Only for Mac OS X 10.10 and newer.
NSUserNotificationActivationTypeContentsClicked	1	The user clicked on the contents of the notification Available in OS X v10.8 and later.
NSUserNotificationActivationTypeNone	0	The user did not interact with the notification alert Available in OS X v10.8 and later.

30.5 class UNCalendarNotificationTriggerMBS

30.5.1 class UNCalendarNotificationTriggerMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A trigger condition that causes a notification to be delivered at a specific date and time.
Notes: Create a UNCalendarNotificationTriggerMBS object when you want to schedule the delivery of a local notification at the specified date and time. You specify the temporal information using an NSDateComponentsMBS object, which lets you specify only the time values that matter to you. The system uses the provided information to determine the next date and time that matches the specified information.
Subclass of the UNNotificationTriggerMBS class.

30.5.2 Methods

30.5.3 Constructor(dateComponents as NSDateComponentsMBS, repeats as boolean)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a calendar trigger from the specified date components.
Notes: dateComponents: The temporal information to use when constructing the trigger. Provide only the date components that are relevant for your trigger.
repeats: Specify false to deliver the notification one time. Specify YES to reschedule the notification request each time the notification is delivered.

Returns a new calendar trigger based on the specified temporal information.

If you specify true for the repeats parameter, you must explicitly remove the notification request to stop the delivery of the associated notification. Use the methods of UNUserNotificationCenterMBS to remove notification requests that are no longer needed.

30.5.4 trigger(dateComponents as NSDateComponentsMBS, repeats as boolean) as UNCalendarNotificationTriggerMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a calendar trigger from the specified date components.
Notes: dateComponents: The temporal information to use when constructing the trigger. Provide only the date components that are relevant for your trigger.
repeats: Specify false to deliver the notification one time. Specify YES to reschedule the notification request each time the notification is delivered.

Returns a new calendar trigger based on the specified temporal information.

If you specify true for the repeats parameter, you must explicitly remove the notification request to stop the delivery of the associated notification. Use the methods of UNUserNotificationCenterMBS to remove notification requests that are no longer needed.

30.5.5 Properties

30.5.6 dateComponents as NSDateComponentsMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The date components used to construct this object.
Notes: Use this property to review the date components associated with this trigger.
(Read only property)

30.5.7 nextTriggerDate as Date

Plugin Version: 19.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: The next date at which the trigger conditions will be met.
Notes: Use this property to find out when a notification associated with this trigger will next be delivered.
(Read only property)

30.5.8 nextTriggerDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The next date at which the trigger conditions will be met.
Notes: Use this property to find out when a notification associated with this trigger will next be delivered.
(Read only property)

30.6 class UNMutableNotificationContentMBS

30.6.1 class UNMutableNotificationContentMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The editable content for a notification.
Notes: Create a UNMutableNotificationContent object when you want to specify the payload for a local notification. Specifically, use this object to specify the title and message for an alert, the sound to play, or the value to assign to your app's badge. You might also provide details about how the system handles the notification. For example, you can specify a custom launch image and a thread identifier for visually grouping related notifications.
After creating your content object, assign it to a UNNotificationRequest object, add a trigger condition, and schedule your notification. The trigger condition defines when the notification is delivered to the user. Listing 1 shows the scheduling of a local notification that displays an alert and plays a sound after a delay of five seconds. The strings for the alert's title and body are stored in the app,Äôs Localizable.strings file.
Subclass of the UNNotificationContentMBS class.

30.6.2 Methods

30.6.3 addAttachment(attachment as UNNotificationAttachmentMBS)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Adds an attachment.

30.6.4 clearBadge

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Clears the badge.

30.6.5 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The constructor.

30.6.6 setAttachments(attachments() as UNNotificationAttachmentMBS)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Sets an array of attachments to display in an alert-based notification.
Notes: Use this property to include images or movies, or to include playable audio files, with the contents of an alert. The system displays the attachments alongside the title and body of your alert. You can also customize the presentation of attachments using a notification content app extension.
All attachments must reside locally on the current device before they can be added. For local notifications, modify this property before scheduling the notification. For remote notifications, use a notification service app extension to locate and download the specified files and modify the notification content before it is delivered.
For more information on how to specify attachments, see UNNotificationAttachmentMBS.

30.6.7 Properties

30.6.8 badge as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The number to apply to the app,Äôs icon.
Notes: Use this property to specify the number to apply to the app,Äôs icon when the notification arrives. If your app is not authorized to display badge-based notifications, this property is ignored.
Specify the number 0 to remove the current badge, if present. Specify a number greater than 0 to display a badge with that number. Use clearBadge to leave the current badge unchanged.
(Read and Write property)

30.6.9 body as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The localized message to display in the notification alert.
Notes: Use this property to specify the body of the notification alert. If your app is not authorized to display alert-based notifications, this property is ignored.
The body text should contain the final text that you want to display, and should not contain any placeholder characters. To include a percent symbol (%) in the message body, use two percent symbols (%%). The system strips all other printf style escape characters from your string prior to display.
(Read and Write property)

30.6.10 categoryIdentifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The identifier of the category object that represents the notification's type.
Notes: Use notification types to distinguish between the different types of notifications your app supports. You use this support primarily to create actionable notifications—that is, notifications with custom action buttons—and to redirect your notifications through either your notification service app extension or your notification content app extension.
Assign a value to this property that matches the identifier property of one of the UNNotificationCategory objects you previously registered with your app. If you assign a string that does not match one of your registered categories, the system displays your notification without custom actions and without routing it through your app extensions.
(Read and Write property)

30.6.11 sound as UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The sound to play when the notification is delivered.
Notes: Use this property to specify the sound that you want played when the notification arrives. If your app is not authorized to play sounds for notifications, this property is ignored.
For information on how to specify sounds for your notifications, see UNNotificationSoundMBS.
(Read and Write property)

30.6.12 subtitle as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The localized subtitle, containing a secondary description of the reason for the alert.
Notes: Use this property to specify additional context about the purpose of the notification. Subtitles offer additional context in cases where the title alone is not clear. Subtitles are not displayed in all cases. If your app is not authorized to display alert-based notifications, this property is ignored.
(Read and Write property)

30.6.13 summaryArgument as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The string the notification adds to the category,Äôs summary format string.
Notes: (Read and Write property)

30.6.14 summaryArgumentCount as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The number of items the notification adds to the category,Äôs summary format string.
Notes: (Read and Write property)

30.6.15 threadIdentifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: An identifier that you use to group related notifications together.
Notes: You may specify any value for the string, but assign the same thread identifier string to all notifications that you want to group together visually.
(Read and Write property)

30.6.16 title as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The localized title, containing the reason for the alert.
Notes: Use this property to specify the title of your notification alert. If your app is not authorized to display alert-based notifications, this property is ignored.
Title strings should be short, usually only a couple of words describing the reason for the notification. In watchOS, the title string is displayed as part of the short look notification interface, which has limited space.
(Read and Write property)

30.6.17 userInfo as Dictionary

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A dictionary of custom information associated with the notification.
Notes: Use this property to associate custom information with the notification. The contents of the dictionary are not seen by the user, but are accessible to your app or to any notification-related app extensions.
The keys in this dictionary must be property-list types—that is, they must be types that can be serialized into the property-list format.
(Read and Write property)

30.7 class UNNotificationActionMBS

30.7.1 class UNNotificationActionMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The class for an action for a notification.
Notes: Use UNNotificationAction objects to define the actions that your app can perform in response to a delivered notification. You define the actions that your app supports. For example, a meeting app might define actions for accepting or rejecting a meeting invitation. The action object itself contains the title to display in an action button and the button's appearance. After creating action objects, add them to a UNNotificationCategory object and register your categories with the system.
For information on how to define actions and categories, see Declaring Your Actionable Notification Types.

When the user selects one of your actions in response to a notification, the system notifies the delegate of the shared UNUserNotificationCenterMBS object. Specifically, the system calls the didReceiveNotification-Response event. The response object passed to your delegate includes the identifier string of the action that was selected, which you can use to perform the corresponding task.
Blog Entries

- MBS Xojo Plugins, version 20.6pr1

30.7.2 Methods

30.7.3 action(identifier as string, title as string, options as integer) as UNNotificationActionMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates an action object with the specified title and options.
Notes: identifier: The string that you use internally to identify the action. This string must be unique among all of your app's supported actions. When the user selects the action, the system passes this string to your app and asks you to perform the related task. This parameter must not be nil or an empty string.
title: The localized string to display to the user. This string is used as the title of a button, which is added to the notification interface. This parameter must not be nil.
options: Additional options describing how the action behaves. Include options when you need the related behavior. For a list of possible values, see constants.

30.7.4 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotificationAction class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.7.5 Constructor(identifier as string, title as string, options as integer)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates an action object with the specified title and options.
Notes: identifier: The string that you use internally to identify the action. This string must be unique among all of your app's supported actions. When the user selects the action, the system passes this string to your app and asks you to perform the related task. This parameter must not be nil or an empty string.
title: The localized string to display to the user. This string is used as the title of a button, which is added to the notification interface. This parameter must not be nil.
options: Additional options describing how the action behaves. Include options when you need the related behavior. For a list of possible values, see constants.

30.7.6 copy as UNNotificationActionMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.7.7 Properties

30.7.8 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.7.9 identifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The unique string that your app uses to identify the action.
Notes: When the user selects an action, the system reports the value of this string to your app. Because all actions are handled by a single delegate method, the identifier strings for all of your app's actions must be unique.
(Read only property)

30.7.10 options as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The behaviors associated with the action.
Notes: Options should be applied to an action when the corresponding behavior is required.
(Read only property)

30.7.11 title as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The localized string to use as the title of the action.
Notes: This string is used as the title of the button that the user taps or selects in the notification interface.
(Read only property)

30.7.12 Constants

Options

Constant	Value	Description
OptionAuthenticationRequired	1	The action can be performed only on an unlocked device. When the user selects an action with this option, the system prompts the user to unlock the device. After unlocking, the system notifies your app of the selected action. You might use option to perform actions that require accessing data that is encrypted while the device is locked.
OptionDestructive	2	The action performs a destructive task. Use this option for actions that delete user data or change the app irrevocably. The action button is displayed with special highlighting to indicate that it performs a destructive task.
OptionForeground	4	The action causes the app to launch in the foreground. When the user selects an action containing this option, the system brings the app to the foreground, asking the user to unlock the device as needed. Use this option for actions that require the user to interact further with your app. Do not use this option simply to bring your app to the foreground.
OptionNone	0	The action has the default behavior.

30.8 class UNNotificationAttachmentMBS

30.8.1 class UNNotificationAttachmentMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A media file associated with a notification.
Notes: Create a UNNotificationAttachmentMBS object when you want to include audio, image, or video content together in an alert-based notification. When creating the UNNotificationAttachmentMBS object, the file you specify must be on disk, and the file format must be one of the supported types.

You are responsible for supplying attachments before the system displays your notification's alert. For local notifications, add attachments when creating the notification,ÄôÄôs content. For remote notifications, use a notification service app extension to download the attached files and then add them to the notification's content before delivery.

The system validates attachments before displaying the associated notification. If you attach a file to a local notification request that is corrupted, invalid, or of an unsupported file type, the system doesn't schedule your request. For remote notifications, the system validates attachments after your notification service app extension finishes. Once validated, attached files are moved into the attachment data store so that they can be accessed by all of the appropriate processes. Attachments located inside an app,ÄôÄôs bundle are copied instead of moved.

Supported File Types
Table lists the types of files you can include as an attachment and the supported file formats. The table also lists the maximum size allowed for attachments of each type. An image file may contain a static image or an animated image sequence.

Supported attachment file types

Attachment	Supported file types	Maximum size
Audio	kUTTypeAudioInterchangeFileFormat, kUTTypeWaveformAudio, kUTTypeMP3 and kUTTypeMPEG4Audio	5 MB
Image	kUTTypeJPEG, kUTTypeGIF and kUTTypePNG	10 MB
Movie	kUTTypeMPEG, kUTTypeMPEG2Video, kUTTypeMPEG4 and kUTTypeAVIMovie	50 MB

When creating an attachment, you can specify optional details about how to present the thumbnail image for the image or movie. Use the UNNotificationAttachmentOptionsThumbnailClippingRectKey option to use only the specified portion of an image as a thumbnail. For animated images and movies, use the UNNotificationAttachmentOptionsThumbnailTimeKey option to select which frame to use for the thumbnail image.

The amount of storage space allocated for attachments is limited for each app. To delete attachments, use the methods of the UNUserNotificationCenterMBS class to remove the notification requests that contain those attachments.
Blog Entries

- MBS Xojo Plugins, version 19.2pr1

30.8.2 Methods

30.8.3 attachment(identifier as String, File as FolderItem, options as Dictionary = nil, byref error as NSErrorMBS) as UNNotificationAttachmentMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates an attachment object from the specified file and options.
Notes: identifier: The unique identifier of the attachment. Use this string to identify the attachment later. If you specify an empty string, this method creates a unique identifier string for you.
URL: The URL of the file you want to attach to the notification. The URL must be a file URL and the file must be readable by the current process. This parameter must not be nil. For a list of supported file types, see Supported File Types.
options: A dictionary of options related to the attached file. Use the options to specify meta information about the attachment, such as the clipping rectangle to use for the resulting thumbnail.
error: An error object indicating whether a problem occurred. If the attachment was created successfully, this parameter is set to nil. If an error occurs, it is set to an error object containing information about why the attachment was not created. You may specify nil for this parameter if you do not want the error information.

Returns an attachment object containing information about the specified file or nil if the attachment could not be created.

This method verifies that the specified file is readable and that the file format is one of the supported types. When errors occur, the method provides an appropriate error object.
When you schedule a notification request containing the attachment, the attachment‚Äôs file is moved to a new location to facilitate access by the appropriate processes. After the move, the only way to access the file is using the methods of the UNUserNotificationCenterMBS object.
See also:

- 30.8.4 attachment(identifier as String, URL as String, options as Dictionary = nil, byref error as NSErrorMBS) as UNNotificationAttachmentMBS 1252

30.8.4 attachment(identifier as String, URL as String, options as Dictionary = nil, byref error as NSErrorMBS) as UNNotificationAttachmentMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates an attachment object from the specified file and options.
Notes: identifier: The unique identifier of the attachment. Use this string to identify the attachment later. If you specify an empty string, this method creates a unique identifier string for you.
URL: The URL of the file you want to attach to the notification. The URL must be a file URL and the file must be readable by the current process. This parameter must not be nil. For a list of supported file types, see Supported File Types.

options: A dictionary of options related to the attached file. Use the options to specify meta information about the attachment, such as the clipping rectangle to use for the resulting thumbnail.
error: An error object indicating whether a problem occurred. If the attachment was created successfully, this parameter is set to nil. If an error occurs, it is set to an error object containing information about why the attachment was not created. You may specify nil for this parameter if you do not want the error information.

Returns an attachment object containing information about the specified file or nil if the attachment could not be created.

This method verifies that the specified file is readable and that the file format is one of the supported types. When errors occur, the method provides an appropriate error object.
When you schedule a notification request containing the attachment, the attachment‚Äôs file is moved to a new location to facilitate access by the appropriate processes. After the move, the only way to access the file is using the methods of the UNUserNotificationCenterMBS object.
See also:

- 30.8.3 attachment(identifier as String, File as FolderItem, options as Dictionary = nil, byref error as NSErrorMBS) as UNNotificationAttachmentMBS 1252

30.8.5 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotificationAttachment class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.8.6 Constructor(identifier as String, File as FolderItem, options as Dictionary = nil)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates an attachment object from the specified file and options.
Notes: identifier: The unique identifier of the attachment. Use this string to identify the attachment later. If you specify an empty string, this method creates a unique identifier string for you.
URL: The URL of the file you want to attach to the notification. The URL must be a file URL and the file must be readable by the current process. This parameter must not be nil. For a list of supported file types, see Supported File Types.
options: A dictionary of options related to the attached file. Use the options to specify meta information about the attachment, such as the clipping rectangle to use for the resulting thumbnail.
error: An error object indicating whether a problem occurred. If the attachment was created successfully, this parameter is set to nil. If an error occurs, it is set to an error object containing information about why the attachment was not created. You may specify nil for this parameter if you do not want the error information.

Returns an attachment object containing information about the specified file or nil if the attachment could

not be created.

This method verifies that the specified file is readable and that the file format is one of the supported types. When errors occur, the method provides an appropriate error object.
When you schedule a notification request containing the attachment, the attachment,Äôs file is moved to a new location to facilitate access by the appropriate processes. After the move, the only way to access the file is using the methods of the UNUserNotificationCenterMBS object.
See also:

- 30.8.7 Constructor(identifier as String, URL as String, options as Dictionary = nil) 1254

30.8.7 Constructor(identifier as String, URL as String, options as Dictionary = nil)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates an attachment object from the specified file and options.
Notes: identifier: The unique identifier of the attachment. Use this string to identify the attachment later. If you specify an empty string, this method creates a unique identifier string for you.
URL: The URL of the file you want to attach to the notification. The URL must be a file URL and the file must be readable by the current process. This parameter must not be nil. For a list of supported file types, see Supported File Types.
options: A dictionary of options related to the attached file. Use the options to specify meta information about the attachment, such as the clipping rectangle to use for the resulting thumbnail.
error: An error object indicating whether a problem occurred. If the attachment was created successfully, this parameter is set to nil. If an error occurs, it is set to an error object containing information about why the attachment was not created. You may specify nil for this parameter if you do not want the error information.

Returns an attachment object containing information about the specified file or nil if the attachment could not be created.

This method verifies that the specified file is readable and that the file format is one of the supported types. When errors occur, the method provides an appropriate error object.
When you schedule a notification request containing the attachment, the attachment,Äôs file is moved to a new location to facilitate access by the appropriate processes. After the move, the only way to access the file is using the methods of the UNUserNotificationCenterMBS object.
See also:

- 30.8.6 Constructor(identifier as String, File as FolderItem, options as Dictionary = nil) 1253

30.8.8 copy as UNNotificationAttachmentMBS

Plugin Version: 19.2, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.8.9 UNNotificationAttachmentOptionsThumbnailClippingRectKey as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The clipping rectangle for a thumbnail image.
Notes: The value of this key is a dictionary containing a normalized CGRectMBS—that is, a unit rectangle whose values are in the range 0.0 to 1.0 and represent the portion of the original image that you want to display. For example, specifying an origin of (0.25, 0.25) and a size of (0.5, 0.5) defines a clipping rectangle that shows only the center portion of the image.

30.8.10 UNNotificationAttachmentOptionsThumbnailHiddenKey as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A Boolean value indicating whether the attachment,Äôs thumbnail is hidden.
Notes: The value of this key is a number containing a Boolean value. When set to true, the attachment,Äôs thumbnail is not displayed. If you do not include this key, the thumbnail is shown.

30.8.11 UNNotificationAttachmentOptionsThumbnailTimeKey as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The frame number of an animation to use as a thumbnail image.
Notes: For animated images, the value of this key is an number containing the frame number to use as the thumbnail. For movies, the value of this key is the time (in seconds) into the movie from which to grab the thumbnail image.

30.8.12 UNNotificationAttachmentOptionsTypeHintKey as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A hint about an attachment,Äôs file type.
Notes: The value of this key is a string containing a Uniform Type Identifier (UTI) that describes the file,Äôs type. If you do not include this key, the attachment,Äôs filename extension is used to determine its type.

30.8.13 Properties

30.8.14 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.8.15 identifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The unique identifier for the attachment.
Notes: (Read only property)

30.8.16 type as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The UTI type of the attachment.
Notes: The value of this property is derived from the attachment data.
(Read only property)

30.8.17 URL as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The URL of the file for this attachment.
Notes: The file at the specified URL is security scoped to your app. Before you access it, call the startAccessingSecurityScopedResource method of NSURL.
(Read only property)

30.9 class UNNotificationCategoryMBS

30.9.1 class UNNotificationCategoryMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A type of notification that your app supports and the custom actions to display with it.
Notes: A UNNotificationCategoryMBS object defines a type of notification that your executable can receive. You create category objects to define your app's actionable notifications—that is, notifications that have action buttons that the user can select in response to the notification. Each category object you create stores the actions and other behaviors associated with a specific type of notification. Register your category objects using the setNotificationCategories method of UNUserNotificationCenterMBS. You can register as many category objects as you want.

To apply category objects to your notifications, include the category,Äôs identifier string in the payload of any notifications you create. For local notifications, put this string in the categoryIdentifier property of the UNMutableNotificationContentMBS object that you use to specify the notification,Äôs content. For remote notifications, use this string as the value of the category key in the aps dictionary of your payload.

Categories can have associated actions, which define custom buttons to display for notifications of that category. When space is unlimited, the system displays up to 10 actions. When space is limited, the system displays at most two actions.

30.9.2 Methods

30.9.3 actions as UNNotificationActionMBS()

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The actions to display when a notification of this type is presented.
Notes: When displaying a notification assigned to this category, the system adds a button to the notification interface for each action in this property. These buttons are displayed after the notification,Äôs content but before the Dismiss button.
When displaying banner notifications, the system displays only the first two actions.

30.9.4 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotificationCategory class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.9.5 category(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, categorySummaryFormat as String, options as Integer) as UNNotificationCategoryMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a category object containing the specified actions and options, a hidden previous placeholder, and the category,Äôs summary format string.
See also:

- 30.9.6 category(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, options as Integer) as UNNotificationCategoryMBS 1258
- 30.9.7 category(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, options as Integer) as UNNotificationCategoryMBS 1259

30.9.6 category(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, options as Integer) as UNNotificationCategoryMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a category object containing the specified actions, options, and a hidden previous placeholder.
Notes: identifier: The unique identifier for the category. Each category that your app uses must have a unique identifier. Do not specify an empty string.
actions: The actions to display when notifications of this type are delivered. When minimal space is available, only the first two actions in the array are displayed. You may specify nil for this parameter if you do not want to display custom actions.
intentIdentifiers: The intent identifier strings that you want to associate with notifications of this type. The Intents framework defines constants for each type of intent that you can associate with your notifications.
hiddenPreviewsBodyPlaceholder: A placeholder string to display when the user has disabled notification previews for the app. Include the characters %u in the string to represent the number of notifications with the same thread identifier. (No other formatting characters are supported.) For example, the string "%u Messages" becomes "2 Messages" when there are two messages.
To specify different strings for the singular and plural cases, use the localizedUserNotificationStringForKey method of string to specify the value for this parameter. The key passed to that method contains the identifier of an entry in a .stringsdict property list of your project. A strings dictionary lets you specify different formatted strings based on the language rules, and is as described in Internationalization and Localization Guide.
options: Additional options for handling notifications of this type. For a list of possible values, see UNNotificationCategoryOptions.
See also:

- 30.9.5 category(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, categorySummaryFormat as String, options as Integer) as

30.9.7 category(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, options as Integer) as UNNotificationCategoryMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a category object containing the specified actions and options.
Notes: identifier: The unique identifier for the category. Each category that your app uses must have a unique identifier. Do not specify an empty string.
actions: The actions to display when notifications of this type are delivered. When minimal space is available, only the first two actions in the array are displayed. You may specify nil for this parameter if you do not want to display custom actions.
intentIdentifiers: The intent identifier strings that you want to associate with notifications of this type. The Intents framework defines constants for each type of intent that you can associate with your notifications.
options: Additional options for handling notifications of this type. For a list of possible values, see UNNotificationCategoryOptions.

Returns an initialized category object.
See also:

- 30.9.5 category(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, categorySummaryFormat as String, options as Integer) as UNNotificationCategoryMBS 1258
- 30.9.6 category(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, options as Integer) as UNNotificationCategoryMBS 1258

30.9.8 Constructor(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, categorySummaryFormat as String, options as Integer)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a category object containing the specified actions and options, a hidden previous placeholder, and the category,Äôs summary format string.
See also:

- 30.9.9 Constructor(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, options as Integer) 1260
- 30.9.10 Constructor(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, options as Integer) 1260

30.9.9 Constructor(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, options as Integer)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a category object containing the specified actions, options, and a hidden previous placeholder.
Notes: identifier: The unique identifier for the category. Each category that your app uses must have a unique identifier. Do not specify an empty string.
actions: The actions to display when notifications of this type are delivered. When minimal space is available, only the first two actions in the array are displayed. You may specify nil for this parameter if you do not want to display custom actions.
intentIdentifiers: The intent identifier strings that you want to associate with notifications of this type. The Intents framework defines constants for each type of intent that you can associate with your notifications.
hiddenPreviewsBodyPlaceholder: A placeholder string to display when the user has disabled notification previews for the app. Include the characters %u in the string to represent the number of notifications with the same thread identifier. (No other formatting characters are supported.) For example, the string "%u Messages" becomes "2 Messages" when there are two messages.
To specify different strings for the singular and plural cases, use the localizedUserNotificationStringForKey method of string to specify the value for this parameter. The key passed to that method contains the identifier of an entry in a .stringsdict property list of your project. A strings dictionary lets you specify different formatted strings based on the language rules, and is as described in Internationalization and Localization Guide.
options: Additional options for handling notifications of this type. For a list of possible values, see UNNotificationCategoryOptions.
See also:

- 30.9.8 Constructor(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, categorySummaryFormat as String, options as Integer) 1259
- 30.9.10 Constructor(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, options as Integer) 1260

30.9.10 Constructor(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, options as Integer)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a category object containing the specified actions and options.
Notes: identifier: The unique identifier for the category. Each category that your app uses must have a unique identifier. Do not specify an empty string.
actions: The actions to display when notifications of this type are delivered. When minimal space is available, only the first two actions in the array are displayed. You may specify nil for this parameter if you do not want to display custom actions.
intentIdentifiers: The intent identifier strings that you want to associate with notifications of this type. The

Intents framework defines constants for each type of intent that you can associate with your notifications.
options: Additional options for handling notifications of this type. For a list of possible values, see UNNotificationCategoryOptions.

Returns an initialized category object.
See also:

- 30.9.8 Constructor(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, categorySummaryFormat as String, options as Integer) 1259
- 30.9.9 Constructor(identifier as String, actions() as UNNotificationActionMBS, intentIdentifiers() as string, hiddenPreviewsBodyPlaceholder as String, options as Integer) 1260

30.9.11 copy as UNNotificationCategoryMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.9.12 intentIdentifiers as String()

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The intents related to notifications of this category.
Notes: When a notification is delivered, the presence of an intent identifier lets the system know that the notification is potentially related to the handling of a request made through Siri.

30.9.13 Properties

30.9.14 categorySummaryFormat as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A format string for the summary description used when the system groups the category,Äôs notifications.
Notes: (Read only property)

30.9.15 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.9.16 hiddenPreviewsBodyPlaceholder as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The placeholder text to display when notification previews are disabled for the app.
Notes: The string in this property may contain the special characters %u as a placeholder for the number of messages with the same thread identifier. If the string in this property is declared in a .stringsdict property list, the system formats the preview message using the information in that file. For more information about specifying a .stringsdict property file, see Internationalization and Localization Guide.
(Read only property)

30.9.17 identifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The unique string assigned to the category.
Notes: Use this string to differentiate the different types of notifications that your app can send. To assign a category to a local notification, assign this string to the categoryIdentifier property of the content object. To assign a category to a remote notification, use the string as the value of the category key in the aps dictionary of the notification payload.
(Read only property)

30.9.18 options as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Options for how to handle notifications of this type.
Notes: (Read only property)

30.9.19 Constants

Options

Constant	Value	Description
OptionAllowInCarPlay	2	Allow CarPlay to display notifications of this type. Apps must be approved for CarPlay overall and then you must enable CarP for the notification types you want displayed. If a category does not explic contain this option, notifications of that type are not displayed in a CarP environment.
OptionCustomDismissAction	1	Send dismiss actions to the UNUserNotificationCenter object,Äôs delegate handling.
OptionHiddenPreviewsShowSubtitle	8	Show the notification's subtitle, even if the user has disabled notification p views for the app.
OptionHiddenPreviewsShowTitle	4	Show the notification's title, even if the user has disabled notification previ for the app.
OptionNone	0	No options.

30.10 class UNNotificationContentMBS

30.10.1 class UNNotificationContentMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The uneditable content of a notification.
Notes: A UNNotificationContent object contains the data associated with a notification. When your app receives a notification, the associated UNNotificationRequestMBS object contains an object of this type with the content that your app received. Use the content object to get the details of the notification, including the type of notification that was delivered, any custom data you stored in the userInfo dictionary before scheduling the notification, and any attachments.
Don't create instances of this class directly. For remote notifications, the contents of this object are derived from the JSON payload that your server sends to the APNS server. For local notifications, create a UNMutableNotificationContentMBS object, and configure the contents of that object instead.
Blog Entries

- MBS Xojo Plugins, version 21.1pr4

30.10.2 Methods

30.10.3 attachment(Index as integer) as UNNotificationAttachmentMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Queries attachment with given index.
Notes: Index from 0 to attachmentCount-1.

30.10.4 attachments as UNNotificationAttachmentMBS()

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: An array of attachments to display with the notification.
Notes: Use this property to retrieve the images, movies, and audio files associated with your notification,Äôs content. A notification content app extension might use these values to add the associated content to its view controller.

30.10.5 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotificationContent class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.10.6 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The private constructor.
See also:

- 30.10.7 Constructor(Handle as Integer) 1265

30.10.7 Constructor(Handle as Integer)

Plugin Version: 21.1, Platform: macOS, Targets: Desktop only.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a UNNotificationContent reference from a declare.
The object is retained.
See also:

- 30.10.6 Constructor 1265

30.10.8 copy as UNNotificationContentMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.10.9 mutableCopy as UNMutableNotificationContentMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a mutable copy of the object.

30.10.10 Properties

30.10.11 attachmentCount as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The attachment count.
Notes: (Read only property)

30.10.12 badge as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The number to display as the app,Äôs icon badge.
Notes: When the number in this property is 0, the system does not display a badge. When the number is greater than 0, the system displays the badge with the specified number. When the value in this property is not set, the system leaves the current badge unchanged.
(Read only property)

30.10.13 body as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The message displayed in the notification alert.
Notes: The body text contains the final text that you want to display. If your app is not authorized to display alert-based notifications, this property is ignored.
If you specified two percent symbols (%%) in the message body, the system replaces it with a single percent symbol (%). The system strips all other printf style escape characters from your string prior to display.
(Read only property)

30.10.14 categoryIdentifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The identifier of the app-defined category object.
Notes: Use notification types to distinguish between the different types of notifications your app supports. You use this support primarily to create actionable notifications—that is, notifications with custom action buttons—and to redirect your notifications through either your notification service app extension or your notification content app extension.
For remote notifications, this property is set to the value of the category key in the aps dictionary.
(Read only property)

30.10.15 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.10.16 sound as UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The sound to play when the notification is delivered.
Notes: Notifications can play a default sound or a custom sound. For information on how to specify custom sounds for your notifications, see UNNotificationSoundMBS.
(Read only property)

30.10.17 subtitle as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A secondary description of the reason for the alert.
Notes: Subtitles offer additional context in cases where the title alone is not clear. Subtitles are not displayed in all cases. If your app is not authorized to display alert-based notifications, this property is ignored.
(Read only property)

30.10.18 summaryArgument as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The string the notification adds to the category,Äôs summary format string.
Notes: (Read only property)

30.10.19 summaryArgumentCount as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The number of items the notification adds to the category,Äôs summary format string.
Notes: (Read only property)

30.10.20 threadIdentifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: An identifier that you use to group related notifications together.
Notes: For remote notifications, this property is set to the value of the thread-id key in the aps dictionary.
(Read only property)

30.10.21 title as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A short description of the reason for the alert.
Notes: When a title is present, the system attempts to display a notification alert. If your app is not authorized to display alert-based notifications, this property is ignored.
Title strings should be short, usually only a couple of words describing the reason for the notification. In watchOS, the title string is displayed as part of the short look notification interface, which has limited space.
(Read only property)

30.10.22 userInfo as Dictionary

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A dictionary of custom information associated with the notification.
Notes: For remote notifications, this property contains the entire notification payload. For local notifications, you configure the property directly before scheduling the notification.
The keys in this dictionary must be property-list types—that is, they must be types that can be serialized into the property-list format.
(Read only property)

30.11 class UNNotificationMBS

30.11.1 class UNNotificationMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The data for a local or remote notification that was delivered to your app.
Notes: A UNNotification object contains the initial notification request, which contains the notification's payload, and the date on which the notification was delivered.
Don't create notification objects directly. When handling notifications, the system delivers notification objects to your events. The UNUserNotificationCenterMBS object also maintains the list of notifications that were previously delivered, and you use the getDeliveredNotifications method to retrieve those objects.
Blog Entries

- MBS Xojo Plugins, version 21.1pr4
- MBS Xojo Plugins, version 20.6pr1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 19.1
- MBS Xojo Plugins, version 19.1pr1

Videos

- Presentation from Xojo Developer Conference 2019 in Miami.

Xojo Developer Magazine

- 17.3, page 11: News

30.11.2 Methods

30.11.3 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotification class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.11.4 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The private constructor.
See also:

- 30.11.5 Constructor(Handle as Integer) 1270

30.11.5 Constructor(Handle as Integer)

Plugin Version: 21.1, Platform: macOS, Targets: Desktop only.

Function: Constructor for creating an instanced based on an existing handle.
Notes: Useful if you get a UNNotification reference from a declare.
The object is retained.
See also:

- 30.11.4 Constructor 1269

30.11.6 copy as UNNotificationMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.11.7 UNErrorDomain as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The error domain for notifications.

30.11.8 Properties

30.11.9 Date as Date

Plugin Version: 19.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: The delivery date of the notification.
Notes: This date is displayed to the user in Notification Center.
(Read only property)

30.11.10 DateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The delivery date of the notification.
Notes: This date is displayed to the user in Notification Center.
(Read only property)

30.11.11 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.11.12 request as UNNotificationRequestMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The notification request containing the payload and trigger condition for the notification.
Notes: For local notifications, the request object is a copy of the one you originally configured. For remote notifications, the request object is synthesized from information received from Apple Push Notification service.
(Read only property)

30.11.13 Constants

Errors

Constant	Value	Description
UNErrorCodeAttachmentCorrupt	105	The file for an attachment is corrupt.
UNErrorCodeAttachmentInvalidFileSize	102	An attachment is too large.
UNErrorCodeAttachmentInvalidURL	100	The URL for an attachment was invalid.
UNErrorCodeAttachmentMoveIntoDataStoreFailed	104	An error occurred when trying to move an attachment to the
UNErrorCodeAttachmentNotInDataStore	103	The specified attachment is not in the system data store.
UNErrorCodeAttachmentUnrecognizedType	101	The file type of an attachment is not supported.
UNErrorCodeNotificationInvalidNoContent	1401	The notification has no user-facing content, but should.
UNErrorCodeNotificationInvalidNoDate	1400	The notification does not have an associated date, but shou
UNErrorCodeNotificationsNotAllowed	1	Notifications are not allowed. This error occurs when you try to submit a notification req or app extension is not authorized to schedule notifications.

30.12 class UNNotificationRequestMBS

30.12.1 class UNNotificationRequestMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A request to schedule a local notification, which includes the content of the notification and the trigger conditions for delivery.
Notes: Create a UNNotificationRequestMBS object when you want to schedule the delivery of a local notification. A notification request object contains a UNNotificationContentMBS object with the payload to be delivered, and it contains the UNNotificationTriggerMBS object with the conditions that trigger the delivery of the notification. To schedule the delivery of your notification, pass your request object to the addNotificationRequest method of the shared user notification center object.

After scheduling a request, you interact with UNNotificationRequestMBS objects in the following ways:

- View your app's pending notifications by calling the getPendingNotificationRequestsWithCompletion-Handler: method of your shared user notification center object.
- When a notification is delivered to your app, the provided UNNotificationMBS object contains a UNNotificationRequest object that you can inspect to get the notification details.
- Use the request's identifier to remove delivered notifications from Notification Center.

When receiving a local or remote notification, use the provided UNNotificationRequestMBS object to fetch details about the notification.

30.12.2 Methods

30.12.3 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotificationRequest class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.12.4 Constructor(identifier as string, content as UNNotificationContentMBS, trigger as UNNotificationTriggerMBS)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a notification request object that you use to schedule a notification.
Notes: identifier: An identifier for the request; this parameter must not be nil. You can use this identifier

to cancel the request if it is still pending (see the removePendingNotificationRequests method).
content: The content of the notification. This parameter must not be nil.
trigger: The condition that causes the notification to be delivered. Specify nil to deliver the notification right away.

Returns a new notification request object.

Use this method when you want to schedule the delivery of a local notification. This method creates the request object that you subsequently pass to the addNotificationRequest method.
The system uses the identifier parameter to determine how to handle the request:

- If you provide a unique identifier, the system creates a new notification.
- If the identifier matches a previously delivered notification, the system alerts the user again, replaces the old notification with the new one, and places the new notification at the top of the list.
- If the identifier matches a pending request, the new request replaces the pending request.

30.12.5 Copy as UNNotificationRequestMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.12.6 request(identifier as string, content as UNNotificationContentMBS, trigger as UNNotificationTriggerMBS) as UNNotificationRequestMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a notification request object that you use to schedule a notification.
Notes: identifier: An identifier for the request; this parameter must not be nil. You can use this identifier to cancel the request if it is still pending (see the removePendingNotificationRequests method).
content: The content of the notification. This parameter must not be nil.
trigger: The condition that causes the notification to be delivered. Specify nil to deliver the notification right away.

Returns a new notification request object.

Use this method when you want to schedule the delivery of a local notification. This method creates the request object that you subsequently pass to the addNotificationRequest method.
The system uses the identifier parameter to determine how to handle the request:

- If you provide a unique identifier, the system creates a new notification.
- If the identifier matches a previously delivered notification, the system alerts the user again, replaces the old notification with the new one, and places the new notification at the top of the list.
- If the identifier matches a pending request, the new request replaces the pending request.

30.12.7 Properties

30.12.8 content as UNNotificationContentMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The content associated with the notification.
Notes: Use this property to access the contents of the notification.
(Read only property)

30.12.9 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.12.10 identifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The unique identifier for this notification request.
Notes: Use this string to identify notifications in your app. For example, you can pass this string to the removePendingNotificationRequests method to cancel a previously scheduled notification.
If you use the same identifier when scheduling a new notification, the system removes the previously scheduled notification with that identifier and replaces it with the new one.
For local notifications, this property is set to the value passed to the request,Äôs initializer (see the request method). For remote notifications, it is set to the value of the apns-collapse-id key that you specified in the APNs request header when generating the remote notification. If no value is set, the system automatically assigns an identifier.
(Read only property)

30.12.11 trigger as UNNotificationTriggerMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The conditions that trigger the delivery of the notification.
Notes: For notifications that have already been delivered, use this property to determine what caused the delivery to occur. For remote notifications, this property contains a UNPushNotificationTriggerMBS object. For other notifications, the type is based on the trigger condition specified in the original request.
(Read only property)

30.13 class UNNotificationResponseMBS

30.13.1 class UNNotificationResponseMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The user,Äôs response to an actionable notification.
Notes: When the user interacts with a delivered notification, the system delivers a UNNotificationResponseMBS object to your app so that you can process the response. Users can interact with delivered notifications in many ways. If the notification,Äôs category had associated action buttons, they can select one of those buttons. Users can also dismiss the notification without selecting one of your actions and they can open your app. A response object tells you which option the user selected.

You don't create UNNotificationResponseMBS objects yourself. Instead, the shared user notification center object creates them and delivers them to the didReceiveNotificationResponse event. Use that method to extract any needed information from the response object and take appropriate action.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

30.13.2 Methods

30.13.3 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotificationResponse class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.13.4 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The private constructor.

30.13.5 copy as UNNotificationResponseMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.13.6 UNNotificationDefaultActionIdentifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: An action that indicates the user opened the app from the notification interface.
Notes: The delivery of this action does not require any special configuration of notification categories. Use the didReceiveNotificationResponse event to receive this action.

30.13.7 UNNotificationDismissActionIdentifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The action that indicates the user explicitly dismissed the notification interface.
Notes: This action is delivered only if the notification,Äôs category object was configured with the UNNotificationCategoryOptionCustomDismissAction option. To trigger this action, the user must explicitly dismiss the notification interface. For example, the user must tap the Dismiss button or swipe down on the notification interface in watchOS to trigger this action.
Ignoring a notification or flicking away a notification banner does not trigger this action.

30.13.8 Properties

30.13.9 actionIdentifier as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The identifier string of the action that the user selected.
Notes: This parameter may contain one the identifier of one of your UNNotificationActionMBS objects or it may contain a system-defined identifier. The system defined identifiers are UNNotificationDefaultActionIdentifier and UNNotificationDismissActionIdentifier, which indicate that the user opened the app or dismissed the notification without any further actions.
(Read only property)

30.13.10 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.13.11 notification as UNNotificationMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The notification to which the user responded.
Notes: (Read only property)

30.14 class UNNotificationSettingsMBS

30.14.1 class UNNotificationSettingsMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The object for managing notification-related settings and the authorization status of your app.
Notes: A UNNotificationSettingsMBS object contains the current authorization status and notification-related settings for your app. Apps must receive authorization to schedule notifications and to interact with the user. Apps that run in CarPlay must similarly receive authorization to do so. You use this object to determine what notification-related actions your app is allowed to perform. You might then use that information to enable, disable, or adjust your app's notification-related behaviors. Regardless of whether you take action, the system enforces your app's settings by preventing denied interactions from occurring.
You don't create instances of this class directly. Instead, call the getNotificationSettings method of your app,Äôs UNUserNotificationCenterMBS object to get the current settings.
For more information about requesting authorization for user interactions, see UNUserNotificationCenter.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

30.14.2 Methods

30.14.3 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotificationSettings class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.14.4 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The private constructor.

30.14.5 copy as UNNotificationSettingsMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.14.6 settings as UNNotificationSettingsMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The last settings received via getNotificationSettingsCompleted event.
Notes: You call getNotificationSettings and whether you implement and handle the event or not, the settings are stored by plugin in a global variable, so you can query them here.

30.14.7 Properties

30.14.8 alertSetting as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The authorization status for displaying alerts.
Notes: When the value of this property is NotificationSettingEnabled, the app is authorized to display alerts. Authorization does not guarantee that alerts always appear on the user,Äôs screen. When a device is unlocked, the alertStyle property determines the presentation style for the alert, which can include not displaying the alert at all.
The system tries to display an alert when the title, subtitle, or body properties of a UNNotificationContentMBS object contain values, or when the aps dictionary in a remote notification contains the alert key.
(Read only property)

30.14.9 alertStyle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The type of alert that the app may display when the device is unlocked.
Notes: When alerts are authorized, this property specifies the presentation style for alerts when the device is unlocked. The user may choose to display alerts as automatically disappearing banners or as modal windows that require explicit dismissal. The user may also choose not to display alerts at all.
(Read only property)

30.14.10 authorizationStatus as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The app's ability to schedule and receive local and remote notifications.
Notes: When the value of this property is AuthorizationStatusAuthorized, your app is allowed to schedule and receive local and remote notifications. When authorized, use the alertSetting, badgeSetting, and soundSetting properties to specify which types of interactions are allowed. When the value of the property is AuthorizationStatusDenied, the system doesn't deliver notifications to your app, and the system ignores any attempts to schedule local notifications.

The value of this property is AuthorizationStatusNotDetermined if your app has never requested authorization using the requestAuthorization method.
(Read only property)

30.14.11 badgeSetting as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The authorization status for badging your app,Äôs icon.
Notes: When the value of this property is NotificationSettingEnabled, the app is authorized to badge its icon. The system tries to badge your app's icon when the badge property of a UNNotificationContentMBS object contain a value, or when the aps dictionary in a remote notification contains the badge key.
(Read only property)

30.14.12 criticalAlertSetting as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The authorization status to play sounds for critical alerts.
Notes: When NotificationSettingEnabled, this property authorizes the app to play critical sounds that ignore Do Not Disturb and the device,Äôs mute switch.
For local notifications, the system attempts to play a critical sound when the sound property of the UNNotificationContentMBS object contains an object returned by the defaultCriticalSound property, the criticalSoundNamed method, or a related method.
For remote notifications, the system attempts to play a critical sound when the notification,Äôs payload contains a sound directory that contains the critical key.
Critical alerts require a special entitlement issued by Apple.
(Read only property)

30.14.13 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.14.14 lockScreenSetting as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The setting that indicates whether your app,Äôs notifications appear onscreen when the device

is locked.
Notes: Even if the user disables lock screen notifications, your notifications may still appear onscreen when the device is unlocked.
(Read only property)

30.14.15 notificationCenterSetting as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The setting that indicates whether your app,Äôs notifications are displayed in Notification Center.
Notes: The default value of this property is NotificationSettingEnabled.
(Read only property)

30.14.16 providesAppNotificationSettings as Boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A Boolean value indicating the system displays a button for in-app notification settings.
Notes: (Read only property)

30.14.17 showPreviewsSetting as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The setting that indicates whether the app shows a preview of the notification's content.
Notes: (Read only property)

30.14.18 soundSetting as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The authorization status for playing sounds for incoming notifications.
Notes: When the value of this property is NotificationSettingEnabled, the app is authorized to play sounds. The system tries to play a sound when the sound property of the UNNotificationContentMBS object contains a value, or when the aps dictionary in a remote notification contains the sound key.
(Read only property)

30.14.19 Constants

Alert Style

Constant	Value	Description
AlertStyleAlert	2	Modal alerts. Alerts are displayed in a modal window that must be dismissed explicitly by the user.
AlertStyleBanner	1	Banner alerts. Alerts are displayed as a slide-down banner. Banners appear for a short time and then disappear automatically if the user does nothing.
AlertStyleNone	0	No alert.

Authorization Status

Constant	Value	Description
AuthorizationStatusAuthorized	2	The app is authorized to schedule or receive notifications.
AuthorizationStatusDenied	1	The app isn't authorized to schedule or receive notifications.
AuthorizationStatusNotDetermined	0	The user hasn't yet made a choice about whether the app is allowed to sched notifications.
AuthorizationStatusProvisional	3	The application is provisionally authorized to post noninterruptive user not cations.

Notification Settings

Constant	Value	Description
NotificationSettingDisabled	1	The setting is disabled.
NotificationSettingEnabled	2	The setting is enabled.
NotificationSettingNotSupported	0	The setting is not available to your app.

Show Preview Settings

Constant	Value	Description
ShowPreviewsSettingAlways	0	The notification's content is always shown, even when the device is lo
ShowPreviewsSettingNever	2	The notification's content is never shown, even when the device is un
ShowPreviewsSettingWhenAuthenticated	1	The notification's content is shown only when the device is unlocked.

30.15 class UNNotificationSoundMBS

30.15.1 class UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The sound played when a notification is delivered.
Notes: Create a UNNotificationSoundMBS object when you want the delivery of your notification to be accompanied by a specific sound. To play the default system sound, create your sound object using the defaultSound method. If you want to play a custom sound, create a new sound object and specify the name of the audio file that you want to play.

For local notifications, assign the sound object to the sound property of your UNMutableNotificationContentMBS object. For a remote notification, assign the name of your sound file to the sound key in the aps dictionary. You can also use a notification service app extension to add a sound file to a notification shortly before delivery. In your extension, create a UNNotificationSound object and add it to your notification content in the same way that you would for a local notification.
Audio files must already be on the user,Äôs device before they can be played. If you use a predefined set of sounds for your notifications, include the audio files in your app,Äôs bundle. For all other sounds, place a copy of the audio file in the Library/Sounds folder of your app,Äôs container directory. The UNNotificationSound object looks only in those two locations.

Prepare Sound Resources
The system sound facility plays custom alert sounds, so they must be in one of the following audio data formats:

- Linear PCM
- MA4 (IMA/ADPCM)
- ¬µLaw
- aLaw

You can package the audio data in an aiff, wav, or caf file. Sound files must be less than 30 seconds in length. If the sound file is longer than 30 seconds, the system plays the default sound instead.

You can use the afconvert command-line tool to convert sounds. For example, to convert the system sound Submarine.aiff to IMA4 audio in a CAF file, use the following command in Terminal:

afconvert /System/Library/Sounds/Submarine.aiff
textasciitilde /Desktop/sub.caf -d ima4 -f caff -v
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

30.15.2 Methods

30.15.3 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotificationSound class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.15.4 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The private constructor.

30.15.5 copy as UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.15.6 criticalSoundNamed(name as string) as UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a custom sound object for critical alerts.
Notes: name: The name of the sound file to play. This file must be located in the current executable,Äôs main bundle or in the Library/Sounds directory of the current app container directory. If files exist at both locations, the system uses the file from the Library/Sounds directory. This parameter must not be nil.

Returns a sound object representing a custom critical alert sound.

Critical alerts ignore the mute switch and Do Not Disturb. They require a special entitlement issued by Apple.
See also:

- 30.15.7 criticalSoundNamed(name as string, volume as double) as UNNotificationSoundMBS 1286

30.15.7 criticalSoundNamed(name as string, volume as double) as UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a custom sound object for critical alerts with the specified volume.
Notes: name: The name of the sound file to play. This file must be located in the current executable,Äôs main bundle or in the Library/Sounds directory of the current app container directory. If files exist at both locations, the system uses the file from the Library/Sounds directory. This parameter must not be nil.
volume: The volume must be a value between 0.0 and 1.0.

Returns a sound object representing a custom critical alert sound at the specified volume.

Critical alerts ignore the mute switch and Do Not Disturb. They require a special entitlement issued by Apple.
See also:

- 30.15.6 criticalSoundNamed(name as string) as UNNotificationSoundMBS 1285

30.15.8 defaultCriticalSound as UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The default sound used for critical alerts.
Notes: Critical alerts ingore the mute switch and Do Not Disturb. They require a special entitlement issued by Apple.

30.15.9 defaultCriticalSoundWithAudioVolume(volume as double) as UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a sound object that plays the default critical alert sound at the specified volume.
Notes: volume: The volume must be a value between 0.0 and 1.0.

Returns a sound object representing the default critical alert sound at the specified volume.

Critical alerts ignore the mute switch and Do Not Disturb. They require a special entitlement issued by Apple.

30.15.10 defaultSound as UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Returns an object representing the default sound for notifications.

30.15.11 soundNamed(name as string) as UNNotificationSoundMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a sound object that represents a custom sound file.
Notes: name: The name of the sound file to play. This file must be located in the current executable,Äôs main bundle or in the Library/Sounds directory of the current app container directory. This parameter must not be nil.

Returns a sound object representing the custom sound.

If a sound file with the given name exists both in the current bundle and in the Library/Sounds folder, this method chooses the file in the Library/Sounds folder.

30.15.12 Properties

30.15.13 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.16 class UNNotificationTriggerMBS

30.16.1 class UNNotificationTriggerMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The common behavior for subclasses that trigger the delivery of a local or remote notification.
Notes: The UNNotificationTrigger class is an abstract class for representing an event that triggers the delivery of a notification. You don't create instances of this class directly. Instead, you instantiate the concrete subclass that defines the trigger condition you want for your notification. You then assign the resulting object to the UNNotificationRequestMBS object that you use to schedule your notification.

Concrete trigger classes include the following:

- UNTimeIntervalNotificationTriggerMBS
- UNCalendarNotificationTriggerMBS
- UNLocationNotificationTriggerMBS
- UNPushNotificationTriggerMBS

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

30.16.2 Methods

30.16.3 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNNotificationTrigger class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.16.4 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The private constructor.

30.16.5 copy as UNNotificationTriggerMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

30.16.6 Properties

30.16.7 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.16.8 repeats as Boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A Boolean value indicating whether the system reschedules the notification after it is delivered.
Notes: When this property is NO, the notification is delivered only once. When this property is YES, the notification request is rescheduled automatically, resulting in the notification being delivered each time the trigger condition is met. To unschedule the notification request, use the methods of the UNUserNotificationCenterMBS to remove the notification request.
(Read only property)

30.17 class UNPushNotificationTriggerMBS

30.17.1 class UNPushNotificationTriggerMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A trigger condition that indicates the notification was sent from Apple Push Notification Service (APNs).
Notes: You don't create instances of this class yourself. The system creates UNPushNotificationTrigger objects and associates them with requests that originated from Apple Push Notification service. You encounter instances of this class when managing your app,Äôs delivered notification requests, which store an object of this type in their trigger property.
Subclass of the UNNotificationTriggerMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

30.17.2 Methods

30.17.3 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The private constructor.

30.18 class UNTextInputNotificationActionMBS

30.18.1 class UNTextInputNotificationActionMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: An action that can accept user-typed text.
Notes: Use UNTextInputNotificationActionMBS objects to define an action that allows the user to provide a custom text-based response. When the user selects an action of this type, the system displays controls for the user to enter or dictate the text content. That text is then included in the response object that is delivered to your app.
Subclass of the UNNotificationActionMBS class.

30.18.2 Methods

30.18.3 action(identifier as string, title as string, options as integer, textInputButtonTitle as string, textInputPlaceholder as string) as UNTextInputNotificationActionMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates an action object that accepts text input from the user.
Notes: identifier: The string that you use internally to identify the action. This string must be unique among all of your app's supported actions. When the user selects the action, the system passes this string to your app and asks you to perform the related task. This parameter must not be nil or an empty string.
title: The localized string to display to the user. This string is used as the title of a button, which is added to the notification interface. This parameter must not be nil.
options: Additional options describing how the action behaves. Include options when you need the related behavior. For a list of possible values, see options.
textInputButtonTitle: The localized title of the text input button that is displayed to the user.
textInputPlaceholder: The localized placeholder text to display in the text input field.

Returns a new text input action object.

30.18.4 Constructor(identifier as string, title as string, options as integer, textInputButtonTitle as string, textInputPlaceholder as string)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates an action object that accepts text input from the user.
Notes: identifier: The string that you use internally to identify the action. This string must be unique among all of your app's supported actions. When the user selects the action, the system passes this string to your app and asks you to perform the related task. This parameter must not be nil or an empty string.

title: The localized string to display to the user. This string is used as the title of a button, which is added to the notification interface. This parameter must not be nil.
options: Additional options describing how the action behaves. Include options when you need the related behavior. For a list of possible values, see options.
textInputButtonTitle: The localized title of the text input button that is displayed to the user.
textInputPlaceholder: The localized placeholder text to display in the text input field.

Returns a new text input action object.

30.18.5 Properties

30.18.6 textInputButtonTitle as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The localized title of the text input button that is displayed to the user.
Notes: (Read only property)

30.18.7 textInputPlaceholder as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The localized placeholder text to display in the text input field.
Notes: (Read only property)

30.19 class UNTextInputNotificationResponseMBS

30.19.1 class UNTextInputNotificationResponseMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The user,Äôs response to an actionable notification, including any custom text that the user typed or dictated.
Notes: The system delivers a UNTextInputNotificationResponse object to your app so that you can process user-provided text content. When defining your categories, you can specify an UNTextInputNotificationActionMBS object instead of an UNNotificationActionMBS object for your action. If you do, the system creates an UNTextInputNotificationResponseMBS object when the user selects the accompanying action, and it fills the userText property with any user-entered text.

You don't create UNTextInputNotificationResponseMBS objects yourself. Instead, the shared user notification center object creates them and delivers them to the didReceiveNotificationResponse event. Use that method to extract any needed information from the response object and take appropriate action.
Subclass of the UNNotificationResponseMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

30.19.2 Methods

30.19.3 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The private constructor.

30.19.4 Properties

30.19.5 userText as String

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The text response provided by the user.
Notes: If the user does not specify any text, this property contains an empty string.
(Read only property)

30.20 class UNTimeIntervalNotificationTriggerMBS

30.20.1 class UNTimeIntervalNotificationTriggerMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A trigger condition that causes a notification to be delivered after the specified amount of time elapses.
Notes: Create a UNTimeIntervalNotificationTrigger object when you want to schedule the delivery of a local notification after the specified number of seconds elapse. You use this type of trigger to implement timers.
Subclass of the UNNotificationTriggerMBS class.

30.20.2 Methods

30.20.3 Constructor(timeInterval as double, repeats as boolean)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a time interval trigger from the specified time value.
Notes: timeInterval: The time (in seconds) that must elapse from the current time before the trigger fires. This value must be greater than zero.
repeats: Specify false to deliver the notification one time. Specify true to reschedule the notification request each time the notification is delivered. If this parameter is true, the value in the timeInterval parameter must be 60 seconds or greater.

Return Value:
A new time interval trigger based on the specified temporal information.

If you specify true for the repeats parameter, you must explicitly remove the notification request to stop the delivery of the associated notification. Use the methods of UNUserNotificationCenterMBS to remove notification requests that are no longer needed.

30.20.4 trigger(timeInterval as double, repeats as boolean) as UNTimeIntervalNotificationTriggerMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Creates a time interval trigger from the specified time value.
Notes: timeInterval: The time (in seconds) that must elapse from the current time before the trigger fires. This value must be greater than zero.
repeats: Specify false to deliver the notification one time. Specify true to reschedule the notification request each time the notification is delivered. If this parameter is true, the value in the timeInterval parameter

must be 60 seconds or greater.

Return Value:
A new time interval trigger based on the specified temporal information.

If you specify true for the repeats parameter, you must explicitly remove the notification request to stop the delivery of the associated notification. Use the methods of UNUserNotificationCenterMBS to remove notification requests that are no longer needed.

30.20.5 Properties

30.20.6 nextTriggerDate as Date

Plugin Version: 19.1, Platform: macOS, Targets: Desktop, Console & Web.

Function: The next date at which the trigger conditions will be met.
Notes: Use this property to find out when a notification associated with this trigger will next be delivered.
(Read only property)

30.20.7 nextTriggerDateTime as DateTime

Plugin Version: 20.5, Platform: macOS, Targets: All.

Function: The next date at which the trigger conditions will be met.
Notes: Use this property to find out when a notification associated with this trigger will next be delivered.
(Read only property)

30.20.8 timeInterval as Double

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The time interval used to create the trigger.
Notes: This property contains the original time interval that you specified when creating the trigger object. The value in this property is not updated as time counts down. To find out when the trigger will fire next, call the nextTriggerDate method.
(Read only property)

30.21 class UNUserNotificationCenterMBS

30.21.1 class UNUserNotificationCenterMBS

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The central object for managing notification-related activities for your app or app extension.
Notes: see also
https://developer.apple.com/documentation/usernotifications/unusernotificationcenter?language=objc
Blog Entries

- MBS Xojo Plugins, version 20.6pr1
- MBS Xojo Plugins, version 19.2pr4

30.21.2 Methods

30.21.3 addNotificationRequest(request as UNNotificationRequestMBS, tag as Variant = nil)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Schedules a local notification for delivery.
Notes: This method schedules local notifications only; you cannot use it to schedule the delivery of remote notifications. Upon calling this method, the system begins tracking the trigger conditions associated with your request. When the trigger condition is met, the system delivers your notification. If the request does not contain a UNNotificationTriggerMBS object, the notification is delivered right away.
You may call this method from any thread of your app.

request: The request object containing the notification payload and trigger information. This parameter must not be nil.

Calls addNotificationRequestCompleted event later. Request and tag parameter is passed through.

30.21.4 Available as boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Whether the UNUserNotificationCenter class is available.
Notes: Returns true on MacOS 10.14 or newer in 64-bit MacOS application.

30.21.5 Constructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Returns the shared user notification center object for your app or app extension.

30.21.6 Destructor

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The destructor.

30.21.7 getDeliveredNotifications(tag as Variant = nil)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Returns a list of the app,Äôs notifications that are still displayed in Notification Center.
Notes: This method executes asynchronously, returning immediately and executing the provided block on a background thread when the results become available.

Calls getDeliveredNotificationsCompleted event later. Tag parameter is

30.21.8 getNotificationCategories(tag as Variant = nil)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Retrieves the app,Äôs currently registered notification categories.
Notes: Use this method to retrieve your app,Äôs currently registered notification types. You might use this method when you want to augment the current set of categories with new categories later on. Simply merge the returned set with any new category objects and register the updated set.

Calls getNotificationCategoriesCompleted event later. Tag parameter is passed through.

30.21.9 getNotificationSettings(tag as Variant = nil)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Requests the notification settings for this app.
Notes: Use this method to determine the user interactions and notification-related features that your app is authorized to use. You might then use this information to enable or disable specific notification-related

features of your app.
When the user initially grants authorization to your app, the system gives your app a set of default notification-related settings. The user may change those settings at any time to enable or disable specific capabilities. For example, the user might disable the playing of sounds when a notification arrives.

Calls getNotificationSettingsCompleted event later. Tag parameter is passed through.

30.21.10 getPendingNotificationRequests(tag as Variant = nil)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Returns a list of all notification requests that are scheduled and waiting to be delivered.
Notes: This method executes asynchronously, returning immediately and executing the provided block on a secondary thread when the results are available.

Calls getPendingNotificationRequestsCompleted event later. Tag parameter is passed through.

30.21.11 removeAllDeliveredNotifications

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Removes all of the app,Äôs delivered notifications from Notification Center.
Notes: Use this method to remove all of your app,Äôs delivered notifications from Notification Center. The method executes asynchronously, returning immediately and removing the identifiers on a background thread. This method does not affect any notification requests that are scheduled, but have not yet been delivered.

30.21.12 removeAllPendingNotificationRequests

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Unschedules all pending notification requests.
Notes: This method executes asynchronously, removing all pending notification requests on a secondary thread.

30.21.13 removeDeliveredNotifications(identifiers() as string)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Removes the specified notification requests from Notification Center.

Notes: identifiers: An array of strings, each of which corresponds to a value in the identifier property of a UNNotificationRequestMBS object. This method ignores the identifiers of requests whose notifications are not currently displayed in Notification Center.

Use this method to selectively remove notifications that you no longer want displayed in Notification Center. The method executes asynchronously, returning immediately and removing the specified notifications on a background thread.

30.21.14 removePendingNotificationRequests(identifiers() as string)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Unschedules the specified notification requests.
Notes: identifiers: An array of strings, each of which contains the identifier of an active UNNotification-RequestMBS object. If the identifier belongs to a non repeating request, and the trigger condition for that request has already been met, this method ignores the identifier.

This method executes asynchronously, removing the pending notification requests on a secondary thread.

30.21.15 requestAuthorization(options as integer, tag as Variant = nil)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Requests authorization to interact with the user when local and remote notifications are delivered to the user's device.
Notes: options: The authorization options your app is requesting. You may combine the available constants to request authorization for multiple items. Request only the authorization options that you plan to use. For a list of possible values, see UNAuthorizationOptions.

Calls requestAuthorizationCompleted event later. The tag parameter is passed through.

If your app's local or remote notifications involve user interactions, you must request authorization for the system to perfom those interactions on your app's behalf. Interactions include displaying an alert, playing a sound, or badging the app's icon.

Always call this method before scheduling any local notifications and before registering with the Apple Push Notification service. Typically, you call this method at launch time when configuring your app's notification support.

The first time your app ever calls the method, the system prompts the user to authorize the requested interactions. The user may grant or deny authorization, and the system stores the user,Äôs response so that

subsequent calls to this method do not prompt the user again. After determining the authorization status, the user notification center object executes the block in the completionHandler parameter. Use that block to make any adjustments to your app's behavior. For example, if authorization was denied, you might notify a remote notification server not to send notifications to the user,Äôs device.

The user may change the allowed interactions at any time in system settings. Use the getNotificationSettings method to determine what interactions are currently allowed for your app.

30.21.16 setNotificationCategories(categories() as UNNotificationCategoryMBS)

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: Registers your app,Äôs notification types and the custom actions that they support.
Notes: categories: A set of UNNotificationCategoryMBS objects, each of which contains the actions that are displayed with the notification interface. This parameter must contain all of your app,Äôs supported categories.

Call this method at launch time to register your app,Äôs actionable notification types. This method registers all of your categories at once, replacing any previously registered categories with the new ones in the categories parameter. Typically, you call this method only once.

Each object in the categories parameter contains a string for identifying the notification's type. It also contains one or more custom actions that the user may perform in response to notifications of that type. When the system displays an alert for a notification, it looks in the notification payload for one of the identifier strings from your category objects. If it finds one, it adds user-selectable buttons for each action associated with that category object. Tapping a button notifies your app of the selected action, without bringing your app to the foreground.

30.21.17 Properties

30.21.18 Handle as Integer

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

30.21.19 supportsContentExtensions as Boolean

Plugin Version: 19.1, Platform: macOS, Targets: All.

Function: A Boolean value indicating whether the current device supports notification content extensions.
Notes: Notification content extensions let you customize the appearance of the alerts displayed for your app's notifications. The value of this property is YES for devices that support notification content extensions and NO for devices that do not support them.
(Read only property)

30.21.20 Events

30.21.21 addNotificationRequestCompleted(request as UNNotificationRequestMBS, error as NSErrorMBS, tag as variant)

Plugin Version: 19.1, Platform: macOS, Targets: .

Function: Called by addNotificationRequest method when completed.
Notes: error: An error object indicating whether a problem occurred. If the notification was scheduled successfully, this parameter is nil; otherwise, it is set to an error object indicating the reason for the failure.

30.21.22 didReceiveNotificationResponse(response as UNNotificationResponseMBS)

Plugin Version: 19.1, Platform: macOS, Targets: .

Function: Asks you to process the user's response to a delivered notification.
Notes: response: The user,Äôs response to the notification. This object contains the original notification and the identifier string for the selected action. If the action allowed the user to provide a textual response, this parameter contains a UNTextInputNotificationResponseMBS object.

Use this method to process the user's response to a notification. If the user selected one of your app's custom actions, the response parameter contains the identifier for that action. (The response can also indicate that the user dismissed the notification interface, or launched your app, without selecting a custom action.) At the end of your implementation, call the completionHandler block to let the system know that you are done processing the user's response. If you do not implement this method, your app never responds to custom actions.

You specify your app,Äôs notification types at app launch using UNNotificationCategoryMBS objects, and you specify the custom actions for each type using UNNotificationActionMBS objects.

30.21.23 getDeliveredNotificationsCompleted(notifications() as UNNotificationMBS, tag as variant)

Plugin Version: 19.1, Platform: macOS, Targets: .

Function: Called by getDeliveredNotifications method.
Notes: notifications: An array of UNNotificationMBS objects representing the local and remote notifications of your app that have been delivered and are still visible in Notification Center. If none of your app,Äôs notifications are visible in Notification Center, the array is empty.

30.21.24 getNotificationCategoriesCompleted(categories() as UNNotificationCategoryMBS, tag as variant)

Plugin Version: 19.1, Platform: macOS, Targets: .

Function: Called by getNotificationCategories method later.
Notes: categories: The array of UNNotificationCategoryMBS objects containing your registered notification types. If your app has not yet registered any categories, this parameter is an empty set.

30.21.25 getNotificationSettingsCompleted(settings as UNNotificationSettingsMBS, tag as variant)

Plugin Version: 19.1, Platform: macOS, Targets: .

Function: Called by getNotificationSettings when finished.

30.21.26 getPendingNotificationRequestsCompleted(requests() as UNNotificationRequestMBS, tag as variant)

Plugin Version: 19.1, Platform: macOS, Targets: .

Function: Called by getPendingNotificationRequests method.
Notes: requests: An array of UNNotificationRequestMBS objects representing the scheduled notification requests. If there are no scheduled requests, this array is empty.

30.21.27 openSettingsForNotification(notification as UNNotificationMBS)

Plugin Version: 19.1, Platform: macOS, Targets: .

Function: Asks the delegate to display the in-app notification settings.

30.21.28 requestAuthorizationCompleted(granted as boolean, error as NSErrorMBS, tag as variant)

Plugin Version: 19.1, Platform: macOS, Targets: .

Function: Called by requestAuthorization method when completed.
Notes: granted: A Boolean value indicating whether authorization was granted. The value of this parameter is YES when authorization was granted for one or more options. The value is false when authorization is denied for all options.
error: An object containing error information or nil if no error occurred.

30.21.29 willPresentNotification(notification as UNNotificationMBS, byref options as Integer)

Plugin Version: 19.1, Platform: macOS, Targets: .

Function: Asks you how to handle a notification that arrived while the app was running in the foreground.
Notes: notification: The notification that is about to be delivered. Use the information in this object to determine an appropriate course of action. For example, you might use the information to update your app,Äôs interface.

options
The option for notifying the user. Specify NotificationPresentationOptionNone to silence the notification completely. Specify other values to interact with the user. For a list of possible options, see constants.

If your app is in the foreground when a notification arrives, the shared user notification center calls this method to deliver the notification directly to your app. If you implement this method, you can take whatever actions are necessary to process the notification and update your app. When you finish, call the completionHandler block and specify how you want the system to alert the user, if at all.
If your event does not implement this method, the system behaves as if you had passed the UNNotificationPresentationOptionNone option to the completionHandler block. If you do not provide a delegate at all for the UNUserNotificationCenterMBS object, the system uses the notification,Äôs original options to alert the user.

30.21.30 Constants

Authorization Options

Constant	Value	Description
AuthorizationOptionAlert	4	The ability to display alerts.
AuthorizationOptionAnnouncement	128	The ability for Siri to automatically read out messages ov
AuthorizationOptionBadge	1	The ability to update the app,Äôs badge.
AuthorizationOptionCarPlay	8	The ability to display notifications in a CarPlay environn
AuthorizationOptionCriticalAlert	16	The ability to play sounds for critical alerts. Critical alerts ignore the mute switch and Do Not Disturl critical alert's sound regardless of the device's mute or Do You can specify a custom sound and volume. Critical alerts require a special entitlement issued by App
AuthorizationOptionNone	0	No options.
AuthorizationOptionProvidesAppNotificationSettings	32	An option indicating the system should display a button f settings.
AuthorizationOptionProvisional	64	The ability to post noninterrupting notifications provisio tion Center.
AuthorizationOptionSound	2	The ability to play sounds.

Notification Presentation

Constant	Value	Description
NotificationPresentationOptionAlert	4	Display the alert using the content provided by the notification.
NotificationPresentationOptionBadge	1	Apply the notification's badge value to the app,Äôs icon. for MacOS 11.0 or newer, please use NotificationPresentationOptionBan NotificationPresentationOptionList + NotificationPresentationOptionBa
NotificationPresentationOptionBanner	16	New for macOS 11.0
NotificationPresentationOptionList	8	New for macOS 11.0
NotificationPresentationOptionNone	0	No alert. Specify this constant when you want to silence any user interactions notification.
NotificationPresentationOptionSound	2	Play the sound associated with the notification.

Chapter 31

Vision

31.1 module VisionModuleMBS

31.1.1 module VisionModuleMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The Vision module.
Notes: Global declarations for the Vision framework on MacOS.
Requires MacOS 10.13 or newer.
Blog Entries

- Vision Framework for Xojo

31.1.2 Methods

31.1.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether the Vision module is available.
Notes: Returns true on MacOS 10.13 or newer.

31.1.4 ElementSize(ElementType as Integer) as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Queries byte size of an element type.
Notes: Returns 4 for floats and 8 for double.

Otherwise returns zero.

31.1.5 ImagePointForNormalizedPoint(normalizedPoint as CGPointMBS, imageWidth as Integer, imageHeight as Integer) as CGPointMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Projects a point from normalized coordinate space into image coordinates.
Notes: normalizedPoint: The input point, in normalized coordinate space.
imageWidth: The width of the image into whose coordinate space you're projecting the input point.
imageHeight: The height of the image into whose coordinate space you're projecting the input point.

Returns the input point projected into image coordinates.

The resulting point in image coordinate space may have nonintegral (floating-point) coordinates.

31.1.6 ImageRectForNormalizedRect(normalizedRect as CGRectMBS, imageWidth as Integer, imageHeight as Integer) as CGRectMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Projects a rectangle from normalized coordinate space into image coordinates.
Notes: normalizedRect: The input rect, in normalized coordinate space.
imageWidth: The width of the image into whose coordinate space you're projecting the input rect.
imageHeight: The height of the image into whose coordinate space you're projecting the input rect.

Returns the input rect projected into image (pixel) coordinates.

31.1.7 NormalizedIdentityRect as CGRectMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The normalized identity rectangle with origin (0,0) and unit length and width.

31.1.8 NormalizedRectForImageRect(imageRect as CGRectMBS, imageWidth as Integer, imageHeight as Integer) as CGRectMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Normalizes a rectangle from image coordinates.
Notes: imageRect: The input rect, in image coordinate space.
imageWidth: The width of the image in whose coordinates the input rect resides.
imageHeight: The height of the image in whose coordinates the input rect resides.

Returns the input rect projected into normalized coordinates.

31.1.9 NormalizedRectIsIdentityRect(rect as CGRectMBS) as boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Returns true if the rectangle has origin (0,0) and unit length and width.
Notes: normalizedRect: Normalized input rect to test for identity.

Returns a Boolean value that indicates whether the input normalized rect is the identity rect.

31.1.10 VNErrorDomain as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The domain for NSError objects produced by Vision framework methods.

31.1.11 Properties

31.1.12 VersionNumber as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The current version number of the Vision framework.
Notes: (Read only property)

31.1.13 Constants

Error Codes

Constant	Value	Description
VNErrorDataUnavailable	17	Error code signifying unavailable data.
VNErrorInternalError	9	Error code signifying an error internal to the Vision system.
VNErrorInvalidArgument	14	Error code signifying an invalid parameter passed to a Vision request.
VNErrorInvalidFormat	2	Error code signifying an invalid image format.
VNErrorInvalidImage	13	Error code signifying a problematic image.
VNErrorInvalidModel	15	Error code signifying an invalid model.
VNErrorInvalidOperation	12	Error code signifying an unsupported operation for a Vision request.
VNErrorInvalidOption	5	Error code signifying an invalid option in a Vision request.
VNErrorIOError	6	Error code signifying an input or output error for an image, image sequence, or Core ML model.
VNErrorMissingOption	7	Error code signifying that a Vision request is missing a required option.
VNErrorNotImplemented	8	Error code signifying a method not implemented in the underlying model.
VNErrorOK	0	Error code signifying no error.
VNErrorOperationFailed	3	Error code signifying that a request operation failed.
VNErrorOutOfBoundsError	4	Error code signifying an out-of-bounds access.
VNErrorOutOfMemory	10	Error code signifying insufficient memory to complete a Vision request.
VNErrorRequestCancelled	1	Error code signifying a canceled Vision request.
VNErrorUnknownError	11	Error code signifying an unidentifiable error.
VNErrorUnsupportedRevision	16	Error code signifying an unsupported revision number.

31.1.14 Delegates

31.1.15 VNPerformRequestsCompletedMBS(Requests() as VNRequestMBS, result as boolean, error as NSErrorMBS, tag as Variant)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The delegate used for completed event calls.
Notes: You declare a method with (Requests() as VNRequestMBS, result as boolean, error as NSErrorMBS) as parameters and pass the method reference with addressOf or weakAddressOf to the plugin method. Later the plugin may invoke the delegate and call your method.

31.1.16 VNProgressHandlerMBS(Request as VNRequestMBS, fractionCompleted as double, error as NSErrorMBS, tag as Variant)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The delegate used for progress event calls.
Notes: You declare a method with (Request as VNRequestMBS, fractionCompleted as double, error as NSErrorMBS) as parameters and pass the method reference with addressOf or weakAddressOf to the plugin method. Later the plugin may invoke the delegate and call your method.

31.1.17 VNRequestCompletedMBS(Request as VNRequestMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The delegate used for completed event calls.
Notes: You declare a method with (Request as VNRequestMBS, error as NSErrorMBS) as parameters and pass the method reference with addressOf or weakAddressOf to the plugin method. Later the plugin may invoke the delegate and call your method.

31.2 class VNBarcodeObservationMBS

31.2.1 class VNBarcodeObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Barcode information detected by an image analysis request.
Notes: This type of observation results from a VNDetectBarcodesRequest. It contains information about the detected barcode, including parsed payload data for supported symbology.
Available on MacOS 10.13 or newer.
Subclass of the VNRectangleObservationMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Xojo Plugins, version 21.3pr4
- Using zbar library with Xojo
- Vision Framework for Xojo

31.2.2 Methods

31.2.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.2.4 VNBarcodeSymbologyAztec as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for Aztec code recognition.

31.2.5 VNBarcodeSymbologyCodabar as String

Plugin Version: 21.3, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A constant that indicates Codabar symbology.
Available in iOS 15 or macOS 12 or later.

31.2.6 VNBarcodeSymbologyCode128 as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for standard Code 128 barcode recognition.

31.2.7 VNBarcodeSymbologyCode39 as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for standard Code 39 barcode recognition.

31.2.8 VNBarcodeSymbologyCode39Checksum as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for recognizing barcodes in standard Code 39 with checksum.

31.2.9 VNBarcodeSymbologyCode39FullASCII as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for recognizing barcodes in full ASCII Code 39.

31.2.10 VNBarcodeSymbologyCode39FullASCIIChecksum as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for recognizing barcodes in full ASCII Code 39 with checksum.

31.2.11 VNBarcodeSymbologyCode93 as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for standard Code 93 barcode recognition.

31.2.12 VNBarcodeSymbologyCode93i as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for standard Code 93i barcode recognition.

31.2.13 VNBarcodeSymbologyDataMatrix as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for Data Matrix barcode recognition.

31.2.14 VNBarcodeSymbologyEAN13 as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for EAN-13 barcode recognition.

31.2.15 VNBarcodeSymbologyEAN8 as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for EAN-8 barcode recognition.

31.2.16 VNBarcodeSymbologyGS1DataBar as String

Plugin Version: 21.3, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A constant that indicates GS1 DataBar symbology.
Available in iOS 15 or macOS 12 or later.

31.2.17 VNBarcodeSymbologyGS1DataBarExpanded as String

Plugin Version: 21.3, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A constant that indicates GS1 DataBar Expanded symbology.
Available in iOS 15 or macOS 12 or later.

31.2.18 VNBarcodeSymbologyGS1DataBarLimited as String

Plugin Version: 21.3, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A constant that indicates GS1 DataBar Limited symbology.
Available in iOS 15 or macOS 12 or later.

31.2.19 VNBarcodeSymbologyI2of5 as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for Interleaved 2 of 5 (ITF) barcode recognition.

31.2.20 VNBarcodeSymbologyI2of5Checksum as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for recognizing barcodes in Interleaved 2 of 5 (ITF) with checksum.

31.2.21 VNBarcodeSymbologyITF14 as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for ITF-14 barcode recognition.

31.2.22 VNBarcodeSymbologyMicroPDF417 as String

Plugin Version: 21.3, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A constant that indicates MicroPDF417 symbology.
Available in iOS 15 or macOS 12 or later.

31.2.23 VNBarcodeSymbologyMicroQR as String

Plugin Version: 21.3, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A constant that indicates MicroQR symbology.
Available in iOS 15 or macOS 12 or later.

31.2.24 VNBarcodeSymbologyPDF417 as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for PDF417 barcode recognition.

31.2.25 VNBarcodeSymbologyQR as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for QR code recognition.

31.2.26 VNBarcodeSymbologyUPCE as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: One of the Symbologies supported by the Vision framework.
Notes: A symbol indicating support for UPC-E barcode recognition.

31.2.27 Properties

31.2.28 barcodeDescriptor as Variant

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A CIBarcodeDescriptorMBS object with low-level details about the barcode and its data.
Notes: This object is sufficient for Core Image to regenerate the observed barcode.
(Read only property)

31.2.29 payloadStringValue as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The string representation of the barcode's payload.
Notes: Depending on the symbology of the barcode or the payload data itself, a string representation of the payload may not be available.
(Read only property)

31.2.30 symbology as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The symbology of the observed barcode.
Notes: To detect specific barcode symbologies in a Vision request, add the corresponding VNBarcodeSymbology to the supportedSymbologies property of your VNDetectBarcodesRequestMBS.
(Read only property)

31.3 class VNClassificationObservationMBS

31.3.1 class VNClassificationObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Classification information produced by an image analysis request.
Notes: This type of observation results from performing a VNCoreMLRequestMBS image analysis with a Core ML model whose role is classification (rather than prediction or image-to-image processing). Vision infers that an MLModel object is a classifier model if that model predicts a single feature. That is, the model's modelDescription object has a non-nil value for its predictedFeatureName property.
Subclass of the VNObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.3.2 Methods

31.3.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.3.4 hasMinimumPrecision(minimumPrecision as single, recall as single) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Determines whether the observation for a specific recall has a minimum precision value.
Notes: minimumPrecision: The minimum percentage of classification results that are relevant.
recall: The percentage of relevant results that the algorithm correctly classified.

Returns a Boolean indicating whether or not this classification observation provides a minimum percentage of relevant results that meet the desired recall criterion.

31.3.5 hasMinimumRecall(minimumRecall as single, precision as single) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Determines whether the observation for a specific precision has a minimum recall value.
Notes: minimumRecall: The minimum percentage of relevant results that the algorithm correctly classified.

precision: The percentage of classification results that are relevant.

Returns a Boolean indicating whether or not this classification observation provides a minimum percentage of relevant results that meet the desired precision criterion.

31.3.6 Properties

31.3.7 hasPrecisionRecallCurve as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean variable indicating whether the observation contains precision and recall curves.
Notes: Precision refers to the percentage of your classification results that are relevant, while recall refers to the percentage of total relevant results correctly classified.
If this property is true, then you can call precision and recall-related methods in this observation. If this property is false, then the precision and recall-related methods won't return meaningful data.
(Read only property)

31.3.8 identifier as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Classification label identifying the type of observation.
Notes: An example classification could be a string like cat or hotdog. The model used for the classification defines the domain of strings that may result. Usually, these strings are unlocalized technical labels not meant for direct presentation to the end user.
(Read only property)

31.4 class VNClassifyImageRequestMBS

31.4.1 class VNClassifyImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A request to classify an image.
Notes: This type of request produces a collection of VNClassificationObservationMBS objects that describe an image. Access the classifications through knownClassificationsForRevision function.

Available on MacOS 10.15 or newer.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

- News from the MBS Xojo Plugins Version 23.3
- MBS Xojo Plugins, version 23.3pr2
- Vision Framework for Xojo

31.4.2 Methods

31.4.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.4.4 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.4.5 knownClassificationsForRevision(requestRevision as Integer = 1, byref error as NSErrorMBS) as VNClassificationObservationMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Requests the collection of classifications that the Vision framework recognizes.
Notes: requestRevision: The revision of the request for which classifications should be reported.
error: The address of the error variable to populate should the call fail.

Returns an array of classifications for the given revision, or nil if an error occurred.

31.4.6 supportedIdentifiers(byref error as NSErrorMBS) as String()

Plugin Version: 23.3, Platform: macOS, Targets: All.

Function: Obtain the collection of identifiers supported by the target request.
Notes: This method will return the collection of all possible classification identifiers that are produced by the target request based on its current state of configuration at the time of the call.

error: The variable that will be populated with the error if the call fails.

Returns an array of classification identifiers, or nil if a failure occurs.

Requires macOS 12.0 or iOS 15.0 or newer.

31.5 class VNCoreMLFeatureValueObservationMBS

31.5.1 class VNCoreMLFeatureValueObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A collection of key-value information produced by a Core ML image analysis request.
Notes: This type of observation results from performing a VNCoreMLRequestMBS image analysis with a Core ML model whose role is prediction rather than classification or image-to-image processing.
Vision infers that an MLModel object is a predictor model if that model predicts multiple features. You can tell that a model predicts multiple features when its modelDescription object has a nil value for its predictedFeatureName property, or when it inserts its output in an outputDescriptionsByName dictionary.
Subclass of the VNObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.5.2 Methods

31.5.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.5.4 Properties

31.5.5 featureName as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The name used in the model description of the CoreML model that produced this observation.
Notes: (Read only property)

31.5.6 featureValue as Variant

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The feature result of a VNCoreMLRequestMBS that outputs neither a classification nor an image.
Notes: Refer to Core ML documentation and the model itself to learn about proper handling of the content.
Value is a MLFeatureValueMBS object.

(Read only property)

31.6 class VNCoreMLModelMBS

31.6.1 class VNCoreMLModelMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A container for a Core ML model used with Vision requests.
Notes: A Core ML model encapsulates the information trained from a data set used to drive Vision recognition requests. See Getting a Core ML Model for instructions on training your own. Once you have the trained model, use this class to initialize a VNCoreMLRequestMBS for identification.
Blog Entries

- Vision Framework for Xojo

31.6.2 Methods

31.6.3 Constructor(MLModel as Variant)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a model container to be used with VNCoreMLRequestMBS.
Notes: Please pass MLModelMBS object.

This method may fail if Vision does not support the created CoreML model. For example, a model that does not accept an image as any of its inputs will yield an VNErrorInvalidModel error.

31.6.4 modelForMLModel(MLModel as Variant) as VNCoreMLModelMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a model container to be used with VNCoreMLRequestMBS.
Notes: Please pass MLModelMBS object.

This method may fail if Vision does not support the created CoreML model. For example, a model that does not accept an image as any of its inputs will yield an VNErrorInvalidModel error.

31.6.5 Properties

31.6.6 featureProvider as Variant

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An optional object to support inputs outside Vision.
Notes: An MLFeatureProviderMBS object.

This optional object conforms to the MLFeatureProvider protocol that the model uses to predict inputs that are not supplied by Vision. Vision provides the MLModel with the image for the inputImageFeatureName via the VNRequestHandlerMBS.
A feature provider is necessary for models that have more than one required input. Models with only one image input won't use the feature provider.

Available on MacOS 10.15 or newer.
(Read only property)

31.6.7 inputImageFeatureName as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The name of the MLFeatureValueMBS that Vision sets from the request handler.
Notes: By default, Vision uses the first input found, but you can manually set that input to another featureName instead.
(Read and Write property)

31.7 class VNCoreMLRequestMBS

31.7.1 class VNCoreMLRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that uses a Core ML model to process images.
Notes: The results array of a Core ML-based image analysis request contains a different observation type depending on the kind of MLModel object you create the request with:

- If the model predicts a single feature (that is, the model's modelDescription object has a non-nil value for its predictedFeatureName property), Vision treats that model as a classifier: the results are VNClassificationObservationMBS objects.
- If the model's outputs include at least one output whose feature type is MLFeatureTypeImage, Vision treats that model as an image-to-image model: the results are VNPixelBufferObservationMBS objects.
- Otherwise, Vision treats the model as a general predictor model: the results are VNCoreMLFeatureValueObservationMBS objects.

Subclass of the VNImageBasedRequestMBS class.
Blog Entries

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31.7.2 Methods

31.7.3 Constructor(model as VNCoreMLModelMBS, DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.7.4 Properties

31.7.5 imageCropAndScaleOption as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Determine what type of croping and scaling action should be applied to the image before generating the feature print.

Notes: The default value for this property is VNImageCropAndScaleOptionScaleFill.
(Read and Write property)

31.7.6 model as VNCoreMLModelMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The Core ML model on which the request is based, wrapped in a VNCoreMLModel.
Notes: (Read only property)

31.7.7 Constants

Crop and Scale options

Constant	Value	Description
VNImageCropAndScaleOptionCenterCrop	0	A scaling option that maintains aspect ratio to fit the short side, and centered image on its long side.
VNImageCropAndScaleOptionScaleFill	2	A scaling option that scales an image proportionally so that its short sion fills the canvas, potentially cropping along the longer dimension
VNImageCropAndScaleOptionScaleFit	1	An option that scales an image to fit the input image dimensions wh taining aspect ratio. This option ensures the entire image fits into the Vision algorithm's in dimensions by scaling down the longer dimension until it fits. This op the image along the shorter dimension to maintain aspect ratio.

31.8 class VNDetectBarcodesRequestMBS

31.8.1 class VNDetectBarcodesRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that finds and recognizes barcodes in an image.
Notes: By default, a barcode request first locates all barcodes in the input image, then analyzes each to decode payload. To specify or limit the types of barcodes sought in the request, set the symbologies property to an array of barcode types you would like to support.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

- News from the MBS Xojo Plugins Version 23.3
- MBS Xojo Plugins, version 23.3pr2
- MonkeyBread Software Releases the MBS Xojo Plugins in version 21.3
- MBS Xojo Plugins, version 21.3pr4
- Using zbar library with Xojo
- Vision Framework for Xojo

Xojo Developer Magazine

- 19.5, page 9: News

31.8.2 Methods

31.8.3 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.8.4 setSymbologies(symbologies() as String)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Sets an array of symbologies that Vision should detect in the image.
Notes: Use this array to specify or restrict the types of symbols you want the Vision algorithm to detect. The default value leads Vision to scan for all possible symbologies.

31.8.5 supportedSymbologies as String()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of VNBarcodeSymbology objects describing the symbologies that Vision currently supports.
Notes: Calling this method could be an expensive operation.
See also:

- 31.8.6 supportedSymbologies(byref error as NSErrorMBS) as String() 1327

31.8.6 supportedSymbologies(byref error as NSErrorMBS) as String()

Plugin Version: 23.3, Platform: macOS, Targets: All.

Function: Obtain the collection of barcode symbologies that can be recognized by the request in its current configuration.
Notes: Calling this method could be a potentially expensive operation.
Returns an array of VNBarcodeSymbology strings describing the symbologies recognized by the request in its current configuration.
Requires macOS 12.0 or iOS 15.0 or newer.
See also:

- 31.8.5 supportedSymbologies as String() 1327

31.8.7 symbologies as String()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of symbologies that Vision should detect in the image.
Notes: Use this array to specify or restrict the types of symbols you want the Vision algorithm to detect. The default value leads Vision to scan for all possible symbologies.

31.9 class VNDetectedObjectObservationMBS

31.9.1 class VNDetectedObjectObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis result that provides the position and extent of a detected image feature.
Notes: This type of observation results from a VNTrackObjectRequestMBS. It represents a detected object that the Vision request should track.
Subclass of the VNObservationMBS class.
Blog Entries

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31.9.2 Methods

31.9.3 Constructor(boundingBox as CGRectMBS)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a detected object observation based on bounding box coordinates.
Notes: boundingBox: The observation's bounding box, in coordinates normalized to the dimensions of the processed image, with its origin at the image's lower-left corner.
See also:

- 31.9.4 Constructor(requestRevision as Integer, boundingBox as CGRectMBS) 1328

31.9.4 Constructor(requestRevision as Integer, boundingBox as CGRectMBS)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a detected object observation with the specified revision number and bounding box coordinates.
See also:

- 31.9.3 Constructor(boundingBox as CGRectMBS) 1328

31.9.5 Properties

31.9.6 boundingBox as CGRectMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The bounding box of the detected object.
Notes: The coordinates are normalized to the dimensions of the processed image, with the origin at the

image's lower-left corner.
(Read only property)

31.10 class VNDetectFaceCaptureQualityRequestMBS

31.10.1 class VNDetectFaceCaptureQualityRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A request that produces a floating-point number representing the capture quality of a given face in a photo.
Notes: This request produces or updates a VNFaceObservationMBS object's property faceCaptureQuality with a floating-point value. The float will be a value between 0 and 1. Faces with quality closer to 1 are better lit, sharper, and centrally positioned than faces with quality closer to 0. If the request fails, or the face observation has never been processed, the property faceCaptureQuality will be nil.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

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31.10.2 Methods

31.10.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.10.4 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.10.5 inputFaceObservations as VNFaceObservationMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of VNFaceObservation objects to process as part of the request.

31.10.6 setInputFaceObservations(faces() as VNFaceObservationMBS)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Sets an array of VNFaceObservation objects to process as part of the request.

31.11 class VNDetectFaceLandmarksRequestMBS

31.11.1 class VNDetectFaceLandmarksRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that finds facial features (such as the eyes and mouth) in an image.
Notes: By default, a face landmarks request first locates all faces in the input image, then analyzes each to detect facial features.
If you've already located all the faces in an image, or want to detect landmarks in only a subset of the faces in the image, set the inputFaceObservations property to an array of VNFaceObservationMBS objects representing the faces you want to analyze. (You can either use face observations output by a VNDetectFaceRectanglesRequestMBS or manually create VNFaceObservation instances with the bounding boxes of the faces you want to analyze.)
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

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31.11.2 Methods

31.11.3 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.11.4 inputFaceObservations as VNFaceObservationMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of VNFaceObservation objects to process as part of the request.

31.11.5 setInputFaceObservations(faces() as VNFaceObservationMBS)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Sets an array of VNFaceObservation objects to process as part of the request.

31.11.6 supportsConstellation(requestRevision as Integer = 1, constellation as Integer) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean variable that indicates whether the Vision framework supports a given constellation type for a given request revision.

31.11.7 Properties

31.11.8 constellation as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A variable describing how a face landmarks request orders or enumerates the resulting features.
Notes: Set this variable to one of the supported constellation types detailed in VNRequestFaceLandmarksConstellation. The default value is VNRequestFaceLandmarksConstellationNotDefined.
(Read and Write property)

31.11.9 Constants

Constellations

Constant	Value	Description
VNRequestFaceLandmarksConstellation65Points	1	A constellation with 65 points.
VNRequestFaceLandmarksConstellation76Points	2	A constellation with 76 points.
VNRequestFaceLandmarksConstellationNotDefined	0	An undefined constellation.

31.12 class VNDetectFaceRectanglesRequestMBS

31.12.1 class VNDetectFaceRectanglesRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that finds faces within an image.
Notes: This request returns faces as rectangular bounding boxes with origin and size.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

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31.12.2 Methods

31.12.3 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.13 class VNDetectHorizonRequestMBS

31.13.1 class VNDetectHorizonRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that determines the horizon angle in an image.
Notes: This request returns the horizon angle detected in an image.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

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31.13.2 Methods

31.13.3 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.14 class VNDetectHumanRectanglesRequestMBS

31.14.1 class VNDetectHumanRectanglesRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that finds rectangular regions containing humans in an image.
Notes: Subclass of the VNImageBasedRequestMBS class.
Blog Entries

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31.14.2 Methods

31.14.3 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.15 class VNDetectRectanglesRequestMBS

31.15.1 class VNDetectRectanglesRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that finds projected rectangular regions in an image.
Notes: A rectangle detection request locates regions of an image with rectangular shape, like credit cards, business cards, documents, and signs. The request returns its observations in the form of VNRectangleObservationMBS objects, which contain normalized coordinates of bounding boxes containing the rectangle.
Use this type of request to find the bounding boxes of rectangles in an image. Vision returns observations for rectangles found in all orientations and sizes, along with a confidence level to indicate how likely it is that the observation contains an actual rectangle.
To further configure or restrict the types of rectangles found, set properties on the request specifying a range of aspect ratios, sizes, and quadrature tolerance.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

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31.15.2 Methods

31.15.3 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.15.4 Properties

31.15.5 maximumAspectRatio as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A float specifying the maximum aspect ratio of the rectangle to detect, defined as the shorter dimension over the longer dimension.
Notes: The value should range from 0.0 to 1.0, inclusive. The default value is 0.5.
(Read and Write property)

31.15.6 maximumObservations as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An integer specifying the maximum number of rectangles Vision returns.
Notes: The default value is 1.
Setting this property to 0 allows Vision algorithms to return an unlimited number of observations.
(Read and Write property)

31.15.7 minimumAspectRatio as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A float specifying the minimum aspect ratio of the rectangle to detect, defined as the shorter dimension over the longer dimension.
Notes: The value should range from 0.0 to 1.0, inclusive. The default value is 0.5.
(Read and Write property)

31.15.8 minimumConfidence as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A value specifying the minimum acceptable confidence level.
Notes: Vision won't return rectangles with a confidence score lower than the specified minimum.
The confidence score ranges from 0.0 to 1.0, inclusive, where 0.0 represents no confidence, and 1.0 represents full confidence.
(Read and Write property)

31.15.9 minimumSize as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A float specifying the minimum size of the rectangle to be detected, as a proportion of the smallest dimension.
Notes: The value should range from 0.0 to 1.0 inclusive. The default minimum size is 0.2.
Any smaller rectangles that Vision may have detected aren't returned.
(Read and Write property)

31.15.10 quadratureTolerance as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A float specifying the number of degrees a rectangle corner angle can deviate from 90¬∞.
Notes: The tolerance value should range from 0 to 45, inclusive. The default tolerance is 30.
(Read and Write property)

31.16 class VNDetectTextRectanglesRequestMBS

31.16.1 class VNDetectTextRectanglesRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that finds regions of visible text in an image.
Notes: This request returns detected text characters as rectangular bounding boxes with origin and size.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

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31.16.2 Methods

31.16.3 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.16.4 Properties

31.16.5 reportCharacterBoxes as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean variable indicating interest in detecting character bounding boxes.
Notes: Set to true to have the detector return character bounding boxes as an array of VNRectangleObservationMBS objects.
(Read and Write property)

31.17 class VNFaceLandmarkRegion2DMBS

31.17.1 class VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: 2D geometry information for a specific facial feature.
Notes: This class represents the set of all facial landmark regions in 2D, exposed as properties.
Subclass of the VNFaceLandmarkRegionMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

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31.17.2 Methods

31.17.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.17.4 normalizedPoints as CGPointMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A buffer in memory containing normalized landmark points.
Notes: Returns array with CGPointMBS representing landmark points.

31.17.5 pointsInImageOfSize(imageSize as CGSizeMBS) as CGPointMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A buffer in memory containing landmark points in the coordinate space of the specified image size.
Notes: imageSize: The pixel dimensions of the image in which to present landmark points.

31.17.6 precisionEstimatesPerPoint as Variant()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of precision estimates for each landmark point.
Notes: This property is only populated when you configure your VNDetectFaceLandmarksRequestMBS object with VNRequestFaceLandmarksConstellation76Points. For other constellation types, this array is set to nil.

31.18 class VNFaceLandmarkRegionMBS

31.18.1 class VNFaceLandmarkRegionMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The abstract superclass for information about a specific face landmark.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

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31.18.2 Methods

31.18.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.18.4 copy as VNFaceLandmarkRegionMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

31.18.5 Properties

31.18.6 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

31.18.7 pointCount as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The number of points in the face region.
Notes: The value is zero if no points for a region could be found.
(Read only property)

31.18.8 requestRevision as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The revision of the VNRequest subclass used to generate the implementing object.
Notes: (Read only property)

31.19 class VNFaceLandmarks2DMBS

31.19.1 class VNFaceLandmarks2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A collection of all facial features detected in a face observation, with 2D geometry information for each.
Notes: This class represents the set of all detectable 2D face landmarks and regions, exposed as properties. The coordinates of the face landmarks are normalized to the dimensions of the face observation,Äôs boundingBox, with the origin at the bounding box,Äôs lower-left corner. Use the VNImagePointForFaceLandmarkPointMBS function to convert normalized face landmark points into absolute points within the image,Äôs coordinate system.
Subclass of the VNFaceLandmarksMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
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31.19.2 Methods

31.19.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.19.4 Properties

31.19.5 allPoints as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing all face landmark points.
Notes: (Read only property)

31.19.6 faceContour as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that trace the face contour from the left cheek, over the chin, to the right cheek.

Notes: (Read only property)

31.19.7 innerLips as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that outline the space between the lips.
Notes: (Read only property)

31.19.8 leftEye as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that outline the left eye.
Notes: (Read only property)

31.19.9 leftEyebrow as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that trace the left eyebrow.
Notes: (Read only property)

31.19.10 leftPupil as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing the point where the left pupil is located.
Notes: This value may be inaccurate if the eye is blinking.
(Read only property)

31.19.11 medianLine as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that trace a vertical line down the center of the face.
Notes: (Read only property)

31.19.12 nose as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that outline the nose.
Notes: (Read only property)

31.19.13 noseCrest as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that trace the center crest of the nose.
Notes: (Read only property)

31.19.14 outerLips as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that outline the outside of the lips.
Notes: (Read only property)

31.19.15 rightEye as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that outline the right eye.
Notes: (Read only property)

31.19.16 rightEyebrow as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing points that trace the right eyebrow.
Notes: (Read only property)

31.19.17 rightPupil as VNFaceLandmarkRegion2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region containing the point where the right pupil is located.
Notes: This value may be inaccurate if the eye is blinking.
(Read only property)

31.20 class VNFaceLandmarksMBS

31.20.1 class VNFaceLandmarksMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The abstract superclass for containers of face landmark information.
Notes: This class represents the set of all detectable facial landmarks and regions, exposed as properties.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

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31.20.2 Methods

31.20.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.20.4 copy as VNFaceLandmarksMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

31.20.5 Properties

31.20.6 confidence as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A confidence estimate for the detected landmarks.
Notes: A value of 0 indicates no confidence. A value of 1 indicates full confidence.
(Read only property)

31.20.7 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

31.20.8 requestRevision as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The revision of the VNRequestMBS subclass used to generate the implementing object.
Notes: (Read only property)

31.21 class VNFaceObservationMBS

31.21.1 class VNFaceObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Face or facial-feature information detected by an image analysis request.
Notes: This type of observation results from a VNDetectFaceRectanglesRequestMBS. It contains information about facial landmarks and regions found in the image.
Subclass of the VNDetectedObjectObservationMBS class.
Blog Entries

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31.21.2 Methods

31.21.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.21.4 faceObservationWithRequestRevision(requestRevision as Integer = 2, boundingBox as CGRectMBS, roll as Variant, yaw as Variant) as VNFaceObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a face observation with the given revision number, bounding box, roll, and yaw.

31.21.5 Properties

31.21.6 faceCaptureQuality as Variant

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The capture quality of the face, normalized between 0.0 and 1.0.
Notes: The capture quality of the face allows you to compare the quality of the face in terms of its capture attributes: lighting, blur, and prime positioning. Use this metric to compare the capture quality of a face against other captures of the same face in a given set. Faces with quality closer to 1.0 are better lit, sharper, and centrally positioned than faces with quality closer to 0.0.
(Read only property)

31.21.7 landmarks as VNFaceLandmarks2DMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The facial features found in the detected face.
Notes: This property's value is nil for face observations produced by a VNDetectFaceRectanglesRequestMBS analysis. Use the VNDetectFaceLandmarksRequestMBS class to find facial features.
(Read only property)

31.21.8 roll as Variant

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The detected face's roll angle, as populated by the VNDetectFaceRectanglesRequestMBS.
Notes: The roll is reported in radians. A positive angle corresponds to counterclockwise roll. The range is [-Pi, Pi). A nil value indicates that the roll angle hasn't been computed.
(Read only property)

31.21.9 yaw as Variant

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The detected face's yaw angle, as populated by the VNDetectFaceRectanglesRequestMBS.
Notes: The yaw is reported in radians. A positive angle corresponds to counterclockwise roll. The range is [-Pi/2, Pi/2). A nil value indicates that the yaw angle hasn't been computed.
(Read only property)

31.22 class VNFeaturePrintObservationMBS

31.22.1 class VNFeaturePrintObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The observation resulting from a VNGenerateImageFeaturePrintRequestMBS.
Notes: The observations returned from a VNGenerateImageFeaturePrintRequestMBS are of this class.
Subclass of the VNObservationMBS class.
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31.22.2 Methods

31.22.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.22.4 computeDistance(byref outDistance as Single, featurePrint as VNFeaturePrintObservationMBS, byref error as NSErrorMBS) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Computes the distance between two observations.
Notes: The larger the distance the more dissimlar the feature prints are. In case of an error this method returns false with an error describing the error condition, for instance comparing two non-comparable feature prints.

31.22.5 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.22.6 Values as Double()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Queries values as a double array.
Notes: Floats are expanded to doubles for your convenience.

31.22.7 Properties

31.22.8 data as MemoryBlock

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The feature print data.
Notes: The data is divided into separate elements. Determine the type of element using elementType, and the number of elements using elementCount.
(Read only property)

31.22.9 elementCount as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The total number of elements in the data.
Notes: (Read only property)

31.22.10 elementType as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The type of each element in the data.
Notes: (Read only property)

31.22.11 Constants

Element Types

Constant	Value	Description
ElementTypeDouble	2	The elements are double-precision floating-point numbers.
ElementTypeFloat	1	The elements are floating-point numbers.
ElementTypeUnknown	0	The element type isn't known.

31.23 class VNGenerateAttentionBasedSaliencyImageRequestMBS

31.23.1 class VNGenerateAttentionBasedSaliencyImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Generates a heat map that identifies the parts of an image most likely to draw attention.
Notes: The resulting observation, VNSaliencyImageObservationMBS, encodes this data as a heat map, which you can use to highlight regions of interest.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

- Vision Framework for Xojo

31.23.2 Methods

31.23.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.23.4 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.24 class VNGenerateImageFeaturePrintRequestMBS

31.24.1 class VNGenerateImageFeaturePrintRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image-based request to generate feature prints from an image.
Notes: This request returns an array of feature print elements in the form of data wrapped in VNFeaturePrintObservationMBS objects.
Available in MacOS 10.15 or newer.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

- Vision Framework for Xojo

31.24.2 Methods

31.24.3 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.24.4 Properties

31.24.5 imageCropAndScaleOption as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Determine what type of croping and scaling action should be applied to the image before generating the feature print.
Notes: The default value for this property is VNImageCropAndScaleOptionScaleFill.
(Read and Write property)

31.24.6 Constants

Crop and Scale options

Constant	Value	Description
VNImageCropAndScaleOptionCenterCrop	0	A scaling option that maintains aspect ratio to fit the short side, and centered image on its long side.
VNImageCropAndScaleOptionScaleFill	2	A scaling option that scales an image proportionally so that its short sion fills the canvas, potentially cropping along the longer dimension
VNImageCropAndScaleOptionScaleFit	1	An option that scales an image to fit the input image dimensions wh taining aspect ratio. This option ensures the entire image fits into the Vision algorithm's in dimensions by scaling down the longer dimension until it fits. This op the image along the shorter dimension to maintain aspect ratio.

31.25 class VNGenerateObjectnessBasedSaliencyImageRequestMBS

31.25.1 class VNGenerateObjectnessBasedSaliencyImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Generates a heat map that identifies the parts of an image most likely to represent objects.
Notes: The resulting observation, VNSaliencyImageObservationMBS, encodes this data as a heat map, which you can use to highlight regions of interest.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

- Vision Framework for Xojo

31.25.2 Methods

31.25.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.25.4 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.26 class VNHomographicImageRegistrationRequestMBS

31.26.1 class VNHomographicImageRegistrationRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that determines the perspective warp matrix needed to align the content of two images.
Notes: Create and perform a homographic image registration request to align content in two images through a homography. A homography is an isomorphism of projected spaces, a bijection that maps lines to lines.
Requires MacOS 10.13 or newer.
Subclass of the VNImageRegistrationRequestMBS class.
Blog Entries

- Vision Framework for Xojo

31.26.2 Methods

31.26.3 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.27 class VNHorizonObservationMBS

31.27.1 class VNHorizonObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Horizon angle information detected by an image analysis request.
Notes: Instances of this class result from invoking a VNDetectHorizonRequestMBS and report the angle and transform of the horizon in an image.
Subclass of the VNObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.27.2 Methods

31.27.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.27.4 Properties

31.27.5 angle as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Angle of the observed horizon.
Notes: Use the angle to orient the image in an upright position and make the detected horizon level.
(Read only property)

31.27.6 transform as CGAffineTransformMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Transform applied to the detected horizon.
Notes: Apply the transform's inverse to orient the image in an upright position and make the detected horizon level.
(Read only property)

31.28 class VNImageAlignmentObservationMBS

31.28.1 class VNImageAlignmentObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The abstract superclass for image analysis results that describe the relative alignment of two images.
Notes: This abstract superclass forms the basis of image alignment or registration output. You receive its subclasses, such as VNImageTranslationAlignmentObservationMBS and VNImageHomographicAlignmentObservationMBS, by performing specific registration requests. Don't create one of these classes yourself.
Subclass of the VNObservationMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Vision Framework for Xojo

31.28.2 Methods

31.28.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.29 class VNImageBasedRequestMBS

31.29.1 class VNImageBasedRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The abstract superclass for image analysis requests that focus on a specific part of an image.
Notes: Other Vision request handlers that operate on still images inherit from this abstract base class. Don't use it directly.
Subclass of the VNRequestMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Vision Framework for Xojo

31.29.2 Methods

31.29.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.29.4 Properties

31.29.5 regionOfInterest as CGRectMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The region of the image in which Vision will perform the request.
Notes: The rectangle is normalized to the dimensions of the processed image. Its origin is specified relative to the image's lower-left corner.

The default value is { { 0, 0 } , { 1, 1 } } .

Important
The request will fail to perform if you set this property to a rectangle outside the normalized coordinate space.
(Read and Write property)

31.30 class VNImageHomographicAlignmentObservationMBS

31.30.1 class VNImageHomographicAlignmentObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Perspective warp information produced by an image alignment request.
Notes: This type of observation results from a VNHomographicImageRegistrationRequestMBS, informing the warpTransform performed to align the input images.
Subclass of the VNImageAlignmentObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.30.2 Methods

31.30.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.30.4 Properties

31.30.5 warpTransform as MemoryBlock

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The warp transform matrix to morph the floating image into the reference image.
Notes: This is a 3x3 float matrix wrapped into a memoryblock.
(Read only property)

31.31 class VNImageRegistrationRequestMBS

31.31.1 class VNImageRegistrationRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The abstract superclass for image analysis requests that align images based on their content.
Notes: This abstract superclass forms the basis of image alignment or registration requests. Make specific requests through one of its subclasses, VNTranslationalImageRegistrationRequestMBS or VNHomographicImageRegistrationRequestMBS. Don't create an instance of this superclass yourself.
Subclass of the VNTargetedImageRequestMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Vision Framework for Xojo

31.31.2 Methods

31.31.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.32 class VNImageRequestHandlerMBS

31.32.1 class VNImageRequestHandlerMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An object that processes one or more image analysis requests pertaining to a single image.
Notes: Instantiate this handler to perform Vision requests on a single image. You specify the image and, optionally, a completion handler at the time of creation, and call performRequests to begin executing the request.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Xojo Plugins, version 23.2pr1
- MBS Xojo Plugins, version 22.3pr3
- Vision Framework for Xojo

31.32.2 Methods

31.32.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.32.4 performRequests(requests() as VNRequestMBS, byref error as NSErrorMBS) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Schedules Vision requests to be performed.
Notes: requests: A nonempty array of VNRequestMBS instances to perform.
error: An optional error parameter populated when problems arise in scheduling the requests. Check if the return value is false.

Returns true if all requests were scheduled and performed. If the return value is false, check the error parameter.

The function returns after all requests have either completed or failed. Check individual requests and errors for their respective successes and failures.

31.32.5 performRequestsAsync(requests() as VNRequestMBS, DelegateHandler as VNPerformRequestsCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Schedules Vision requests to be performed asynchronously in background.
Notes: requests: A nonempty array of VNRequestMBS instances to perform.
error: An optional error parameter populated when problems arise in scheduling the requests. Check if the return value is false.

Returns true if all requests were scheduled and performed. If the return value is false, check the error parameter.

The function returns immediately. Delegate will be called when finished.

31.32.6 RequestWithCGImage(CGImage as CGImageMBS, orientation as Integer = 0, Options as Dictionary = nil) as VNImageRequestHandlerMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a handler to be used for performing requests on a Core Graphics image.
Notes: image: A CGImageMBS containing the image to be used for performing the requests. Image content is immutable.
orientation: The orientation of the input image. Pass zero if unknown.
options: An optional dictionary containing VNImageOption keys to auxiliary image data.

31.32.7 RequestWithCIImage(CIImage as Variant, orientation as Integer = 0, Options as Dictionary = nil) as VNImageRequestHandlerMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a handler to be used for performing requests on CIImage data.
Notes: image: A CIImageMBS containing the image to be used for performing the requests. Image content is immutable.
orientation: The orientation of the input image. Pass zero if unknown.
options: An optional dictionary containing VNImageOption keys to auxiliary image data.

31.32.8 RequestWithCVPixelBuffer(CVPixelBuffer as Variant, orientation as Integer = 0, Options as Dictionary = nil) as VNImageRequestHandlerMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a handler to be used for performing requests on a Core Video pixel buffer of a known orientation.
Notes: pixelBuffer: A CVPixelBufferMBS containing the image to be used for performing the requests. Buffer contents can't be changed for the lifetime of the request handler.
orientation: The orientation of the input image. Pass zero if unknown.
options: An optional dictionary containing VNImageOption keys to auxiliary image data.

31.32.9 RequestWithData(Data as MemoryBlock, orientation as Integer = 0, Options as Dictionary = nil) as VNImageRequestHandlerMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a handler to be used for performing requests on an image, contained in a memoryblock.
Notes: imageData: Data containing the image to be used for performing the requests. Image content is immutable.
orientation: The orientation of the input image. Pass zero if unknown.
options: An optional dictionary containing VNImageOption keys to auxiliary image data.

The intended use cases of this type of initializer include compressed images and network downloads, where a client may receive a JPEG from a website or the cloud.

31.32.10 RequestWithFile(File as FolderItem, orientation as Integer = 0, Options as Dictionary = nil) as VNImageRequestHandlerMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a handler to be used for performing requests on an image, at the specified folderitem.
Notes: File: A folderitem pointing to the image to be used for performing the requests. The image must be in a format supported by Image I/O. Image content is immutable.
orientation: The orientation of the input image. pass zero if unknown.
options: An optional dictionary containing VNImageOption keys to auxiliary image data.

31.32.11 RequestWithPicture(Picture as Picture, orientation as Integer = 0, Options as Dictionary = nil) as VNImageRequestHandlerMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a handler to be used for performing requests on a picture.
Notes: image: A Picture containing the image to be used for performing the requests. Image content is immutable.
orientation: The orientation of the input image. Pass zero if unknown.
options: An optional dictionary containing VNImageOption keys to auxiliary image data.

31.32.12 VNImageOptionCameraIntrinsics as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An option to specify the camera intrinstics as an MemoryBlock object representing a matrix_float3x3.
Notes: see
https://developer.apple.com/documentation/vision/vnimageoptioncameraintrinsics?language=objc

31.32.13 VNImageOptionCIContext as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An option key to specify the CIContextMBS to be used in the handler's Core Image operations.
Notes: If this key isn't specified, Vision will create its own CIContext.
Specify a CIContextMBS when you've used one in processing an input CIImageMBS or executing a CIFilterMBS chain, so you can save the cost of creating a new context.

31.32.14 VNImageOptionProperties as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The dictionary from CGImageSourceCopyPropertiesAtIndex containing metadata for algorithms like horizon detection.

31.32.15 Properties

31.32.16 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

31.32.17 Constants

Orientations

Constant	Value	Description
kOrientationDown	3	The encoded image data is rotated 180¬∞ from the image's intended display orientation.
kOrientationDownMirrored	4	The encoded image data is vertically flipped from the image's intended display orientation.
kOrientationLeft	8	The encoded image data is rotated 90¬∞ clockwise from the image's intended display orientation.
kOrientationLeftMirrored	5	The encoded image data is horizontally flipped and rotated 90¬∞ counterclockwise from the image's intended display orientation.
kOrientationRight	6	The encoded image data is rotated 90¬∞ clockwise from the image's intended display orientation.
kOrientationRightMirrored	7	The encoded image data is horizontally flipped and rotated 90¬∞ clockwise from the image's intended display orientation.
kOrientationUp	1	The encoded image data matches the image's intended display orientation.
kOrientationUpMirrored	2	The encoded image data is horizontally flipped from the image's intended display orientation.

31.33 class VNImageTranslationAlignmentObservationMBS

31.33.1 class VNImageTranslationAlignmentObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Affine transform information produced by an image alignment request.
Notes: This type of observation results from a VNTranslationalImageRegistrationRequestMBS, informing the alignmentTransform performed to align the input images.
Subclass of the VNImageAlignmentObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.33.2 Methods

31.33.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.33.4 Properties

31.33.5 alignmentTransform as CGAffineTransformMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The alignment transform to align the floating image with the reference image.
Notes: (Read only property)

31.34 class VNObservationMBS

31.34.1 class VNObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The abstract superclass for analysis results.
Notes: Observations resulting from Vision image analysis requests inherit from this abstract base class. Do not use this abstract superclass directly.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Vision Framework for Xojo

31.34.2 Methods

31.34.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.34.4 copy as VNObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

31.34.5 Properties

31.34.6 className as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Queries class name of the observation.
Notes: (Read only property)

31.34.7 Confidence as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The level of confidence in the observation's accuracy, normalized to [0, 1.0] .
Notes: A value of 0.0 indicates no confidence.
A value of 1.0 indicates the highest confidence. An observation that doesn't support or assign meaning to confidence also returns 1.0.
(Read only property)

31.34.8 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

31.34.9 requestRevision as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The revision used in request.
Notes: (Read only property)

31.34.10 UUID as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A unique identifier assigned to the Vision observation.
Notes: (Read only property)

31.35 class VNPixelBufferObservationMBS

31.35.1 class VNPixelBufferObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An output image produced by a Core ML image analysis request.
Notes: This type of observation results from performing a VNCoreMLRequestMBS image analysis with a Core ML model whose role is image-to-image processing. For example, this observation would result from a model that analyzes the style of one image and then transfers that style to a different image.
Vision infers that an MLModel object is an image-to-image model if that model includes an image. Its modelDescription object includes an image-typed feature description in its outputDescriptionsByName dictionary.
Subclass of the VNObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.35.2 Methods

31.35.3 CIImage as Variant

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates CIImageMBS object for given pixel buffer.

31.35.4 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.35.5 Properties

31.35.6 featureName as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The name used in the model description of the CoreML model that produced this observation.
Notes: This value can be empty if the observation is not the result of a VNCoreMLRequest operation.
Available in MacOS 10.15 or later.
(Read only property)

31.35.7 pixelBuffer as Variant

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The image that results from a request with image output.
Notes: VNCoreMLRequestMBS produces observations that contain images in pixel buffer format. The confidence level is always 1.0.
(Read only property)

31.36 class VNRecognizeAnimalsRequestMBS

31.36.1 class VNRecognizeAnimalsRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A request that will recognize various animals in an image.
Notes: The list of animals supported by the recognition algorithm can be queried by knownAnimalIdentifiersForRevision.
This request will generate VNRecognizedObjectObservationMBS objects with a defined boundingBox, label and confidence level.

Availalble on MacOS 10.15.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

- Vision Framework for Xojo

31.36.2 Methods

31.36.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.36.4 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.36.5 knownAnimalIdentifiersForRevision(requestRevision as Integer = 1, byref error as NSErrorMBS) as String()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: This class method returns a list of all animals supported by the recognition algorithm

Notes: This request will generate a collection of names for supported animals by current recognition algorithm.

31.36.6 VNAnimalIdentifierCat as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The identifier for cats.

31.36.7 VNAnimalIdentifierDog as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The identifier for dogs.

31.37 class VNRecognizedObjectObservationMBS

31.37.1 class VNRecognizedObjectObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A detected object observation with an array of classification labels that classify the recognized object.
Notes: The confidence of the classifications sum up to 1.0. Multiply the classification confidence with the confidence of this observation.

Available on MacOS 10.14 or newer.
Subclass of the VNDetectedObjectObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.37.2 Methods

31.37.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.37.4 labels as VNClassificationObservationMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of observations that classify the recognized object.

31.38 class VNRecognizedTextMBS

31.38.1 class VNRecognizedTextMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A block of recognized text.
Notes: There can be multiple VNRecognizedTextMBS objects returned in a VNRecognizedTextObservationMBS - one for each candidate.
Blog Entries

- Vision Framework for Xojo

31.38.2 Methods

31.38.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.38.4 boundingBoxForRange(range as NSRangeMBS, byref error as NSErrorMBS) as VNRectangleObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Calculate the bounding box around the characters in the range of the string.
Notes: The bounding boxes are not guaranteed to be an exact fit around the characters and are purely meant for UI purposes and not for image processing.
Range is zero based!

31.38.5 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.38.6 copy as VNRecognizedTextMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

31.38.7 Properties

31.38.8 confidence as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The level of confidence normalized to [0.0, 1.0] where 1.0 is most confident.
Notes: (Read only property)

31.38.9 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

31.38.10 string as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Field that contains recognized text.
Notes: This is the top candidate of the recognized text.
(Read only property)

31.39 class VNRecognizedTextObservationMBS

31.39.1 class VNRecognizedTextObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A request that detects and recognizes regions of text in an image.
Notes: This type of observation results from a VNRecognizeTextRequestMBS. It contains information about both the location and content of text and glyphs that Vision recognized in the input image.
Subclass of the VNRectangleObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.39.2 Methods

31.39.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.39.4 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.39.5 topCandidates(maxCandidateCount as integer) as VNRecognizedTextMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Requests the n top candidates for a recognized text string.
Notes: maxCandidateCount: The maximum number of candidates to return. This can't exceed 10.

Returns an array of the n top candidates, sorted by decreasing confidence score.

This function returns no more than n candidates, but it may return fewer than n candidates.

31.39.6 Properties

31.39.7 string as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The top candidate's string.
Notes: For your convenience.
(Read only property)

31.39.8 topCanditate as VNRecognizedTextMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: First top candidate.
Notes: For your convenience.
Same as first element of topCanditates(1).
(Read only property)

31.40 class VNRecognizeTextRequestMBS

31.40.1 class VNRecognizeTextRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that finds and recognizes text in an image.
Notes: By default, a text recognition request first locates all possible glyphs or characters in the input image, then analyzes each string. To specify or limit the languages sought in the request, set the recognitionLanguages property to an array containing the names of the languages of text you'd like to recognize. Vision returns the result of this request in a VNRecognizedTextObservationMBS object.

Available on MacOS 10.15.
Subclass of the VNImageBasedRequestMBS class.
Blog Entries

- Vision Framework for Xojo

31.40.2 Methods

31.40.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.40.4 Constructor(DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.
Notes: When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.40.5 customWords as String()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of strings to supplement the recognized languages at the word recognition stage.
Notes: The customWords list takes precedence over the standard lexicon.

31.40.6 recognitionLanguages as String()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of languages to detect, in priority order.
Notes: The order of the languages in the array defines the order in which languages are used during language processing and text recognition.
Specify the languages as ISO language codes.

31.40.7 setCustomWords(customWords() as String)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Sets an array of strings to supplement the recognized languages at the word recognition stage.
Notes: The customWords list takes precedence over the standard lexicon.

31.40.8 setProgressHandler(ProgressHandler as VNProgressHandlerMBS, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Sets progress handler.
Notes: The progress handler is an optional delegate that allows clients of the request to report progress to the user or to display partial results as they become available.

31.40.9 setRecognitionLanguages(recognitionLanguages() as String)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Sets array of languages to detect, in priority order.
Notes: The order of the languages in the array defines the order in which languages are used during language processing and text recognition.
Specify the languages as ISO language codes.

31.40.10 supportedRecognitionLanguages(recognitionLevel as Integer, byref error as NSErrorMBS) as String()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Requests a list of languages recognized by the specified revision.
Example:

```
Dim recognitionLevel As Integer = VNRecognizeTextRequestMBS.RecognitionLevelAccurate
Dim languages() As String
Dim error As NSErrorMBS

languages = VNRecognizeTextRequestMBS.supportedRecognitionLanguages(recognitionLevel, error)

MsgBox Join(languages, EndOfLine)

If error <>Nil Then
MsgBox error.LocalizedDescription
End If
```

Notes: recognitionLevel: The level of recognition to prioritize. Set this level to RecognitionLevelFast to prioritize speed over accuracy, and to RecognitionLevelAccurate to prioritize accuracy at the expense of speed.
error: An error that contains information about failed language support, or nil if no error occurred.

Request revision is set automatically by OS version.
Returns an array of supported languages, listed as ISO language codes.

A language supported in one recognition level may not be available in another recognition level.

Returns en-US in macOS 10.15 and iOS 13.0.
Returns en-US, fr-FR, it-IT, de-DE, es-ES and pt-BR in macOS 11.0 and iOS 14.0.
Returns en-US, fr-FR, it-IT, de-DE, es-ES, pt-BR, zh-Hans, zh-Hant in macOS 12.0
Returns en-US, fr-FR, it-IT, de-DE, es-ES, pt-BR, zh-Hans, zh-Hant, yue-Hans, yue-Hant, ko-KR, ja-JP, ru-RU, uk-UA in macOS 13.0 and iOS 16.0.
See also:

- 31.40.11 supportedRecognitionLanguages(recognitionLevel as Integer, requestRevision as Integer, byref error as NSErrorMBS) as String() 1384

31.40.11 supportedRecognitionLanguages(recognitionLevel as Integer, requestRevision as Integer, byref error as NSErrorMBS) as String()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Requests a list of languages recognized by the specified revision.
Example:

```
Dim recognitionLevel As Integer = VNRecognizeTextRequestMBS.RecognitionLevelAccurate
Dim languages() As String
Dim error As NSErrorMBS
```

```
languages = VNRecognizeTextRequestMBS.supportedRecognitionLanguages(recognitionLevel, error)

MsgBox Join(languages, EndOfLine)

If error <>Nil Then
MsgBox error.LocalizedDescription
End If
```

Notes: recognitionLevel: The level of recognition to prioritize. Set this level to RecognitionLevelFast to prioritize speed over accuracy, and to RecognitionLevelAccurate to prioritize accuracy at the expense of speed.
requestRevision: The revision of the text recognition algorithm for the Vision framework to use. Can be 1, 2 or 3. Or leave away for automatic mode.
error: An error that contains information about failed language support, or nil if no error occurred.

Returns an array of supported languages, listed as ISO language codes.

A language supported in one recognition level may not be available in another recognition level.

Returns en-US in macOS 10.15 and iOS 13.0.
Returns en-US, fr-FR, it-IT, de-DE, es-ES and pt-BR in macOS 11.0 and iOS 14.0.
Returns en-US, fr-FR, it-IT, de-DE, es-ES, pt-BR, zh-Hans, zh-Hant in macOS 12.0 with requestRevision = 2.
Returns en-US, fr-FR, it-IT, de-DE, es-ES, pt-BR, zh-Hans, zh-Hant, yue-Hans, yue-Hant, ko-KR, ja-JP, ru-RU, uk-UA in macOS 13.0 and iOS 16.0 with requestRevision = 3.
See also:

- 31.40.10 supportedRecognitionLanguages(recognitionLevel as Integer, byref error as NSErrorMBS) as String() 1383

31.40.12 Properties

31.40.13 indeterminate as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean set to true when a request can't determine its progress in fractions completed.
Notes: A value of true doesn't mean that the request will run forever. Rather, it means that the nature of the request can't be broken down into identifiable fractions to report. The progressHandler will still be called at suitable intervals.
(Read only property)

31.40.14 minimumTextHeight as Double

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The minimum height of the text expected to be recognized, relative to the image height.
Notes: Specify a floating-point number relative to the image height. For example, to limit recognition to text that is half of the image height, use 0.5. Increasing the size reduces memory consumption and expedites recognition with the tradeoff of ignoring text smaller than the minimum height. The default value is 1/32, or 0.03125.
(Read and Write property)

31.40.15 recognitionLevel as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A value that determines whether the request prioritizes accuracy or speed in text recognition.
Notes: The recognition level determines which techniques are used during the text recognition. Set this value to RecognitionLevelFast to prioritize speed over accuracy, and to RecognitionLevelAccurate for longer, more computationally intensive recognition.
(Read and Write property)

31.40.16 usesLanguageCorrection as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean indicating whether Vision applies language correction during the recognition process.
Notes: When this Boolean is set to true, Vision applies language correction during the recognition process. Disabling this property returns the raw recognition results, which provides performance benefits but less accurate results.
(Read and Write property)

31.40.17 Constants

Recognition Levels

Constant	Value	Description
RecognitionLevelAccurate	0	Accurate text recognition takes more time to produce a more comprehensive result.
RecognitionLevelFast	1	Fast text recognition returns results more quickly at the expense of accuracy.

31.41 class VNRectangleObservationMBS

31.41.1 class VNRectangleObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Information about projected rectangular regions detected by an image analysis request.
Notes: This type of observation results from a VNDetectRectanglesRequestMBS. It defines the four vertices of a detected rectangle.
Subclass of the VNDetectedObjectObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.41.2 Methods

31.41.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.41.4 rectangleObservationWithRequestRevision(requestRevision as Integer = 1, topLeft as CGPointMBS, bottomLeft as CGPointMBS, bottomRight as CGPointMBS, topRight as CGPointMBS) as VNRectangleObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A convenience initializer for creating a rectangle observation from its corner points.
Notes: requestRevision: The rectangle detector revision number. A higher revision indicates more recent iterations of the framework.
topLeft: The upper-left corner point.
bottomLeft: The lower-left corner point.
bottomRight: The lower-right corner point.
topRight: The upper-right corner point.

Available on MacOS 10.15 or newer.

31.41.5 Properties

31.41.6 bottomLeft as CGPointMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The coordinates of the lower-left corner of the observation bounding box.
Notes: (Read only property)

31.41.7 bottomRight as CGPointMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The coordinates of the lower-right corner of the observation bounding box.
Notes: (Read only property)

31.41.8 topLeft as CGPointMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The coordinates of the upper-left corner of the observation bounding box.
Notes: (Read only property)

31.41.9 topRight as CGPointMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The coordinates of the upper-right corner of the observation bounding box.
Notes: (Read only property)

31.42 class VNRequestMBS

31.42.1 class VNRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The abstract superclass for analysis requests.
Notes: Other Vision request handlers that perform image analysis inherit from this abstract base class. Instantiate one of its subclasses to perform image analysis.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Vision Framework for Xojo

31.42.2 Methods

31.42.3 cancel

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Cancels the request before it can finish executing.

31.42.4 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.42.5 copy as VNRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a copy of the object.

31.42.6 currentRevision as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The current revison supported by the request.
Notes: Available on MacOS 10.14 or newer.

31.42.7 defaultRevision as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The revision of the latest request for the particular SDK linked with the client application.
Notes: Available on MacOS 10.14 or newer.

31.42.8 results as VNObservationMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The collection of VNObservationMBS results generated by request processing.
Notes: If the request fails, this property is nil. Otherwise, it contains an array of VNObservationMBS subclasses specific to the VNRequest subclass.
Don't access this property until the request has finished processing.

31.42.9 supportedRevisions as NSIndexSetMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The collection of currently-supported algorithm versions for the class of request.
Notes: This method allows clients to inspect at runtime what capabilities are available for each class of VNRequest in the Vision framework.
Available on MacOS 10.14 or newer.

31.42.10 Properties

31.42.11 className as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Queries class name of the request.
Notes: (Read only property)

31.42.12 ClassPath as String

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The class path.
Notes: Useful for debugging to know what super classes the request has.

(Read only property)

31.42.13 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

31.42.14 preferBackgroundProcessing as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A hint to minimize the resource burden of the request.
Notes: If set to true, this property reduces the request's memory footprint, processing footprint, and CPU/GPU contention at the potential cost of longer execution time.
Setting this value can help ensure that Vision processing doesn't block UI updates and other rendering on the main thread.
(Read and Write property)

31.42.15 revision as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The specific algorithm or implementation revision that is to be used to perform the request.
Notes: (Read and Write property)

31.42.16 usesCPUOnly as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean signifying that the Vision request should execute exclusively on the CPU.
Notes: This value defaults to false to signify that the Vision request is free to leverage the GPU to accelerate its processing.
(Read and Write property)

31.43 class VNSaliencyImageObservationMBS

31.43.1 class VNSaliencyImageObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An observation containing a grayscale heat map of important areas across an image.
Notes: The heat map is a CVPixelBufferRef in a one-component floating-point pixel format. Its dimensions are 64 x 64 when fetched in real time, or 68 x 68 when requested in its deferred form.
Available on MacOS 10.15 or later.
Subclass of the VNPixelBufferObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.43.2 Methods

31.43.3 available as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Whether this class is available.
Notes: Returns true on MacOS 10.15 or newer.

31.43.4 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.43.5 salientObjects as VNRectangleObservationMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A collection of objects describing the distinct areas of the saliency heat map.
Notes: The objects in this array don't follow any specific ordering. It's up to your app to iterate across the observations and apply desired ordering.
Requesting this array lazily computes the bounds of salient objects within the image.

31.44 class VNSequenceRequestHandlerMBS

31.44.1 class VNSequenceRequestHandlerMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An object that processes image analysis requests for each frame in a sequence.
Notes: Instantiate this handler to perform Vision requests on a series of images. Unlike the VNImageRequestHandlerMBS, you don't specify the image on creation. Instead, you supply each image frame one by one as you continue to call one of the perform methods.
Blog Entries

- MBS Xojo Plugins, version 23.2pr1
- Vision Framework for Xojo

31.44.2 Methods

31.44.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.44.4 performRequestsOnCGImage(requests() as VNRequestMBS, CGImage as CGImageMBS, orientation as Integer = 0, byref error as NSErrorMBS) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Schedules one or more Vision requests to be performed on a Core Graphics image with known orientation.
Notes: requests: An array of VNRequestMBS requests to perform.
image: The input CGImageMBS on which to perform the request.
orientation: The orientation of the input image. Pass zero if unknown.
error: An optional error parameter populated when problems arise in scheduling the requests. Check if the return value is false.

Returns true if all requests were scheduled and performed. Check the error parameter if the return value is false.

31.44.5 performRequestsOnCIImage(requests() as VNRequestMBS, CIImage as Variant, orientation as Integer = 0, byref error as NSErrorMBS) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Schedules one or more Vision requests to be performed on CIImageMBS data with known orientation.
Notes: requests: An array of VNRequestMBS requests to perform.
image: The input CIImageMBS on which to perform the request.
orientation: The orientation of the input image. Pass zero if unknown.
error: An optional error parameter populated when problems arise in scheduling the requests. Check if the return value is false.

Returns true if all requests were scheduled and performed. Check the error parameter if the return value is false.

31.44.6 performRequestsOnCVPixelBuffer(requests() as VNRequestMBS, CVPixelBuffer as Variant, orientation as Integer = 0, byref error as NSErrorMBS) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Schedules one or more Vision requests to be performed on a Core Video pixel buffer with known orientation.
Notes: requests: An array of VNRequestMBS requests to perform.
pixelBuffer: The input CVPixelBufferMBS on which to perform the request.
orientation: The orientation of the input image. Pass zero if unknown.
error: An optional error parameter populated when problems arise in scheduling the requests. Check if the return value is false.

Returns true if all requests were scheduled and performed. Check the error parameter if the return value is false.

31.44.7 performRequestsOnImageData(requests() as VNRequestMBS, Data as MemoryBlock, orientation as Integer = 0, byref error as NSErrorMBS) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Schedules one or more Vision requests to be performed on raw data containing an image with known orientation.
Notes: requests: An array of VNRequestMBS requests to perform.

imageData: The input MemoryBlock on which to perform the request.
orientation: The orientation of the input image. Pass zero if unknown.
error: An optional error parameter populated when problems arise in scheduling the requests. Check if the return value is false.

Returns true if all requests were scheduled and performed. Check the error parameter if the return value is false.

31.44.8 performRequestsOnImageFile(requests() as VNRequestMBS, File as FolderItem, orientation as Integer = 0, byref error as NSErrorMBS) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Schedules one or more Vision requests to be performed on an image with known orientation, at a specific file.
Notes: requests: An array of VNRequestMBS requests to perform.
File: A folderitem pointing to the image on which to perform the request.
orientation: The orientation of the input image. Pass zero if unknown.
error: An optional error parameter populated when problems arise in scheduling the requests. Check if the return value is NO.

Returns true if all requests were scheduled and performed. Check the error parameter if the return value is false.

31.44.9 performRequestsOnPicture(requests() as VNRequestMBS, Picture as Picture, orientation as Integer = 0, byref error as NSErrorMBS) as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Schedules one or more Vision requests to be performed on a Core Graphics image with known orientation.
Notes: requests: An array of VNRequestMBS requests to perform.
image: The input CGImageMBS on which to perform the request.
orientation: The orientation of the input image. Pass zero if unknown.
error: An optional error parameter populated when problems arise in scheduling the requests. Check if the return value is false.

Returns true if all requests were scheduled and performed. Check the error parameter if the return value is false.

31.44.10 Properties

31.44.11 Handle as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The internal object reference.
Notes: (Read and Write property)

31.44.12 Constants

Orientations

Constant	Value	Description
kOrientationDown	3	The encoded image data is rotated 180¬∞ from the image's intended display orientation.
kOrientationDownMirrored	4	The encoded image data is vertically flipped from the image's intended display orientation.
kOrientationLeft	8	The encoded image data is rotated 90¬∞ clockwise from the image's intended display orientation.
kOrientationLeftMirrored	5	The encoded image data is horizontally flipped and rotated 90¬∞ counterclockwise from the image's intended display orientation.
kOrientationRight	6	The encoded image data is rotated 90¬∞ clockwise from the image's intended display orientation.
kOrientationRightMirrored	7	The encoded image data is horizontally flipped and rotated 90¬∞ clockwise from the image's intended display orientation.
kOrientationUp	1	The encoded image data matches the image's intended display orientation.
kOrientationUpMirrored	2	The encoded image data is horizontally flipped from the image's intended display orientation.

31.45 class VNTargetedImageRequestMBS

31.45.1 class VNTargetedImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The abstract superclass for image analysis requests that operate on both the processed image and a secondary image.
Notes: Other Vision request handlers that operate on both the processed image and a secondary image inherit from this abstract base class. Instantiate one of its subclasses to perform image analysis, and pass in auxiliary image data by filling in the options dictionary at initialization.
Subclass of the VNImageBasedRequestMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MBS Xojo Plugins, version 23.2pr5
- MBS Xojo Plugins, version 23.2pr1
- MBS Xojo Plugins, version 21.5pr3
- Vision Framework for Xojo

31.45.2 Methods

31.45.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.45.4 TargetedImageRequestWithCGImage(CGImage as CGImageMBS, orientation as Integer = 0, options as Dictionary, DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil) as VNTargetedImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a new request targeting a Core Graphics image of known orientation, executing the completion handler when done.
Notes: cgImage: The targeted Core Graphics image.
orientation: The orientation of the image buffer, based on EXIF specification and superseding other orientation information. The value must be an integer from 1 to 8; see kCGImagePropertyOrientation for details. Value 0 means unknown.
options: A dictionary with options specifying auxiliary information for the image.

When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.45.5 TargetedImageRequestWithCIImage(CIImage as Variant, orientation as Integer = 0, options as Dictionary, DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil) as VNTargetedImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a new request targeting a CIImageMBS of known orientation, executing the completion handler when done.
Notes: ciImage: The CIImage encapsulating the targeted image. Variant must be CIImageMBS.
orientation: The orientation of the image buffer, based on EXIF specification and superseding other orientation information. The value must be an integer from 1 to 8; see kCGImagePropertyOrientation for details. Pass zero if unknown.
options: A dictionary with options specifying auxiliary information for the image.

When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.45.6 TargetedImageRequestWithCVPixelBuffer(CVPixelBuffer as Variant, orientation as Integer = 0, options as Dictionary, DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil) as VNTargetedImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a new request targeting an image in a CVPixelBufferMBS of known orientation, executing the completion handler when done.
Notes: pixelBuffer: The pixel buffer containing the targeted image. Variant must be CVPixelBufferMBS.
orientation: The orientation of the image buffer, based on EXIF specification and superseding other orientation information. The value must be an integer from 1 to 8; see kCGImagePropertyOrientation for details. Pass zero if unknown.
options: A dictionary with options specifying auxiliary information for the image.

When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.45.7 TargetedImageRequestWithImageData(Data as MemoryBlock, orientation as Integer = 0, options as Dictionary, DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil) as VNTargetedImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a new request targeting a raw data image of known orientation, executing the completion handler when done.
Notes: imageData: The data containing the targeted image.
orientation: The orientation of the image buffer, based on EXIF specification and superseding other orientation information. The value must be an integer from 1 to 8; see kCGImagePropertyOrientation for details. Pass zero if unknown.
options: A dictionary with options specifying auxiliary information for the image.

When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.45.8 TargetedImageRequestWithImageFile(File as FolderItem, orientation as Integer = 0, options as Dictionary, DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil) as VNTargetedImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a new request targeting an image of known orientation, at the specified file, executing the completion handler when done.
Notes: File: The file of the targeted image.
orientation: The orientation of the image buffer, based on EXIF specification and superseding other orientation information. The value must be an integer from 1 to 8; see kCGImagePropertyOrientation for details. Pass 0 if unknown.
options: A dictionary with options specifying auxiliary information for the image.

When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.45.9 TargetedImageRequestWithPicture(Picture as Picture, orientation as Integer = 0, options as Dictionary, DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil) as VNTargetedImageRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a new request targeting a Core Graphics image of known orientation, executing the completion handler when done.
Notes: Picture: The targeted Core Graphics image.

orientation: The orientation of the image buffer, based on EXIF specification and superseding other orientation information. The value must be an integer from 1 to 8; see kCGImagePropertyOrientation for details. Value 0 means unknown.
options: A dictionary with options specifying auxiliary information for the image.

When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.46 class VNTextObservationMBS

31.46.1 class VNTextObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Information about regions of text detected by an image analysis request.
Notes: This type of observation results from a VNDetectTextRectanglesRequestMBS. It expresses the location of each detected character by its bounding box.
Available on MacOS 10.13 or newer.
Subclass of the VNRectangleObservationMBS class.
Blog Entries

- Vision Framework for Xojo

31.46.2 Methods

31.46.3 characterBoxes as VNRectangleObservationMBS()

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An array of detected individual character bounding boxes.
Notes: If the associated VNDetectTextRectanglesRequestMBS request indicates interest in character boxes by setting the option VNRequestOptionReportCharacterBoxes to true, this property is non-nil. If no characters are found, it remains empty.

31.46.4 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The constructor.

31.47 class VNTrackingRequestMBS

31.47.1 class VNTrackingRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The abstract superclass for image analysis requests that track unique features across multiple images or video frames.
Notes: Instantiate a tracking request subclass to perform object tracking across multiple frames of an image. After initialization, configure the degree of accuracy by setting trackingLevel, and provide observations you would like to track by setting the inputObservation initial bounding box.
Subclass of the VNImageBasedRequestMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Vision Framework for Xojo

31.47.2 Methods

31.47.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

31.47.4 Properties

31.47.5 inputObservation as VNDetectedObjectObservationMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The observation object defining a region to track.
Notes: Providing an observation not returned from a tracker, such as a user-defined observation, begins a new tracker for the sequence. Providing an observation that was returned from a tracker continues the use of that tracker, to track the region to the next frame.
In general, unless specified in the request's documentation or header file, you must define the rectangle in normalized coordinates, with the origin at the lower-left corner.
(Read only property)

31.47.6 LastFrame as Boolean

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A Boolean that indicates the last frame in a tracking sequence.
Notes: If set to true, the current tracker will be released to the pool of available trackers when the current frame finishes processing.
(Read and Write property)

31.47.7 trackingLevel as Integer

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: A value for specifying whether to prioritize speed or location accuracy.
Notes: Use VNRequestTrackingLevelAccurate or VNRequestTrackingLevelFast.
(Read only property)

31.47.8 Constants

TrackingLevel

Constant	Value	Description
VNRequestTrackingLevelAccurate	0	Tracking level that favors location accuracy over speed.
VNRequestTrackingLevelFast	1	Tracking level that favors speed over location accuracy.

31.48 class VNTrackObjectRequestMBS

31.48.1 class VNTrackObjectRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that tracks movement of a previously identified arbitrary object across multiple images or video frames.
Notes: Use this type of request to track the bounding boxes around objects previously identified in an image. Vision will attempt to locate the same object from the input observation throughout the sequence. Subclass of the VNTrackingRequestMBS class.
Blog Entries

- Vision Framework for Xojo

31.48.2 Methods

31.48.3 Constructor(observation as VNDetectedObjectObservationMBS, DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a new object tracking request with a detected object observation.
Notes: observation: A detected object observation with bounding box information.

When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.49 class VNTrackRectangleRequestMBS

31.49.1 class VNTrackRectangleRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that tracks movement of a previously identified rectangular object across multiple images or video frames.
Notes: Use this type of request to track the bounding boxes of rectangles throughout a sequence of images. Vision returns locations for rectangles found in all orientations and sizes.
Subclass of the VNTrackingRequestMBS class.
Blog Entries

- Vision Framework for Xojo

31.49.2 Methods

31.49.3 Constructor(observation as VNRectangleObservationMBS, DelegateHandler as VNRequestCompletedMBS = nil, tag as variant = nil)

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: Creates a new rectangle tracking request with a rectangle observation.
Notes: observation: A rectangle observation with bounding box and corner location information.

When work is done, the optional delegate method is invoked to provide result on success or error on failure.

31.50 class VNTranslationalImageRegistrationRequestMBS

31.50.1 class VNTranslationalImageRegistrationRequestMBS

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: An image analysis request that determines the affine transform needed to align the content of two images.
Notes: Create and perform a translational image registration request to align content in two images through translation.
Subclass of the VNImageRegistrationRequestMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- Vision Framework for Xojo

31.50.2 Methods

31.50.3 Constructor

Plugin Version: 19.4, Platform: macOS, Targets: All.

Function: The private constructor.

Chapter 32

List of Questions in the FAQ

Chapter 33

The FAQ

33.0.1 Can anyone help me convert seconds to time in this format hh:mm:ss?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sure, here's a routine I use (which has an advantage over the previously-posted Date-based solution in that you don't have to rely on the creation of an object – all that happens is some division and string concatenation):
Example:

```
Function SecsToTimeString(timeInSecs as Integer, padHours as boolean, padMinutes as boolean) as string
// Given an amount time (in seconds), generates a string representing that amount
// of time. The padHours and padMinutes parameters determine whether to display
// hours and minutes if their values are zero.

// Examples:
// timeInSecs = 90, padHours = true; returns "00:01:30"
// timeInSecs = 1, padHours = false, padMinutes = true; returns "00:01"
// timeInSecs = 3601, padMinutes = false; returns "01:00:01"

dim hours, minutes, seconds as Integer
dim hoursString, minutesString as string

hours = timeInSecs / 3600
minutes = (timeInSecs mod 3600) / 60
seconds = timeInSecs mod 60

if hours = 0 then
if padHours then
hoursString = "00:"
else
hoursString = ""
end if
```

```
else
hoursString = Format(hours, "##\:")
end if
if minutes = 0 then
if hours <>0 or padMinutes then
minutesString = "00:"
else
minutesString = ""
end if
else
minutesString = Format(minutes, "00\:")
end if

return hoursString + minutesString + Format(seconds, "00")
End Function
```

Notes: (from the rb mailinglist)

33.0.2 Do you have plugins for Android?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Since there is no plugin SDK for Android, we have no way to make a plugin for Android.
Notes: We support macOS, Windows, Linux and iOS.

33.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use functions from NSColor to get proper highlight color in RGB:
Example:

```
Function ProperHighlightColor(active as Boolean) As Color
#if TargetCocoa
Dim theColor As NSColorMBS
If active Then
theColor = NSColorMBS.alternateSelectedControlColor
Else
theColor = NSColorMBS.secondarySelectedControlColor
End If

Dim rgbColor As NSColorMBS = theColor.colorUsingColorSpaceName(NSColorSpaceMBS.NSCalibrate-
```

```
dRGBColorSpace)
If rgbColor <>Nil Then
Dim red as Integer = rgbColor.redComponent * 255.0
Dim green as Integer = rgbColor.greenComponent * 255.0
Dim blue as Integer = rgbColor.blueComponent * 255.0
Return RGB(red, green, blue)
Else
Return HighlightColor
End If
#else
return HighlightColor
#endif
End Function
```

Notes: As you see we convert color to Calibrated RGB for best results.
See also:

33.0.4 How to catch delete key?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following is the code in keydown event catches delete or backspace keys.
Example:

```
Function KeyDown(Key As String) As Boolean
if asc(key) = 8 or asc(key) = 127 then
MsgBox "Delete"
Return true
end if
End Function
```

See also:

33.0.5 How to convert cmyk to rgb?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

The following is the code to convert cmyk values to an RGB color datatype.
It's just a basic estimate of the color values. If you are looking for completely color accurate solution, this is not it. It should work for most people. :)
Example:

```
Function CMYKToRGB(c as Integer, m as Integer, y as Integer, k as Integer) As color
// converts c,m,y,k values (0-100) to color data type RGB
// place this in a method. Supply C,M,Y,K values-
// it returns color datatype


dim color_RGB as color
dim r, g, b as Integer

r=255-round(2.55*(c+k))
if r<0 then
r=0
end if
g=255-round(2.55*(m+k))
if g<0 then
g=0
end if
b=255-round(2.55*(y+k))
if b<0 then
b=0
end if

color_RGB=RGB(r,g,b)

return color_RGB

End Function
```

Notes:

(from the rb mailinglist)
See also:

33.0.6 How to delete a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following is the code deletes a folder recursively.
Example:

```
Sub deletefolder(f as folderitem)
dim files(-1) as FolderItem

if f=nil then Return

// delete single file
if f.Directory=false then
f.Delete
Return
end if

// get a list of all items in that folder
dim i,c as Integer
c=F.Count
for i=1 to c
files.Append f.TrueItem(i)
next

// delete each item
for each fo as FolderItem in files
if fo=nil then
' ignore
elseif fo.Directory then
deletefolder fo
fo.delete
else ' file
```

```
fo.Delete
end if
next

f.Delete
End Sub
```

See also:

- 33.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 1418
- 33.0.4 How to catch delete key? 1419
- 33.0.5 How to convert cmyk to rgb? 1420
- 33.0.7 How to detect if CPU if 64bit processor? 1422
- 33.0.8 How to query variant type string for a variant? 1423
- 33.0.9 How to refresh a htmlviewer on Windows? 1424

33.0.7 How to detect if CPU if 64bit processor?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Via CPUID you can ask CPU:
Example:

```
dim c as new CPUIDMBS

if c.Flags(CPUIDMBS.kFeatureLM) then
MsgBox "64-bit CPU"
else
MsgBox "32-bit CPU"
end if
```

Notes: Should work on all intel compatible CPUs.
See also:

- 33.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 1418
- 33.0.4 How to catch delete key? 1419
- 33.0.5 How to convert cmyk to rgb? 1420
- 33.0.6 How to delete a folder? 1421
- 33.0.8 How to query variant type string for a variant? 1423
- 33.0.9 How to refresh a htmlviewer on Windows? 1424

33.0.8 How to query variant type string for a variant?

Plugin Version: 20.5, Platforms: macOS, Linux, Windows.

Answer: The following example function returns type string for variant.
Example:

```
Public Function VariantTypeString(v as Variant) as string
// Xojo's VarType doesn't know Unsigned integers
'Dim type As Integer = VarType(v)

// MBS VarType can detect unsigned integer
Dim type As Integer = GetVariantTypeMBS(v)

Dim IsArray As Boolean = BitwiseAnd(type, Variant.TypeArray) = Variant.TypeArray

// type without array
type = BitwiseAnd(type, Bitwise.OnesComplement(Variant.TypeArray))

// build a dictionary to map types on first call
Static TypeMap As Dictionary
If TypeMap = Nil Then
TypeMap = New Dictionary
TypeMap.Value(Variant.TypeBoolean) = "Boolean"
TypeMap.Value(Variant.TypeCFStringRef) = "CFStringRef"
TypeMap.Value(Variant.TypeColor) = "Color"
TypeMap.Value(Variant.TypeCString) = "CString"
TypeMap.Value(Variant.TypeCurrency) = "Currency"
TypeMap.Value(Variant.TypeDate) = "Date"
TypeMap.Value(Variant.TypeDateTime) = "DateTime"
TypeMap.Value(Variant.TypeDouble) = "Double"
TypeMap.Value(Variant.TypeInt32) = "Int32"
TypeMap.Value(Variant.TypeInt64) = "Int64"
TypeMap.Value(Variant.TypeInteger) = "Integer"
TypeMap.Value(Variant.TypeNil) = "Nil"
TypeMap.Value(Variant.TypeObject) = "Object"
TypeMap.Value(Variant.TypeOSType) = "OSType"
TypeMap.Value(Variant.TypePString) = "PString"
TypeMap.Value(Variant.TypePtr) = "Ptr"
TypeMap.Value(Variant.TypeSingle) = "Single"
TypeMap.Value(Variant.TypeString) = "String"
TypeMap.Value(Variant.TypeStructure) = "Structure"
TypeMap.Value(Variant.TypeText) = "Text"
TypeMap.Value(Variant.TypeWindowPtr) = "WindowPtr"
TypeMap.Value(Variant.TypeWString) = "WString"

// MBS extra types
TypeMap.Value(Variant.TypeInt32+100) = "UInt32"
TypeMap.Value(Variant.TypeInt64+100) = "UInt64"
```

```
End If

// lookup type

#if DebugBuild then
If Not TypeMap.HasKey(type) Then
Break // missing type
End If
#endif

If IsArray Then
Return "Array of " + TypeMap.Lookup(type,"?")
Else
Return TypeMap.Lookup(type,"?")
End If
End Function
```

See also:

- 33.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 1418
- 33.0.4 How to catch delete key? 1419
- 33.0.5 How to convert cmyk to rgb? 1420
- 33.0.6 How to delete a folder? 1421
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33.0.9 How to refresh a htmlviewer on Windows?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can ask the browser to reload the website with this code line:
Example:

```
call htmlViewer1.IERunJavaScriptMBS("javascript:document.location.reload()")
```

See also:

- 33.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 1418
- 33.0.4 How to catch delete key? 1419
- 33.0.5 How to convert cmyk to rgb? 1420

33.0.10 Is there an example for vector graphics in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this example inside the paint event of a window:
Example:

```
dim v as Group2D
dim r as RectShape
dim s as StringShape

const pi=3.14

s=new StringShape
s.Text="Hello World!"
s.TextFont="Geneva"
s.TextSize=24
s.FillColor=rgb(0,0,255)
s.Italic=true
s.y=5
s.x=0

r=new RectShape

r.X=0
r.y=0
r.Height=100
r.Width=180
r.BorderColor=rgb(255,0,0)
r.FillColor=rgb(0,255,0)
r.BorderWidth=5
r.Border=50

v=new Group2d
v.Append r
v.Append s
v.Rotation=pi*-20.0/180.0
v.x=150
v.y=150

g.DrawObject v
```

33.0.11 Picture functions do not preserve resolution values?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the picture functions return pictures with no/default resolution values.
Example:

```
dim l as Picture = LogoMBS(500)

l.HorizontalResolution = 300
l.VerticalResolution = 300

dim r as Picture = l.Rotate90MBS

MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)

r.HorizontalResolution = l.HorizontalResolution
r.VerticalResolution = l.VerticalResolution

MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)
```

Notes: So please fix them yourself after calling a function.

Maybe in the future this changes, but currently you can't really set this easily from plugin code.

33.0.12 A toolbox call needs a rect - how do I give it one?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Fill a memoryblock like this:
Example:

```
Dim MB As Memoryblock
MB = NewMemoryBlock(8)
MB.Short(0) = window1.Top
MB.Short(2) = window1.Left
MB.Short(4) = window1.Height+window1.Top // bottom
MB.Short(6) = window1.Width+window1.Left // right
```

33.0.13 API client not supported?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you get this exception message on SQLConnectionMBS.Connect, we may have a problem.
Notes: First case is that the given thing is not supported (e.g. MS SQL directly on Mac).
Second case is that the plugin compilation went wrong and the support for the database was not linked into the plugin. Like MySQL missing or MS SQL on Windows missing. In that case please contact us to fix the plugin.

33.0.14 Can I access Access Database with Java classes?

Plugin Version: all, Platform: Windows.

Answer: You can use ucanaccess to access databases created with Microsoft
Example:

```
dim options(-1) as string

// load all the jar files we have in a folder called java:

dim appFolder as FolderItem = GetFolderItem("")

Dim count as Integer = appFolder.Parent.Child("java").Count
dim libjs() as string
For i as Integer = 1 to count
Dim f As FolderItem = appFolder.Parent.Child("java").item(i)
If f <>Nil and f.Exists Then
libjs.append f.NativePath+";"
End If
Next

// now init virtual machine
dim librery as string = Join(libjs, "")
dim vm as new JavaVMMBS(librery)

if vm.Handle = 0 then
MsgBox "Failed to initialize virtual machine"
else
// now make a new database connection with ucanaccess
dim d as new JavaDatabaseMBS(vm,"net.ucanaccess.jdbc.UcanaccessDriver")
Dim DbFile as FolderItem = appFolder.Parent.Child("Database11.accdb")
dim j as JavaConnectionMBS = d.getConnection("jdbc:ucanaccess://"+DbFile.NativePath)

// select and show values
dim r as JavaResultSetMBS = j.MySelectSQL("Select * From test")
while r.NextRecord
MsgBox r.getString("FirstName") +" "+ r.getString("LastName")
wend

end if
```

```
Exception e as JavaExceptionMBS
MsgBox e.message+" errorcode: "+str(e.ErrorNumber)
```

Notes: see website:
http://ucanaccess.sourceforge.net/site.html

33.0.15 Can I create PDF from Xojo Report using DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, we have a graphics class integration for DynaPDF.
Notes: Since MBS Plugin in version 19.2, we can integrate reports with Xojo.

33.0.16 Can I use AppleScripts in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, but they run on the server, not on the client.
Example:

```
dim a as new AppleScriptMBS

// query my application name
a.Compile "tell application ""System Events"" to return name of current application"

// run
a.Execute

// show result
label1.text = a.Result

// shows something like "My Application.fcgi.debug"
```

Notes: This can be useful to control the server from remote, if and only if the your sever is running Mac OS X.

33.0.17 Can I use graphics class with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sorry, no. We can't provide a graphics subclass from plugin.
Notes: The is a feature request to allow graphics subclasses:
Feedback case 11391: feedback://showreport?report_id=11391

33.0.18 Can I use sockets on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, but they run on the server, not on the client.
Notes: You can use HTTPSocket, SMTPSocket, POP3Socket, SMTPSecureSocket, SecurePOP3Socket, EasyTCPSocket, EasyUDPSocket, AutoDiscovery, our Bonjour classes or our CURL* classes. But all of them work on the server, not on the client.

This means if you search for a printer with Bonjour, you can find the printers in the local network on your server hosting site. Using SMTPSocket may be a good idea for sending emails from the server like notifications.

33.0.19 Can I use your ChartDirector plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our ChartDirector plugin works just fine on the Xojo Web Edition.
Example:

```
// The data for the pie chart
dim data(-1) as Double=array(55.0, 18.0, 25.0, 22.0, 18.0, 30.0, 35.0)

// The labels for the pie chart, Words are choosen random to check font!
dim labels(-1) as string=array("Germany","Italy","France","Spain","UK","Poland","Russia")

// The colors to use for the sectors
dim colors(-1) as Integer

colors.Append &h66aaee
colors.Append &heebb22
colors.Append &hbbbbbb
colors.Append &h8844ff

if TargetLinux then
CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype/msttcorefonts"
end if

// Create a PieChart object of size 360 x 300 pixels
dim c as new CDPieChartMBS(700, 600)
```

```
c.setBackground(c.linearGradientColor(0, 0, 0, c.getHeight(), &h0000cc, &h000044))
c.setRoundedFrame(&hffffff, 16)
dim tt as CDTextBoxMBS = c.addTitle("ChartDirector Demonstration", "timesbi.ttf", 18)
tt.setMargin(0, 0, 16, 0)
tt.setFontColor(&hFFFFFF)

// Set the center of the pie at (180, 140) and the radius to 100 pixels
c.setPieSize 350,300,150
// Set the sector colors
c.setColors(c.kDataColor, colors)

// Draw the pie in 3D with a pie thickness of 20 pixels
c.set3D(20)

dim t as CDTextBoxMBS = c.setLabelStyle("arialbd.ttf", 10, &h000000)
t.setBackground(CDPieChartMBS.kSameAsMainColor, CDPieChartMBS.kTransparent, CDPieChartMBS.soft-
Lighting(CDPieChartMBS.kRight, 0))
t.setRoundedCorners(8)

// Use local gradient shading for the sectors, with 5 pixels wide
// semi-transparent white (bbffffff) borders
c.setSectorStyle(CDPieChartMBS.kLocalGradientShading, &hbbffffff, 0)

// Set the pie data and the pie labels
c.setData data,labels
call c.setLabelStyle "arialbd.ttf",18

dim pic as picture = c.makeChartPicture
dim wp as new WebPicture(pic, Picture.FormatJPEG) // JPEG makes it smaller and faster

ImageView1.Picture=wp
```

Notes: Be aware that our plugin produces pictures for you, which you assign to ImageViews. Tranfserring those pictures takes time, so you can optimize that with using WebPicture class. There you can decide between different compressions to improve speed (use JPEG instead of PNG).

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

33.0.20 Can I use your DynaPDF plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our DynaPDF plugin works just fine on the Xojo Web Edition.
Notes: PDF files are created on the server. You may want to offer a preview to the user which uses reduced resolution images to reduce the time to download the PDF.

See our Create PDF example for the Xojo Web Edition.

33.0.21 Can I use your plugin controls on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: No.

33.0.22 Can you get an unique machine ID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There is nothing like an unique machine ID.
Notes: 1:
You can use the MAC IDs of the network interfaces.
This can be changed by the user with software tools.
And the list of network interfaces changes if user reorder the interfaces.

2:
You can use the system folder creation date/time.
This may stay equal after cloning machines or after migration to new PC.

3:
You can use the Mac Serialnumber.
Mac only and it can happen that a Mac does not have a serial number.

4:
You can use the x86 CPU ID.
This is x86 CPU only and does not avoid running on the same CPU in different PCs.

33.0.23 ChartDirector: Alignment Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Alignment Specification
Notes: In many ChartDirector objects, you may specify the alignment of the object's content relative to its boundary. For example, for a TextBox object, you may specify the text's alignment relative to the box boundary by using TextBox.setAlignment.

The ChartDirector API defines several constants for the alignment options.

ConstantValueDescription

BottomLeft	1	The leftmost point on the bottom line.
BottomCenter	2	The center point on the bottom line.
BottomRight	3	The rightmost point on the bottom line.
Left	4	The leftmost point on the middle horizontal line.
Center	5	The center point on the middle horizontal line.
Right	6	The rightmost point on the middle horizontal line.
TopLeft	7	The leftmost point on the top line.
TopCenter	8	The center point on the top line.
TopRight	9	The rightmost point on the top line.
Bottom	2	The center point on the bottom line. Same as BottomCenter.
Top	8	The center point on the top line. Same as TopCenter.
TopLeft2	10	An alternative top-left position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, TopLeft2 refers to refers to the left of the top side, while TopLeft refers to the top of the left side. The reverse applies for a horizontal axis.
TopRight2	11	An alternative top-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, TopRight2 refers to refers to the right of the top side, while TopRight refers to the top of the right side. The reverse applies for a horizontal axis.
BottomLeft2	12	An alternative bottom-left position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomLeft2 refers to refers to the left of the bottom side, while BottomLeft refers to the bottom of the left side. The reverse applies for a horizontal axis.
BottomRight2	13	An alternative bottom-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomRight2 refers to refers to the right of the bottom side, while BottomRight refers to the bottom of the right side. The reverse applies for a horizontal axis.

33.0.24 ChartDirector: Color Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Color Specification
Notes: Many functions in the ChartDirector API accept colors as parameters. ChartDirector supports col-

ors specified in web and HTML compatible ARGB format, in which ARGB refers to the Alpha transparency, Red, Green and Blue components of the color.

In addition to ARGB colors, ChartDirector supports ”dynamic” colors. A dynamic color is a color that changes depending on the position of the pixels. The ”dynamic” colors that ChartDirector supports include ”pattern colors”, ”metal colors”, ”gradient colors”, ”zone colors” and ”dash line colors”.

ChartDirector supports specifying colors indirectly using ”palette colors”. When a ”palette color” is used, the color is specified as an index to a palette. The actual color is looked up from the palette.ARGB Color
ARGB color consists of 4 components - alpha transparency, red, green and blue. The four components are encoded as a 32-bit number, with each component occupying 8 bits. In hexadecimal notation, it is AARRGGBB, where AA, RR, GG and BB are the alpha transparency, red, green and blue components.

Each component ranges from 00 - FF (0 - 255), representing its intensity. For example, pure red color is 00FF0000, pure green color is 0000FF00, and pure blue color is 000000FF. White color is 00FFFFFF, and black color is 00000000.

Most programming language requires you to put special prefix in front of hexadecimal characters. For C++, the prefix is ”0x”. For example, the syntax for the hexadecimal number 00FFFFFF is 0x00FFFFFF, or simply 0xFFFFFF.
For the alpha transparency component, a zero value means the color is not transparent all at. This is equivalent to traditional RGB colors. A non-zero alpha transparency means the the color is partially transparent. The larger the alpha transparency, the more transparent the color will be. If a partially transparent color is used to draw something, the underlying background can still be seen.

For example, 80FF0000 is a partially transparent red color, while 00FF0000 is a non-transparent red color.

Note that ChartDirector’s ARGB color is web and HTML compatible. For example, red is FF0000, the same as in HTML. There are many resources on the web that provide tables in which you can click a color and it will show its HTML color code. These color codes can be used in ChartDirector.

If alpha transparency is FF (255), the color is totally transparent. That means the color is invisible. It does not matter what the RGB components are. So in ChartDirector, only one totally transparent color is used - FF000000. All other colors of the form FFnnnnnn are reserved to represent palette colors and dynamic colors, and should not be interpreted as the normal ARGB colors.

The totally transparent color FF000000 is often used in ChartDirector to disable drawing something. For example, if you want to disable drawing the border of a rectangle, you can set the border color to totally transparent.

For convenience, ChartDirector defines a constant called Transparent, which is equivalent to FF000000.Pattern Color

A pattern color is a dynamic color that changes according to a 2D periodic pattern. When it is used to fill an area, the area will look like being tiled with a wallpaper pattern.

Pattern colors are created using BaseChart.patternColor, BaseChart.patternColor2, DrawArea.patternColor and DrawArea.patternColor2. The patternColor method creates pattern colors using an array of colors as a bitmap. The patternColor2 method creates pattern colors by loading the patterns from image files.

These methods return a 32-bit integer acting as a handle to the pattern color. The handle can be used in any ChartDirector API that expects a color as its input.Metal Color
A metal color is a color of which the brightness varies smoothly across the chart surface as to make the surface looks shiny and metallic. ChartDirector supports using any color as the base color of the metal color. In particular, using yellow and grey as the base colors will result in metal colors that look gold and silver.

Metal colors are most often used as background colors of charts. They are created using CDBaseChartMBS.metalColor, CDBaseChartMBS.goldColor and CDBaseChartMBS.silverColor. The first method allows you to specify an arbitrary base color. The second and third methods use yellow and grey as the base colors, resulting in gold and silver metal colors.

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any ChartDirector API that expects a color as its input.Gradient Color
A gradient color is a color that changes progressively across a direction.

Gradient colors are created using BaseChart.gradientColor, BaseChart.gradientColor2, DrawArea.gradientColor and DrawArea.gradientColor2. The gradientColor method creates a 2-point gradient color that changes from color A to color B. The gradientColor2 method creates a multi-point gradient colors that changes from color A to B to C ....

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any ChartDirector API that expects a color as its input.

One common use of multi-point gradient colors is to define colors that have metallic look and feel. Please refer to DrawArea.gradientColor2 for details.Dash Line Colors
A dash line color is a color that switches on and off periodically. When used to draw a line, the line will appear as a dash line.

Dash line colors are created using BaseChart.dashLineColor and DrawArea.dashLineColor. They accept a line color and a dash pattern code as arguments, and return a 32-bit integer acting as a handle to the dash line color. The handle can be used in any ChartDirector API that expects a color as its input.Zone Colors
A zone color is for XY charts only. It is a color that automatically changes upon reaching a data threshold value along the x-axis or y-axis. Zone colors are created using Layer.xZoneColor, Layer.yZoneColor, XYChart.xZoneColor or XYChart.yZoneColor.Palette Colors
Palette colors are colors of the format FFFFnnnn, where the least significant 16 bits (nnnn) are the index to the palette. A palette is simply an array of colors. For a palette color, the actual color is obtained by

looking up the palette using the index. For example, the color FFFF0001 is the second color in the palette (first color is index 0).

The colors in the palette can be ARGB colors or "dynamic" colors (pattern, gradient and dash line colors).

The first eight palette colors have special significance. The first three palette colors are the background color, default line color, and default text color of the chart. The 4th to 7th palette colors are reserved for future use. The 8th color is a special dynamic color that is equal to the data color of the "current data set".

The 9th color (index = 8) onwards are used for automatic data colors. For example, in a pie chart, if the sector colors are not specified, ChartDirector will automatically use the 9th color for the first sector, the 10th color for the second sector, and so on. Similarly, for a multi-line chart, if the line colors are not specified, ChartDirector will use the 9th color for the first line, the 10th color for the second line, and so on.

The ChartDirector API defines several constants to facilitate using palette colors.

ConstantValueDescription

Palette	FFFF0000	The starting point of the palette. The first palette color is (Palette + 0). The nth palette color is (Palette + n - 1).
BackgroundColor	FFFF0000	The background color.
LineColor	FFFF0001	The default line color.
TextColor	FFFF0002	The default text color.
[Reserved]	FFFF0003 - FFFF0006	These palette positions are reserved. Future versions of ChartDirector may use these palette positions for colors that have special significance.
SameAsMainColor	FFFF0007	A dynamic color that is equal to the data color of the current data set. This color is useful for objects that are associated with data sets. For example, in a pie chart, if the sector label background color is SameAsMainColor, its color will be the same as the corresponding sector color.
DataColor	FFFF0008	The starting point for the automatic data color allocation.

When a chart is created, it has a default palette. You may modify the palette using BaseChart.setColor, BaseChart.setColors, or BaseChart.setColors2.

The advantages of using palette colors are that you can change the color schemes of the chart in one place. ChartDirector comes with several built-in palettes represented by the following predefined constants.

ConstantDescription

33.0.25 ChartDirector: Font Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

defaultPalette	An array of colors representing the default palette. This palette is designed for drawing charts on white backgrounds (or lightly colored backgrounds).
whiteOnBlackPalette	An array of colors useful for drawing charts on black backgrounds (or darkly colored backgrounds).
transparentPalette	An array of colors useful drawing charts on white backgrounds (or lightly colored backgrounds). The data colors in this palette are all semi-transparent.

Answer: ChartDirector: Font Specification
Notes: Font Name
In ChartDirector, the font name is simply the file name that contains the font. For example, under the Windows platform, the "Arial" font is "arial.ttf", while the "Arial Bold" font is "arialbd.ttf".

NOTE: Mac OS X Specific Information
In Mac OS X, in addition to ".ttf", ChartDirector also supports Mac OS X font file formats, such as Font Suitcase files and Datafork files (.dfont). These files often contain multiple fonts. For example, the "GillSans.dfont" file contains 6 fonts.

So in addition to the file name, an index is needed to determine the font. The index is specified by appending a " | " character to the font name, followed by the index number. For example, the third font in "GillSans.dfont" is denoted as "GillSans.dfont | 2". (Note: The first font starts at 0.) If no index number is provided, the first font is assumed.

ChartDirector also supports using Mac OS X Font Manager names. For example, one may use "Gill Sans Light Italic" instead of using "GillSans.dfont | 1" as the font name. However, the Mac OS X Font Manager is active only if someone has logged into the Mac GUI console, so this method is only recommended for developing applications that run on the GUI console.

The sample programs that come with ChartDirector are designed to run on all operating systems, so they use generic font file names (eg. "arial.ttf") instead of Mac OS X specific names. To allow them to run on Mac OS X, ChartDirector on Mac OS X has a built-in table to map common font file names to Mac OS X font names:

"arial.ttf", "arialbd.ttf", "ariali.ttf" and "arialbi.ttf" are mapped to "Arial | 0" (Arial), "Arial | 1" (Arial Bold), "Arial | 2" (Arial Italic) and "Arial | 3" (Arial Bold Italic)

"times.ttf", "timesbd.ttf", "timesi.ttf" and "timesbi.ttf" are mapped to "Times New Roman | 0" (Times New Roman), "Times New Roman | 1" (Times New Roman Bold), "Times New Roman | 2" (Times New Roman Italic) and "Times New Roman | 3" (Times New Roman Bold Italic)

"cour.ttf", "courbd.ttf", "couri.ttf" and "courbi.ttf" are mapped to "Courier New | 0" (Courier New), "Courier New | 1" (Courier New Bold), "Courier New | 2" (Courier New Italic) and "Courier New | 3" (Courier New Bold Italic)

Font Location
ChartDirector on Windows does not come with any font files. It relies on the operating system's font files in the " [windows] \Fonts" directory. To see what fonts are installed in your operating system and their file names, use the File Explorer to view that directory.

ChartDirector on Windows will also search for the font files in the "fonts" subdirectory (if it exists) under the directory where the ChartDirector DLL "chartdir.dll" is installed. This is useful for private fonts. Also, for some especially secure web servers, the web anonymous user may not have access to the " [windows] \Fonts" directory. In this case, you may copy the font files to the above subdirectory.

ChartDirector on Mac OS X relies on operating system font files in "/Library/Fonts" and "/System/Library/Fonts".

ChartDirector on Linux, FreeBSD and Solaris assume the fonts files are in the "fonts" subdirectory under the directory where the ChartDirector shared object "libchartdir.so" is installed. ChartDirector on Linux, FreeBSD and Solaris come with a number of font files in the "fonts" subdirectory.

To keep the download size small, ChartDirector on Linux, FreeBSD and Solaris only come with some commonly used fonts. You may download additional fonts from the Internet. In particular, the Microsoft fonts at
http://sourceforge.net/project/showfiles.php?group_id=34153&release_id=105355
is highly recommended. Please refer to
http://www.microsoft.com/typography/faq/faq8.htm
on how you could use the fonts legally in your system.

ChartDirector supports True Type fonts (.ttf), Type 1 fonts (.pfa and .pfb) and Windows bitmap fonts (.fon). On Mac OS X, ChartDirector also supports Font Suitcase and Datafork (.dfont) files. On Linux, FreeBSD and Solaris, ChartDirector also supports Portable Compiled Fonts (.pcf fonts).

If you want ChartDirector to search other directories for the font files, you may list the directories in an environment variable called "FONTPATH".

If you specify an absolute path name for the font file, ChartDirector will use the absolute path name and will not search other directories.Artificial Boldening and Italicizing
Whereas most popular font comes with different styles for "normal", "bold", "italic" and "bold italic", some fonts only come with one style (the normal style). For example, the Monotype Corsiva font that comes with MS Office only has the normal style (mtcorsva.ttf). For these cases, you may append the "Bold" and/or "Italic" words after the font file name (separated with a space) to ask ChartDirector to artificially bolden and/or italicize the font. For example, you may specify the font name as "mtcorsva.ttf Bold".Font List
Instead of specifying a single font file as the font name, you may specify a list of font files as the font name, separated by semi-colons. This is useful when using international characters that are only available in some fonts.

For example, if you would like to use the Arial font ("arial.ttf") for western characters, and the MingLiu font "mingliu.ttc" for Chinese characters (since the Arial font does not have Chinese characters), you may specify the font name as "arial.ttf;mingliu.ttc". In this case, ChartDirector will try the Arial font first. If it cannot find a certain character there, it will try the MingLiu font.Indirect Font Names
ChartDirector supports several special keywords for specifying the font name indirectly. When these keywords are used as font names, ChartDirector will look up the actual font names from a font table. The keywords are as follows:

KeywordsDescription

"normal"	This default normal font, which is the first font in the font table. This is initially mapped to "arial.ttf" (Arial).
"bold"	The default bold font, which is the second font in the font table. This is initially mapped to "arialbd.ttf" (Arial Bold).
"italic"	The default italic font, which is the third font in the font table. This is initially mapped to "ariali.ttf" (Arial Italic).
"boldItalic"	The default bold-italic font, which is the fourth font in the font table. This is initially mapped to "arialbi.ttf" (Arial Bold Italic).
"fontN"	The (N + 1)th font in the font table (the first font is "font0").

The font table can be modified using BaseChart.setFontTable or DrawArea.setFontTable.

The advantage of using indirect font names is that you can change the fonts fonts in your charts in one place.Font Index
Most font files contain one font. However, it is possible a font file contains multiple fonts (that is, a font collection). For example, in True Type fonts, font files with extension ".ttc" may represent a font collection.

If a font file contains multiple font, the font index can be used to specify which font to use. By default, the font index is 0, which means the first font in the font file will be used.Font Size
The font size decides how big a font will appear in the image. The font size is expressed in a font unit called points. This is the same unit used in common word processors.

Instead of specifying font size, some ChartDirector API (eg. TextBox.setFontSize) allow you to specify font height and font width separately. You may use different point sizes for font height and font width to create special effects.Font Color
This is the color to draw the font. (See Color Specification on how colors are represented in ChartDirector.)Font Angle
This is the angle in degrees by which the font should be rotated anti-clockwise.Vertical Layout
By default, text are laid out horizontally, with characters being drawn from left to right.

ChartDirector also supports vertical layout, with characters being drawn from top to bottom. For example, you may use BaseChart.addText to add text that are laid out vertically. Vertical layout is common for

oriental languages such as Chinese, Japanese and Korean.

33.0.26 ChartDirector: Mark Up Language

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Mark Up Language
Notes: ChartDirector Mark Up Language (CDML) is a language for including formatting information in text strings by marking up the text with tags.

CDML allows a single text string to be rendered using multiple fonts, with different colors, and even embed images in the text.Font Styles
You can change the style of the text by using CDML tags. For example, the line:

<*font=timesi.ttf,size=16,color=FF0000>Hello <*font=arial.ttf,size=12,color=8000*>world!
will result in the following text rendered:

In general, all tags in CDML are enclosed by <* and *>. Attributes within the tags determine the styles of the text following the tags within the same block.

If you want to include <* in text without being interpreted as CDML tags, use «* as the escape sequence.

The following table describes the supported font style attributes in CDML. See Font Specification for details on various font attributes.

AttributeDescription

Set the following text to be in superscript style. This attribute does not need to have a value. (You may use ”super” as the attribute instead of ”super=1”.)

Note that unlike HTML tags, no double or single quotes are used in the tags. It is because CDML tags are often embedded as string literals in source code. The double or single quotes, if used, will conflict with the string literal quotes in the source code. Therefore in CDML, no quotes are necessary and they must not be used.

Also, unlike HTML tags, CDML uses the comma character as the delimiter between attributes. It is because certain attributes may contain embed spaces (such as the font file name). So space is not used as the delimiter and the comma character is used instead.

Note the font attribute above starts a new style section, while other attributes just modify the current style

font	Starts a new style section, and sets the font name. You may use this attribute without a value (that is, use "font" instead of "font=arial.ttf") to create a new style section without modifying the font name.
size	The font size.
width	The font width. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
height	The font height. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
color	The text color in hex format.
bgColor	The background color of the text in hex format.
underline	The line width of the line used to underline the following characters. Set to 0 to disable underline.
sub	Set the following text to be in subscript style. This attribute does not need to have a value. (You may use "sub" as the attribute instead of "sub=1".)
super	Set the following text to be in superscript style.

xoffset	Draw the following the text by shifting the text horizontally from the original position by the specified offset in pixels.
yoffset	Draw the following the text by shifting the text vertically from the original position by the specified offset in pixels.
advance	Move the cursor forward (to the right) by the number of pixels as specified by the value this attribute.
advanceTo	Move the cursor forward (to the right) to the position as specified by the value this attribute. The position is specified as the number of pixels to the right of the left border of the block. If the cursor has already passed through the specified position, the cursor is not moved.

section. You may use <*/font*>to terminate a style section, which will restore the font styles to the state before the style section.Blocks and Lines
In CDML, a text string may contain multiple blocks. A block may contain multiple lines of text by separating them with new line characters ("\n") or with <*br*>. The latter is useful for programming languages that cannot represent new line characters easily.

For example, the line:

<*size=15*><*block*><*color=FF*>BLOCK<*br*>ONE<*/*>and <*block*><*color=FF00*>BLOCK<*br*>TWO<
will result in the following text rendered:

The above example contains a line of text. The line contains two blocks with the characters " and " in between. Each block in turn contains two lines. The blocks are defined using <*block*>as the start tag and

<*/*>as the end tag.

When a block ends, font styles will be restored to the state before entering the block.Embedding Images
CDML supports embedding images in text using the following syntax:

<*img=my_image_file.png*>
where my_image_file.png is the path name of the image file.

For example, the line:

<*size=20*>A <*img=sun.png*>day
will result in the following text rendered:

ChartDirector will automatically detect the image file format using the file extension, which must either png, jpg, jpeg, gif, wbmp or wmp (case insensitive).

Please refer to BaseChart.setSearchPath or DrawArea.setSearchPath on the directory that ChartDirector will search for the file.

The <*img*>tag may optionally contain width and height attributes to specify its pixel width and height. In this case, ChartDirector will stretch or compress the image if necessary to the required width and height.Blocks Attributes
CDML supports nesting blocks, that is, a block can contain other sub-blocks. Attributes are supported in the <*block*>tag to control the alignment and orientation of the sub-blocks. The <*img=my_image_file.png*>is treated as a block for layout purposes.

For example, the line:

<*block,valign=absmiddle*><*img=molecule.png*><*block*>Hydrazino\nMolecule<*/*><*/*>
will result in the following text rendered:

The the above starts <*block,valign=absmiddle*>which specifies its content should align with each others in the vertical direction using the absolute middle alignment. The block contains an image, followed by a space characters, and then another block which has two lines of text.

The following table describes the supported attributes inside <*block*>tag:

AttributeDescription

The value baseline means the baseline of sub-blocks should align with the baseline of the block. The baseline

width	The width of the block in pixels. By default, the width is automatically determined to be the width necessary for the contents of the block. If the width attribute is specified, it will be used as the width of the block. If the width is insufficient for the contents, the contents will be wrapped into multiple lines.
height	The height of the block in pixels. By default, the height is automatically determined to be the height necessary for the contents of the block. If the height attribute is specified, it will be used as the height of the block.
maxwidth	The maximum width of the block in pixels. If the content is wider than maximum width, it will be wrapped into multiple lines.
truncate	The maximum number of lines of the block. If the content requires more than the maximum number of lines, it will be truncated. In particular, if truncate is 1, the content will be truncated if it exceeds the maximum width (as specified by maxwidth or width) without wrapping. The last few characters at the truncation point will be replaced with "...".
linespacing	The spacing between lines as a ratio to the default line spacing. For example, a line spacing of 2 means the line spacing is two times the default line spacing. The default line spacing is the line spacing as specified in the font used.
bgColor	The background color of the block in hex format.
valign	The vertical alignment of sub-blocks. This is for blocks that contain sub-blocks. Supported values are baseline, top, bottom, middle and absmiddle.

is the underline position of text. This is normal method of aligning text, and is the default in CDML. For images or blocks that are rotated, the baseline is the same as the bottom.

The value top means the top line of sub-blocks should align with the top line of the block.

The value bottom means the bottom line of sub-blocks should align with the bottom line of the block.

The value middle means the middle line of sub-blocks should align with the the middle line of the block. The middle line is the middle position between the top line and the baseline.

The value absmiddle means the absolute middle line of sub-blocks should align with the absolute middle line of the block. The absolute middle line is the middle position between the top line and the bottom line.

halign	The horizontal alignment of lines. This is for blocks that contain multiple lines. Supported values are left, center and right.

The value left means the left border of each line should align with the left border of the block. This is the default.

The value center means the horizontal center of each line should align with the horizontal center of the block.

The value right means the right border of each line should align with the right border of the block.

angle Rotate the content of the block by an angle. The angle is specified in degrees in counter-clockwise direction.

33.0.27 ChartDirector: Parameter Substitution and Formatting

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Parameter Substitution and Formatting
Notes: ChartDirector charts often contain a lot of text strings. For example, sector labels in pie charts, axis labels for x and y axes, data labels for the data points, HTML image maps, etc, are all text strings.

ChartDirector uses parameter substitution to allow you to configure precisely the information contained in the text and their format.
Format Strings
In parameter substitution, format strings are used to specify the entities to be include into labels and how to format numbers and dates.

For example, when drawing a pie chart with side label layout, the default sector label format string is:

" { label } ({ percent } %)"

When the sector label is actually drawn, ChartDirector will replace " { label } " with the sector name, and " { percent } " with the sector percentage. So the above label format will result is a sector label similar to "ABC (34.56%)".

You may change the sector label format by changing the format string. For example, you may change it to:

" { label } : US$ { value | 2 } K ({ percent } %)"

The sector label will then become something like "ABC: US$ 123.00 (34.56%)".

In general, in ChartDirector parameter substitution, parameters enclosed by curly brackets will be substituted with their actual values when creating the texts.

For parameters that are numbers or dates/times, ChartDirector supports a special syntax in parameter substitution to allow formatting for these values. Please refer to the Number Formatting and Date/Time Formatting sections below for details.

Parameter Expressions

ChartDirector supports numeric expressions in format strings. They are denoted by enclosing the expression with curly brackets and using "=" as the first character. For example:

"USD { value } (Euro { = { value } *0.9 })"

In the above, " { value } " will be substituted with the actual value of the sector. The expression " { = { value } *0.9 } " will be substituted with the actual value of the sector multiplied by 0.9.

ChartDirector parameter expressions support operators "+", "-", "*", "/", "%" (modulo) and "^" (exponentiation). Operators "*", "/", "%", "^" is computed first, followed by "+" and "-". Operators of the same precedence are computed from left to right). Parenthesis "(" and ")" can be used to change the computation order.

Parameters for Pie Charts

The following table describes the parameters available for pie charts.

Parameter	Description
sector	The sector number. The first sector is 0, while the nth sector is (n-1).
dataSet	Same as { sector } . See above.
label	The text label of the sector.
dataSetName	Same as { label } . See above.
value	The data value of the sector.
percent	The percentage value of the sector.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using BaseChart.addExtraField or BaseChart.addExtraField2.

Parameters for All XY Chart Layers

The followings are parameters that are apply to all XY Chart layers in general. Some layer types may have additional parameters (see below).

Note that certain parameters are inapplicable in some context. For example, when specifying the aggregate label of a stacked bar chart, the { dataSetName } parameter is inapplicable. It is because a stacked bar is composed of multiple data sets. It does not belong to any particular data set and hence does not have a data set name.

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

Additional Parameters for Line Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Trend Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Box-Whisker Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for HLOC and CandleStick Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Vector Layers
The followings are parameters that are in additional to the parameters for all XY Chart layers.

Parameters for All Polar Layers
The followings are parameters that are apply to all Polar Chart layers in general. Some layer types may have additional parameters (see below).

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

Additional Parameters for PolarVector Layers
The followings are parameters that are in additional to the parameters for all Polar Chart layers.

Parameters for Axis
The following table describes the parameters available for pie charts.

Number Formatting
For parameters that are numbers, ChartDirector supports a number of formatting options in parameter substitution.

For example, if you want a numeric field { value } to have a precision of two digits to the right of the decimal point, use ',' (comma) as the thousand separator, and use '.' (dot) as the decimal point, and you may use { value | 2,. } . The number 123456.789 will then be displayed as 123,456.79.

For numbers, the formatting options are specified using the following syntax:

{ [param] | [a] [b] [c] [d] }

where:

If this field starts with "E" or "e", followed by a number, it means formatting the value using scientific notation with the specified number of decimal places. If the "E" or "e" is not followed by a number, 3 is assumed.

For example, { value | E4 } will format the value 10.3 to 1.0300E+1, and { value | e4 } will format the same value to 1.0300e+1.

If this field starts with "G" or "g", followed by a number, it means formatting the value using the scientific notation only if the value is large and requires more than the specified number of digits, or the value is less than 0.001. If scientific notation is used, the number following "G" or "g" also specifies the number of significant digits to use. If the "G" or "g" is not followed by a number, 4 is assumed.

For example, consider the format string { value | G4 } . The value 10 will be formatted to 10. The value 100000 will be formatted to 1.000E+5. Similarly, for { value | g4 } , the value 10 will be formatted to 10, while the value 100000 will be formatted to 1.000e+5.

If you skip this argument, ChartDirector will display the exact value using at most 6 decimal places.

You may skip [b] [c] [d] . In this case, the default will be used.

Date/Time Formatting
For parameters that are dates/times, the formatting options can be specified using the following syntax:

{ [param] | [datetime_format_string] }

where [datetime_format_string] must start with an english character (A-Z or a-z) that is not "G", "g", "E" or "e", and may contain any characters except ' } '. (If it starts with "G", "g", "E" or "e", it will be considered as a number format string.)

Certain characters are substituted according to the following table. Characters that are not substituted will be copied to the output.

For example, a parameter substitution format of { value | mm-dd-yyyy } will display a date as something similar to 09-15-2002. A format of { value | dd/mm/yy hh:nn:ss a } will display a date as something similar to 15/09/02 03:04:05 pm.

If you want to include characters in the format string without substitution, you may enclose the characters in single or double quotes.

For example, the format { value | mmm '<*color=dd0000*>'yyyy } will display a date as something like Jan <*color=dd0000*>2005 (the <*color=dd0000*>is a CDML tag to specify red text color). Note that the <*color=dd0000*>tag is copied directly without substitution, even it contains "dd" which normally will be substituted with the day of month.
Escaping URL/HTML/CDML characters
Parameter substitution is often used to create HTML image maps. In HTML, some characters has special meanings and cannot be used reliably. For example, the '>' is used to represent the end of an HTML tag.

Furthermore, if the field happens to be used as an URL, characters such as '?', '&' and '+' also have special meanings.

By default, ChartDirector will escape template fields used in URL and query parameters when generating image maps. It will modify URL special characters to the URL escape format "%XX" (eg. "?" will become "%3F"). After that, it will modify HTML special characters to the HTML escape format "&#nn;" (eg. ">" will become ">".). Similarly, it will escape other attributes in the image map using HTML escape format (but not URL escape format).

In addition to escaping HTML and URL special characters, ChartDirector will also remove CDML fields in creating image maps. It is because CDML is only interpreted in ChartDirector, should not be useful outside of ChartDirector (such as in browser tool tips).

In some cases, you may not want ChartDirector to escape the special characters. For example, if the parameters have already been escaped before passing to ChartDirector, you may want to disable ChartDirector from escaping them again.

ChartDirector supports the following special fields to control the escape methods - " { escape_url } ", " { noescape_url } ", " { escape_html } ", " { noescape_html } ", " { escape_cdml } " and { noescape_cdml } ". These fields enable/disable the escape methods used in the template fields that follow them.

33.0.28 ChartDirector: Shape Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Shape Specification
Notes: Several ChartDirector API accept shape specification as arguments. For example, BarLayer.setBarShape and BarLayer.setBarShape2 can be used to specify shapes of bars in bar charts, while DataSet.setDataSymbol, DataSet.setDataSymbol4, PolarLayer.setDataSymbol and PolarLayer.setDataSymbol4 can be used to specify shapes for data symbols.

Note that in addition to shapes, in many cases ChartDirector also accepts images or custom draw objects for data representation. For example, see DataSet.setDataSymbol2, DataSet.setDataSymbol3, PolarLayer.setDataSymbol2 and PolarLayer.setDataSymbol3.

Built-In Shapes

Built-in shapes are specified as integers. The integers can be explicit constants, or can be generated by a ChartDirector method for parameterized shapes. For example, a circle is represented by an explicit constant CircleShape (=7). On the other hand, the number representing a polygon depends on the number of sides the polygon has, so it is generated by using the PolygonShape method, passing in the number of sides as argument.

The following table illustrates the various ChartDirector shapes:

Custom Shapes

In ChartDirector, custom shapes are specified as an array of integers x0, y0, x1, y1, x2, y2 ... representing the coordinates of the vertices of the custom polygonal shape.

The polygon should be defined with a bounding square of 1000 x 1000 units, in which the x-axis is from -500 to 500 going from left to right, and the y-axis is from 0 to 1000 going from bottom to top.

ChartDirector will automatically scale the polygon so that 1000 units will become to the pixel size as requested by the various ChartDirector API.

As an example, the shape of the standard diamond shape in ChartDirector is represented as an array with 8 numbers:

0, 0, 500, 500, 0, 1000, -500, 500

33.0.29 Copy styled text?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: How to quickly copy styled text from one textarea to another?
Example:

```
#if TargetWin32 then
TextArea1.WinRTFDataMBS = TextArea2.WinRTFDataMBS
#elseif TargetMacOS then
TextArea1.NSTextViewMBS.textStorage.setAttributedString TextArea2.NSTextViewMBS.textStorage
#else
TextArea1.StyledText = TextArea2.StyledText
#endif
```

Notes: The code above uses special plugin functions on Mac and Windows and falls back to framework for Linux.

33.0.30 Do you have code to validate a credit card number?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can check the checksum to tell if a credit card number is not valid.
Example:

```
Dim strNumber As String
Dim nLength as Integer
Dim nValue as Integer
Dim nChecksum as Integer
Dim nIndex as Integer

strNumber = EditField1.Text
nLength = Len(strNumber)
nChecksum = 0

For nIndex = 0 To nLength - 2
nValue = Val(Mid(strNumber, nLength - (nIndex + 1), 1)) * (2 - (nIndex Mod 2))
If nValue <10 Then
nChecksum = nChecksum + nValue
Else
nChecksum = nChecksum + (nValue - 9)
End If
Next

If Val(Mid(strNumber, Len(strNumber), 1)) = (10 - (nChecksum Mod 10)) Mod 10 Then
MsgBox("The credit card number looks valid")
Else
MsgBox("The credit card number is invalid")
End IF
```

Notes: Here's some code that will validate the checksum for a credit card. It works for Visa, MasterCard, American Express and Discover. Not sure about others, but I imagine they use the same basic algorithm. Of course, this doesn't actually mean that the credit card is valid, it's only useful for helping the user catch typos.

The above code doesn't have any error checking and it expects that the credit card number will be entered without spaces, dashes or any other non-numeric characters. Addressing those issues will be an exercise left to the reader. :)

(From Mike Stefanik)

33.0.31 Do you have plugins for X-Rite EyeOne, eXact or i1Pro?

Plugin Version: all.

Answer: Our EyeOne plugin is available on request for licensees of the X-Rite SDKs.
Notes: Please first go to X-Rite and get a SDK license.
Than we can talk about the plugin.

33.0.32 Does SQL Plugin handle stored procedures with multiple result sets?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the plugin can work with multiple recordsets.
Notes: You need to use SQLCommandMBS class. When you get back results, you use FetchNext to walk over all records in the first result set. Than you simply start again with FetchNext to get the second record set.
Even the RecordSet functions should work, just use them twice to get all records from both record sets.

33.0.33 Does the plugin home home?

Plugin Version: all, Platform: macOS.

Answer: Yes, we like to know who is using the plugin, so the plugin may contact our server.
Example:

none.

Notes: Please note that this does not affect your users as the plugin will only do this in the IDE and the relevant plugin part is never included in your applications.

The plugin if used for some hours, does contact our server to provide statistical data about Xojo version and OS versions. This way we know what versions are used. We can return the version number of the current plugin which may be visible in future versions somehow. And we transmit partial licenses data so we can track use of illegal license keys.

If you do not like to have this, you can block Xojo IDE from contacting our website via your Firewall.
Blocking the transfer will not disable the plugin or change the features.
Or contact us for a plugin version which explicitly does not contain this feature.

33.0.34 folderitem.absolutepath is limited to 255 chars. How can I get longer ones?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Paths on a Mac are not unique, so use them only to display them to the user.
Example:

```
Function AbsolutePath(f as FolderItem) As String
Dim s as string
Dim nf as FolderItem
nf = f
s = ""
while nf<>nil
s = nf.name + ":" + s
nf = nf.parent
wend
Return s
End Function
```

33.0.35 Has anyone played round with using CoreImage to do things like add dissolve transitions say when changing from one tab to another within a window?

Platform: macOS.

Answer: This code implements animations for a tabpanel change:
Example:

```
// in a tabpanel.change event:

dim r as CGSTransitionRequestMBS
dim co as new CGSConnectionMBS
dim cw as CGSWindowMBS
dim ct as CGSTransitionMBS
static OldTab as Integer

cw=co.CGSWindow(window1)
If cw = Nil Then
return // 10.3...
End If
r=new CGSTransitionRequestMBS
r.TransitionType=r.CGSFlip
r.HasBackGround=false
r.HasBackColor=false
r.Win=cw
```

```
// watch the value of the clicked tab versus the last tab
if tabpanel1.Value=0 or tabpanel1.Value <OldTab then
r.TransitionOption=r.CGSLeft
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
else
r.TransitionOption=r.CGSRight
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
end if
// Keep track of the last tab clicked
OldTab = tabpanel1.Value
```

Notes: See CGS* classes for more details.

33.0.36 How about Plugin support for older OS X?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We support in general Mac OS X 10.5 and newer.
Notes: All the 64-bit plugins on Mac require OS X 10.7.
Intel 32-bit plugins on Mac require OS X 10.5 or newer.

Currently the ChartDirector 6, GraphicsMagick and GameKit plugins requires Mac OS X 10.6.
Also for SQL Plugin the built in SQLite library requires 10.6.

33.0.37 How can I detect whether an Intel CPU is a 64bit CPU?

Plugin Version: all.

Answer: Look on the CPU family returned by sysctl:
Example:

```
Function is64bit() As Boolean

#if TargetLittleEndian

dim m as MemoryBlock = NewMemoryBlock(8)
dim family as Integer
dim s as string

m=SystemControlNameToMIBMBS("hw.cpufamily")
m=SystemControlMBS(m)

if m<>nil then
m.LittleEndian=True
family=m.Long(0)

const CPUFAMILY_INTEL_6_14 = &h73d67300 //* "Intel Core Solo" and "Intel Core Duo" (32-bit Pentium-M with SSE3) */
const CPUFAMILY_INTEL_6_15 = &h426f69ef //* "Intel Core 2 Duo" */
const CPUFAMILY_INTEL_6_23 = &h78ea4fbc //* Penryn */
const CPUFAMILY_INTEL_6_26 = &h6b5a4cd2 //* Nehalem */

Select case family
case CPUFAMILY_INTEL_6_14
Return false
case CPUFAMILY_INTEL_6_15
Return true
case CPUFAMILY_INTEL_6_23
Return true
case CPUFAMILY_INTEL_6_26
Return true
// newer CPUs may be missing here
end Select

end if

#endif

Return false

Exception
Return false
End Function
```

Notes: This code is written for Mac OS X where you only have a limited number of possible CPUs.

33.0.38 How can I disable the close box of a window on Windows?

Plugin Version: all, Platform: Windows.

Answer: The following code will remove the close item from the system menu of the window.
Example:

```
#if TargetWin32 then
Declare Function GetSystemMenu Lib "user32" (hwnd as Integer, bRevert as Integer) as Integer
Declare Function RemoveMenu Lib "user32" (hMenu as Integer, nPosition as Integer, wFlags as Integer) as
Integer
Dim hSysMenu as Integer
hSysMenu = GetSystemMenu(me.WinHWND, 0)
RemoveMenu hSysMenu, &HF060, &H0
#endif
```

Notes: The window may not be updated directly.

33.0.39 How can I get all the environment variables from Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Example:

```
#if targetWin32
declare function GetEnvironmentStrings Lib "kernel32" () as ptr
dim m as memoryBlock
dim n as Integer

m=GetEnvironmentStrings()

n=0
do
msgBox m.cstring(n)
while m.byte(n)<>0
n=n+1
wend
n=n+1
```

```
loop until m.byte(n)=0
#endif
```

Notes: The MBS Plugin has an EnvironmentMBS class for this.

33.0.40 How can i get similar behavior to Roxio Toast or iTunes where clicking a 'burn' button allows the next inserted blank CD-R to bypass the Finder and be accepted by my application?

Plugin Version: all, Platform: macOS.

Answer: You need to get a media reservation.
Example:

```
dim d as DRDeviceMBS // get a device
d.AcquireMediaReservation
```

Notes: Use the plugin function AcquireMediaReservation and later release it using ReleaseMediaReservation.
See plugin examples on how to use it and check Apples DiscRecording framework documentation for more details.

33.0.41 How can I get text from a PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Crossplatform you can use DynaPDF Pro.
Notes: On Mac OS X you can also use PDFKit for the same job.
While DynaPDF Pro gives you each bit of text with rotation, font information and encoding details, PDFKit gives you only the text string for a PDF page.

33.0.42 How can I get text from a Word Document?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: to get the text string from a doc file, use the NSAttributedStringMBS class.
Notes: The NSAttributedStringMBS class is Mac OS X only and we have currently no solution for Windows or Linux.

Use the NSAttributedStringMBS.initWithDocFormat(data as string) as boolean method.

33.0.43 How can I get the item string for a given file creator?

Plugin Version: all.

Answer: Try this function:
Example:

```
Sub pullNativeDocs(aCREA As string)
Dim result as Integer
Dim m, k as memoryBlock
Dim f as folderItem
Dim newType as string
Dim anIcon As picture
Dim ofs as Integer

Declare Function GetFileTypesThatAppCanNativelyOpen Lib "Carbon" (appVRefNumHint as Short, appSignature as OSType, nativeTypes as Ptr) as Short Inline68K("701CABFC")
Declare Function GetDocumentKindString Lib "Carbon" (docVRefNum as Short, docType as OSType, docCreator as OSType, kindString as ptr) as Short Inline68K("7016ABFC")

listBox1.deleteAllRows

m = newMemoryBlock(1024)
result = GetFileTypesThatAppCanNativelyOpen(Volume(0).MacVRefNum, aCREA, m)
if result <>0 then
listBox1.addRow "<Not found.>"
return
end if

do
if m.byte(ofs*4) = 0 then
exit
else
newType = m.OSTypeMBS(ofs*4)
listBox1.addRow newType
k = newMemoryBlock(64)
result = GetDocumentKindString(Volume(0).MacVRefNum, newType, aCREA, k)
if result = 0 then
listBox1.cell(ofs,1) = k.pString(0)
ofs = ofs + 1
else
listBox1.cell(ofs,1) = "(unknown)"
end if

end if
```

```
loop

End Sub
```

Notes: Change ”Translation” to ”CarbonLib” for Mac OS X.

33.0.44 How can I launch an app using it’s creator code?

Plugin Version: all, Platform: macOS.

Answer: Send an AppleEvent ”odoc” with the creator code to the Finder (”MACS”):
Example:

```
Function LaunchByCreator(C As String) As Boolean
Dim A As AppleEvent
A = NewAppleEvent(”aevt”,”odoc”,”MACS”)
A.ObjectSpecifierParam(”—-”) = GetUniqueIDObjectDescriptor(”appf”,nil,C)
return A.Send
End Function
```

33.0.45 How can I learn what shared libraries are required by a plugin on Linux?

Plugin Version: all, Platform: macOS.

Answer: Please use the ldd command in the terminal.
Notes: You build an app on any platform, but for Linux.
For the resulting .so files in the libs folder, you can run the ldd command with the library path as parameter.
It shows you references lib files and you can make sure you have those installed.

This is a sample run of our graphicsmagick plugin:

```
cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$ ldd libMBSGraphicsMagickPlugin17744.so
linux-gate.so.1 =>(0xb76ee000)
libdl.so.2 =>/lib/i386-linux-gnu/libdl.so.2 (0xb6f0e000)
libgtk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgtk-x11-2.0.so.0 (0xb6aa6000)
libpthread.so.0 =>/lib/i386-linux-gnu/libpthread.so.0 (0xb6a8a000)
libstdc++.so.6 =>/usr/lib/i386-linux-gnu/libstdc++.so.6 (0xb69a5000)
libm.so.6 =>/lib/i386-linux-gnu/libm.so.6 (0xb6979000)
libgcc_s.so.1 =>/lib/i386-linux-gnu/libgcc_s.so.1 (0xb695b000)
libc.so.6 =>/lib/i386-linux-gnu/libc.so.6 (0xb67b1000)
```

```
/lib/ld-linux.so.2 (0xb76ef000)
libgdk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk-x11-2.0.so.0 (0xb6701000)
libpangocairo-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangocairo-1.0.so.0 (0xb66f4000)
libX11.so.6 =>/usr/lib/i386-linux-gnu/libX11.so.6 (0xb65c0000)
libXfixes.so.3 =>/usr/lib/i386-linux-gnu/libXfixes.so.3 (0xb65ba000)
libatk-1.0.so.0 =>/usr/lib/i386-linux-gnu/libatk-1.0.so.0 (0xb659a000)
libcairo.so.2 =>/usr/lib/i386-linux-gnu/libcairo.so.2 (0xb64ce000)
libgdk_pixbuf-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk_pixbuf-2.0.so.0 (0xb64ad000)
libgio-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgio-2.0.so.0 (0xb6356000)
libpangoft2-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangoft2-1.0.so.0 (0xb632a000)
libpango-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpango-1.0.so.0 (0xb62e0000)
libfontconfig.so.1 =>/usr/lib/i386-linux-gnu/libfontconfig.so.1 (0xb62ab000)
libgobject-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgobject-2.0.so.0 (0xb625c000)
libglib-2.0.so.0 =>/lib/i386-linux-gnu/libglib-2.0.so.0 (0xb6163000)
libXext.so.6 =>/usr/lib/i386-linux-gnu/libXext.so.6 (0xb6151000)
libXrender.so.1 =>/usr/lib/i386-linux-gnu/libXrender.so.1 (0xb6147000)
libXinerama.so.1 =>/usr/lib/i386-linux-gnu/libXinerama.so.1 (0xb6142000)
libXi.so.6 =>/usr/lib/i386-linux-gnu/libXi.so.6 (0xb6132000)
libXrandr.so.2 =>/usr/lib/i386-linux-gnu/libXrandr.so.2 (0xb6129000)
libXcursor.so.1 =>/usr/lib/i386-linux-gnu/libXcursor.so.1 (0xb611e000)
libXcomposite.so.1 =>/usr/lib/i386-linux-gnu/libXcomposite.so.1 (0xb611a000)
libXdamage.so.1 =>/usr/lib/i386-linux-gnu/libXdamage.so.1 (0xb6115000)
libfreetype.so.6 =>/usr/lib/i386-linux-gnu/libfreetype.so.6 (0xb607b000)
libxcb.so.1 =>/usr/lib/i386-linux-gnu/libxcb.so.1 (0xb605a000)
libpixman-1.so.0 =>/usr/lib/i386-linux-gnu/libpixman-1.so.0 (0xb5fc2000)
libpng12.so.0 =>/lib/i386-linux-gnu/libpng12.so.0 (0xb5f98000)
libxcb-shm.so.0 =>/usr/lib/i386-linux-gnu/libxcb-shm.so.0 (0xb5f93000)
libxcb-render.so.0 =>/usr/lib/i386-linux-gnu/libxcb-render.so.0 (0xb5f89000)
libz.so.1 =>/lib/i386-linux-gnu/libz.so.1 (0xb5f73000)
libgmodule-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgmodule-2.0.so.0 (0xb5f6e000)
libselinux.so.1 =>/lib/i386-linux-gnu/libselinux.so.1 (0xb5f4f000)
libresolv.so.2 =>/lib/i386-linux-gnu/libresolv.so.2 (0xb5f36000)
libexpat.so.1 =>/lib/i386-linux-gnu/libexpat.so.1 (0xb5f0c000)
libffi.so.6 =>/usr/lib/i386-linux-gnu/libffi.so.6 (0xb5f05000)
libpcre.so.3 =>/lib/i386-linux-gnu/libpcre.so.3 (0xb5ec9000)
librt.so.1 =>/lib/i386-linux-gnu/librt.so.1 (0xb5ec0000)
libXau.so.6 =>/usr/lib/i386-linux-gnu/libXau.so.6 (0xb5ebb000)
libXdmcp.so.6 =>/usr/lib/i386-linux-gnu/libXdmcp.so.6 (0xb5eb4000)
cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$
```

As you see all library have been found and their load address is printed behind the na,e.
If a library is missing, you usually see the address missing there or being zero.

33.0.46 How can I validate an email address?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:
Example:

```
Dim re As RegEx
re = New RegEx
Dim rm As RegExMatch

re.SearchPattern = " [ a-z0-9!#$ %&'*+/=?^_' { | }
textasciitilde - ] +(?:\. [ a-z0-9!#$ %&'*+/=?^_' { | }
textasciitilde - ] +)*@(?: [ a-z0-9 ] (?: [ a-z0-9- ] * [ a-z0-9 ] )?\.)+ [ a-z0-9 ] (?: [ a-z0-9- ] * [ a-z0-9 ] )?"
rm = re.Search(editField1.Text)

if rm = Nil Then
StaticText2.text = editField1.Text + " not valid email"
Else
StaticText2.Text = editField1.Text + " is valid"
End if
```

Notes: Adapted from:
http://www.regular-expressions.info/email.html

33.0.47 How do I decode correctly an email subject?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following code can be used to decode an email subject including several encodings including Base 64.
Example:

```
dim src as string // input

dim theRegex as Regex
dim theRegexMatch as RegexMatch
dim result, infoCharset, encodedPart as string
dim theStart as Integer

if instr(src, "=?") >0 then
theRegex = new Regex
theRegex.Options.Greedy = false
theRegex.searchPattern = "(.*)=\?(.+)\?(Q | B)\?(.+)\?="
theRegexMatch = theRegex.search(src)
```

```
while theRegexMatch <>nil
theStart = theRegexMatch.subExpressionStartB(0) + len(theRegexMatch.subExpressionString(0))

result = result + theRegexMatch.subExpressionString(1)
infoCharset = theRegexMatch.subExpressionString(2)
encodedPart = theRegexMatch.subExpressionString(4)
if theRegexMatch.subExpressionString(3) = "B" then
encodedPart = DecodeBase64(encodedPart)
elseif theRegexMatch.subExpressionString(3) = "Q" then
encodedPart = DecodeQuotedPrintable(encodedPart)
end if
if right(result, 1) = " " then
result = mid(result, 1, len(result)-1)
end if
encodedPart = encodedPart.DefineEncoding(GetInternetTextEncoding(infoCharset))
result = result + encodedPart

theRegex.SearchStartPosition = theStart
theRegexMatch = theRegex.search()
wend

result = result + mid(src, theStart+1)

else
result = src
end if
// theRegexMatch = theRegex.search

msgbox result
```

Notes: May not look nice depending on the controls used.
This is no longer needed when using MimeEmailMBS class which decodes for you.

33.0.48 How do I enable/disable a single tab in a tabpanel?

Plugin Version: all, Platform: macOS.

Answer: Use the TabpanelEnabledMBS method.
Example:

```
TabpanelEnabledMBS(tabpanel1, 1, false)
```

Notes: Use Carbon for MachO and CarbonLib for Mac Carbon and AppearanceLib for Mac OS Classic as

library.
For Cocoa, please use enabled property of NSTabViewItemMBS class.

33.0.49 How do I find the root volume for a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this function:
Example:

```
Function GetRootVolume(f as FolderItem) as FolderItem
dim root, dum as folderItem
if f <>nil then
root = f // f might be the volume
do
dum = root.parent
if dum <>nil then
root = dum
end if
loop until dum = nil
return root
end if
End Function
```

33.0.50 How do I get the current languages list?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
dim p as new CFPreferencesMBS
dim a as CFArrayMBS
dim s as CFStringMBS
dim o as CFObjectMBS
dim sa(-1) as string

o=p.CopyAppValue("AppleLanguages",".GlobalPreferences")

if o<>Nil then
a=CFArrayMBS(o)

dim i,c as Integer
```

```
c=a.Count-1
for i=0 to c
o=a.Item(i)

if o isa CFStringMBS then
s=CFStringMBS(o)
sa.Append s.str
end if
next
end if

MsgBox Join(sa,EndOfLine)
```

Notes: On Mac OS X you can get the list of current languages like this list:

```
de
en
ja
fr
es
it
pt
pt-PT
nl
sv
nb
da
fi
ru
pl
zh-Hans
zh-Hant
ko
```

Which has German (de) on the top for a German user.
This code has been tested on Mac OS X 10.5 only.

33.0.51 How do I get the Mac OS Version?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
dim i as Integer
if system.gestalt("sysv", i) then
//do this in an 'If' in case you don't get any value back at all and system.gestalt returns boolean
if i = &h750 then //If OS is 7.5
//do stuff
elseif i = &h761 then //If OS is 7.6.1
//do stuff
end if
end if
```

Notes: The MBS Plugin has a function SystemInformationMBS.OSVersionString for this.

33.0.52 How do I get the printer name?

Plugin Version: all.

Answer: For Mac OS Classic see the code below and for Mac OS X use the Carbon Print Manager Classes from the MBS Plugin.
Example:

```
dim s as String
dim i as Integer

s=app.ResourceFork.GetResource("STR ",-8192)
if s<>"" then
i=ascb(leftb(s,1))
s=mid(s,2,i)

MsgBox s
end if
```

Notes: A note from Craig Hoyt:

After looking at your example I had a little deja-vu experience. Several years ago I played around with this same code if FutureBasic. I discovered that it did not and still doesn't provide the 'Printer Name', it does return the print driver name. If it returns 'LaserWriter 8' as the print driver you can look into this file and get the 'PAPA' resource #-8192 to get the actual Printer Name. Unfortunately this does not hold true for other printers. My Epson and HP Printers (the Epson has an Ethernet Card and the HP is USB) do not provide this info in their drivers. As far as I can tell it only returns the name by polling the printer itself.

33.0.53 How do I make a metal window if RB does not allow me this?

Plugin Version: all, Platform: macOS.

Answer: The following declare turns any window on Mac OS X 10.2 or newer into a metal one.
Example:

```
declare sub ChangeWindowAttributes lib "Carbon" (win as windowptr, a as Integer, b as Integer)

ChangeWindowAttributes window1,256,0
```

Notes: May not look nice depending on the controls used.

33.0.54 How do I make a smooth color transition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

I'd like to show in a report some bars, which start with color A
and end with color B.

The color change should be very smooth.

My problem: If I would start from 255,0,0 and end by 0,0,0, I would have
255 different colors. If the bars are longer than 255 pixels, would
this look nice?
Example:

```
// Window.Paint:
Sub Paint(g As Graphics)
dim w,w1,x,p as Integer
dim c1,c2,c as color
dim p1,p2 as Double

c1=rgb(255,0,0) // start color
c2=rgb(0,255,0) // end color

w=g.Width
w1=w-1

for x=0 to w1
p1=x/w1
p2=1.0-p1
```

```
c=rgb(c1.red*p1+c2.red*p2, c1.green*p1+c2.green*p2, c1.blue*p1+c2.blue*p2)

g.ForeColor=c
g.DrawLine x,0,x,g.Height

next
End Sub
```

Notes:

Try the code above in a window paint event handler.

33.0.55 How do I read the applications in the dock app?

Plugin Version: all, Platform: macOS.

Answer: Use CFPreferencesMBS class like in this example:
Example:

```
// Reads file names from persistent dock applications and puts them into the list

dim pref as new CFPreferencesMBS

dim persistentapps as CFStringMBS = NewCFStringMBS("persistent-apps")
dim ApplicationID as CFStringMBS = NewCFStringMBS("com.apple.dock")
dim tiledata as CFStringMBS = NewCFStringMBS("tile-data")
dim filelabel as CFStringMBS = NewCFStringMBS("file-label")

// get the array of persistent applications from dock preferences
dim o as CFObjectMBS = pref.CopyValue(persistentapps, ApplicationID, pref.kCFPreferencesCurrentUser,
pref.kCFPreferencesAnyHost)

if o isa CFArrayMBS then
dim a as CFArrayMBS = CFArrayMBS(o)

// walk over all items in array
dim c as Integer = a.Count-1
for i as Integer = 0 to c

// get dictionary describing item
o = a.Item(i)

if o isa CFDictionaryMBS then
dim d as CFDictionaryMBS = CFDictionaryMBS(o)
```

```
// and pick tile data dictionary
o = d.Value(tiledata)
if o isa CFDictionaryMBS then
d = CFDictionaryMBS(o)

// and pick there the file label
o = d.Value(filelabel)
if o isa CFStringMBS then
// and display it
dim name as string = CFStringMBS(o).str
List.AddRow name
end if
end if
end if

next

else
MsgBox "Failed to read dock preferences."
end if
```

Notes: You can use the CFPreferencesMBS.SetValue to change a value and CFPreferencesMBS.Synchronize to write the values to disc. You may need to restart the Dock.app if you modified things.

33.0.56 How do I truncate a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In a binarystream you can set the length property to truncate.

33.0.57 How do update a Finder's windows after changing some files?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
dim f as folderitem // some file
dim ae as appleevent
ae=newappleevent("fndr","fupd","MACS")
ae.folderitemparam("—-")=f
if not ae.send then
//something went wrong
```

```
end if
```

Notes: The folderitem.finderupdate from the MBS Plugin does something like this.

33.0.58 How to access a USB device directly?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: First, it depends on the device.
Notes: Some devices can be talked directly from user mode code, but some require a kernel driver.

For some devices you can use plugins to access them like:

- Audio and Video sources using the QTGrabberClassMBS
- Mass storage devices using the folderitem class.
- Serial devices using the System.SerialPort function.
- HID USB devices can be used with MacHIDMBS, WinHIDMBS or LinuxHIDInterface class.
- Any USB device may be used with MacUSBMBS or WinUSBMBS classes.

In general it is always the best to take the most high level access to have others do the work for the details.

33.0.59 How to add icon to file on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use FolderItem.AddCustomIcon or NSWorkspaceMBS.setIcon functions.
Notes: Please close any open stream for the file you want to add an icon.

33.0.60 How to ask the Mac for the Name of the Machine?

Plugin Version: all, Platform: macOS.

Answer: Using Apple Events you can use this code:
Example:

```
Function Computername() As string
```

```
dim theEvent as AppleEvent
dim err as boolean

theEvent = newAppleEvent("mchn","getd","MACS")

err = theEvent.send

return theevent.ReplyString

End Function
```

Notes: Code above is for Mac OS 9!
Also the MBS Plugin has a function for this which may be faster and work also on Macs without Filesharing (which handles this event).

33.0.61 How to automatically enable retina in my apps?

Plugin Version: all, Platform: macOS.

Answer: You can run a build script on each build with this code:
Example:

```
Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSHighResolutionCapable"" YES")
```

Notes: This will set the NSHighResolutionCapable flag to YES.

33.0.62 How to avoid leaks with Cocoa functions?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:
Example:

```
// in a Timer Action event:
Sub Action()
static LastPool as NSAutoreleasePoolMBS = nil
static CurrentPool as NSAutoreleasePoolMBS = nil

LastPool = CurrentPool
CurrentPool = new NSAutoreleasePoolMBS
```

```
End Sub
```

Notes: With Xojo 2009r4 the code above should not be needed as Xojo runtime does automatically handle the NSAutoreleasePools for you. For older Xojo versions you need to use code with a timer with the action event above to avoid memory leaks.

Please do not use Xojo 2009r4 and newer with plugins before version 9.5. You can get crashes there which typically show a line with a objc_msgSend call.

33.0.63 How to avoid trouble connecting to oracle database with SQL Plugin?

Plugin Version: all, Platform: macOS.

Answer: For oracle the most important thing is to point the plugin to the libraries from oracle.
Notes: In environment variables, the paths like ORACLE_HOME must be defined.
On Mac OS X you also need to define DYLD_LIBRARY_PATH to point to the dylib files from oracle.

For that you need to modify /etc/launchd.conf for Mac OS X 10.8 and newer.
In older versions those variables in .MacOSX/environment.plist file in user's home.

Another way for the case you bundle things inside your app is to use the LSEnvironment key in info.plist.
In info.plist it looks like this:

```
<key>LSEnvironment</key>
<dict>
<key>test</key>
<string>Hello World</string>
</dict>
```

33.0.64 How to avoid ___NSAutoreleaseNoPool console messages in threads?

Plugin Version: all, Platform: macOS.

Answer: You need to use your own NSAutoreleasePool on a thread like this:
Example:

```
sub MyThread.run
dim pool as new NSAutoreleasePoolMBS
// do work here

pool=nil
```

```
end sub
```

Notes: For more details read here:
http://developer.apple.com/mac/library/documentation/Cocoa/Reference/Foundation/Classes/NSAutoreleasePool_Class/Reference/Reference.html

33.0.65 How to bring app to front?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac you can use this code:
Example:

```
// First way:
app.FrontMostMBS = true

// second way:
dim p as new ProcessMBS
p.GetCurrentProcess
p.FrontProcess = true

// third way:
NSApplicationMBS.sharedApplication.activateIgnoringOtherApps(true)

// for Windows:
RemoteControlMBS.WinBringWindowToTop
```

Notes: This will bring a Mac app to the front layer.

33.0.66 How to bring my application to front?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code ttxt) to the frontmost application:
Example:

```
Dim A As AppleEvent
A = NewAppleEvent("misc","actv","")
If Not A.Send then
Beep
end if
```

Notes: (Code is Mac only)

33.0.67 How to catch Control-C on Mac or Linux in a console app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use SignalHandlerMBS class for this.
Example:

```
// watch for Control-C on Mac
call SignalHandlerMBS.SetFlagHandler(2)

dim ende as boolean = false
do
if SignalHandlerMBS.IsFlagSet(2) then
Print "Flag 2 set. Existing..."
ende = true
end if

DoEvents 1
loop until ende
```

Notes: The signal is catched, a flag is set and you can ask later in your normal application flow for the result.

33.0.68 How to change name of application menu?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use this code to change the application menu name on Mac OS X:
Example:

```
dim mb as new MenubarMBS
dim m as MenuMBS = mb.item(1) // 1 is in my tests the app menu
if m<>Nil then
m.MenuTitle = "Hello World"
end if
```

Notes: This code is for Carbon only.

33.0.69 How to change the name in the menubar of my app on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer:

You mean it screws up if the file name of the bundle itself is different than the name of the executable file in the MacOS folder within the bundle? If so, you should find something like this within your Info.plist file (or the 'plst' resource that the RB IDE builds for you):

<key>CFBundleExecutable</key>
<string>Executable file name here</string>

Just make sure that file name matches.

However, if your question involves how you can change the name of the app that appears in the menu and the dock, that's different. You can make this name different from the file name by changing the CFBundleName key:

<key>CFBundleName</key>
<string>Name for menu here</string>

Note that if you use my free AppBundler program, this second part is taken care of for you – just fill in a custom name in the right field. You can find AppBundler (from Thomas Reed) at http://www.bitjuggler.com/products/appbundler/ .

33.0.70 How to check if a folder/directory has subfolders?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this to check all items in a folder:
Example:

```
Function HasSubFolder(folder as FolderItem) As Boolean
dim c as Integer = folder.Count

for i as Integer = 1 to c
dim item as FolderItem = folder.TrueItem(i)

if item<>Nil and item.Directory then
Return true
end if
```

```
next

End Function
```

Notes: We use trueitem() here to avoid resolving alias/link files.
Also we check for nil as we may not have permission to see all items.
And if one is a directory, we return without checking the rest.

33.0.71 How to check if Macbook runs on battery or AC power?

Plugin Version: all, Platform: macOS.

Answer: Please use our IOPowerSourcesMBS class like this:
Example:

```
Function PowerSourceState() as Integer
dim p as new IOPowerSourcesMBS

// check all power sources
dim u as Integer = p.Count-1
for i as Integer = 0 to u
dim d as CFDictionaryMBS = p.Item(i)
if d<>nil then
// check if they have a power source state key:
dim o as CFObjectMBS = d.Value(NewCFStringMBS("Power Source State"))
if o isa CFStringMBS then
dim s as string = CFStringMBS(o).str

'MsgBox s

if s = "AC Power" then
Return 1
elseif s = "Battery Power" then
Return 2
end if
end if
end if
next
Return 0 // unknown
End Function
```

Notes: If you want to check the CFDictionaryMBS content, simply use a line like "dim x as dictionary = d.dictionary" and check the contents in the debugger.

33.0.72 How to check if Microsoft Outlook is installed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you need Outlook for Scripting, you should simply check registry for the required Outlook.Application class:
Example:

```
Function OutlookInstalled() As Boolean
#if TargetWin32 then

try
dim r as new RegistryItem("HKEY_CLASSES_ROOT\Outlook.Application\CLSID", false)

Return true

catch r as RegistryAccessErrorException
// not installed
Return false

end try

#else

// Windows only, so false on other platforms
Return false

#endif

End Function
```

33.0.73 How to check on Mac OS which country or language is currently selected?

Plugin Version: all, Platform: macOS.

Answer: The code below returns a country value.
Example:

```
dim result as Integer

IF TargetMacOS THEN
```

```
CONST smScriptLang = 28
CONST smSystemScript = -1

DECLARE FUNCTION GetScriptManagerVariable LIB "Carbon" ( selector as Integer) as Integer
DECLARE FUNCTION GetScriptVariable LIB "Carbon" ( script as Integer, selector as Integer) as Integer

result=GetScriptVariable(smSystemScript, smScriptLang)

END IF
```

Notes: Returns values like:

For more values, check "Script.h" in the frameworks.

33.0.74 How to code sign my app with plugins?

Plugin Version: all, Platform: macOS.

Answer: When you try to code sign the application with plugin dylibs on Mac OS X, you may see error message that there is actually a signature included.
Notes: Please use the -f command line parameter with codesign utility to overwrite our MBS signature.
We sign our plugins for MacOS, iOS and Windows to make sure they have not been modified.

In terminal, you do like this:

cd <Path to folder of app>

xattr -cr <Appname>.app
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.dylib
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.framework
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app

Please use the name of your certificate (See keychain), the name of your app and the path to the app folder.
If you have helper apps you need to sign them first.
You can use a build step to automatically sign your app on build.

33.0.75 How to collapse a window?

Plugin Version: all, Platform: macOS.

Answer: Use this function (Mac only):
Example:

```
Sub CollapseRBwindow(w as window, CollapseStatus as boolean)
dim state, err as Integer
dim wh as MemoryBlock

Declare Function CollapseWindow Lib "Carbon" (window as Integer,collapse as Integer) as Integer

IF CollapseStatus THEN
state = 1
ELSE
state = 0
END IF

err = CollapseWindow(w.MacWindowPtr, state)

End Sub
```

Notes: Also the MBS Plugin has a window.collapsedmbs property you can set.
For Windows the MBS Plugin has a window.isiconicmbs property.

33.0.76 How to compare two pictures?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:
Example:

```
Function ComparePictures(p as picture,q as picture) as Integer
dim r,u as RGBSurface
dim x,y,n,m,h,w as Integer
dim w1,w2,h1,h2,d1,d2 as Integer
dim c1,c2 as color

h1=p.Height
h2=q.Height
w1=p.Width
w2=q.Width
d1=p.Depth
d2=q.Depth

if d1<>d2 then
Return 1
elseif w1<>w2 then
```

```
return 2
elseif h1<>h2 then
Return 3
else
r=p.RGBSurface
u=q.RGBSurface

if r=nil or u=nil then
Return -1
else
h=h1-1
w=w1-1
m=min(w,h)

for n=0 to m
c1=r.Pixel(n,n)
c2=u.Pixel(n,n)
if c1<>c2 then
Return 4
end if
next

for y=0 to h
for x=0 to w
c1=r.Pixel(x,y)
c2=u.Pixel(x,y)
if c1<>c2 then
Return 5
end if
next
next

// 0 for equal
// -1 for error (no RGBsurface)
// 1 for different depth
// 2 for different width
// 3 for different height
// 4 for different pixels (fast test)
// 5 for different pixels (slow test)
end if
end if

Exception
Return -1
End Function
```

Notes: Remember that this only works on bitmap pictures, so the picture.BitmapMBS function may be useful.

33.0.77 How to compile PHP library?

Plugin Version: all, Platform: macOS.

Answer: You have to download the source code and compile a static version of the library.
Notes: This instructions were written based on PHP 5.2.6 on Mac OS X:

- Best take a new Mac with current Xcode version installed.
- Download the source code archive. e.g. "php-5.2.6.tar.bz2"
- Expand that archive on your harddisc.
- Open terminal window
- change directory to the php directory. e.g. "cd /php-5.2.6"
- execute this two lines to define the supported CPU types and the minimum Mac OS X version:
- export CFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"
- export CXXFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"
- the command "./configure help" does show the configure options.
- use configure with a line like this:
- ./configure –enable-embed –with-curl -enable-ftp –enable-zip –enable-sockets –enable-static –enable-soap –with-zlib –with-bz2 –enable-exif –enable-bcmath –enable-calendar
- start the compilation with "make all"
- other option is to use "make install" which first does the same as "make all" and than does some installation scripts.
- you may get an error about a duplicate symbole _yytext. Search the file "zend_ini_scanner.c", search a line with "char *yytext;" and change it to "extern char *yytext;".
- On the end you get a lot of error messages, but you have a working library (named libphp5.so) file in the invisible ".libs" folder inside your php source folder.

Possible problems and solutions:

- If the path to your files has spaces, you can get into trouble. e.g. "/RB Plugins/PHP" is bad as files will be searched sometimes in "/RB".

- If you have in /usr/local/lib libraries which conflict with the default libraries, you can get into trouble.
- If you installed some open source tools which compiled their own libraries, you can get into conflicts.
- if you have to reconfigure or after a problem, you may need to use ”make clean” before you start ”make all” again.

Feel free to install additional libraries and add more packages to the configure line.

33.0.78 How to convert a BrowserType to a String with WebSession.Browser?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:
Example:

```
Function GetBrowserName(s as WebSession.BrowserType) As string
Select case s
case WebSession.BrowserType.Android
Return ”Andriod”
case WebSession.BrowserType.Blackberry
Return ”Blackberry”
case WebSession.BrowserType.Chrome
Return ”Chrome”
case WebSession.BrowserType.ChromeOS
Return ”ChromeOS”
case WebSession.BrowserType.Firefox
Return ”Firefox”
case WebSession.BrowserType.InternetExplorer
Return ”InternetExplorer”
case WebSession.BrowserType.Opera
Return ”Opera”
case WebSession.BrowserType.Safari
Return ”Safari”
case WebSession.BrowserType.SafariMobile
Return ”SafariMobile”
case WebSession.BrowserType.Unknown
Return ”Unknown”
else
Return ”Unkown: ”+str(integer(s))
end Select

End Function
```

33.0.79 How to convert a EngineType to a String with WebSession.Engine?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:
Example:

```
Function GetRenderingEngineName(s as WebSession.EngineType) As string
Select case s
case WebSession.EngineType.Gecko
Return "Gecko"
case WebSession.EngineType.Presto
Return "Presto"
case WebSession.EngineType.Trident
Return "Trident"
case WebSession.EngineType.Unknown
Return "Unknown"
case WebSession.EngineType.WebKit
Return "WebKit"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

33.0.80 How to convert a PlatformType to a String with WebSession.Platform?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:
Example:

```
Function GetPlatformName(s as WebSession.PlatformType) As string
Select case s
case WebSession.PlatformType.Blackberry
Return "Blackberry"
case WebSession.PlatformType.iPad
Return "iPad"
case WebSession.PlatformType.iPhone
Return "iPhone"
case WebSession.PlatformType.iPodTouch
Return "iPodTouch"
case WebSession.PlatformType.Linux
Return "Linux"
case WebSession.PlatformType.Macintosh
Return "Macintosh"
```

```
case WebSession.PlatformType.PS3
Return "PS3"
case WebSession.PlatformType.Unknown
Return "Unknown"
case WebSession.PlatformType.WebOS
Return "WebOS"
case WebSession.PlatformType.Wii
Return "Wii"
case WebSession.PlatformType.Windows
Return "Windows"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

33.0.81 How to convert a text to iso-8859-1 using the TextEncoder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you althrough it's not perfect.
You need to set lc to the current color you use.
Example:

```
dim outstring as string
dim theMac, thePC as textencoding
dim Mac2PC as textconverter

theMac = getTextEncoding(0) // MacRoman
thePC = getTextEncoding(&h0201) // ISOLatin1

Mac2PC = getTextConverter(theMac, thePC)
// if you wanted to do the opposite just create a converter
// PC2Mac = getTextConverter(thePC, theMac)

outstring = Mac2PC.convert("Bj√rn, this text should be converted")
Mac2PC.clear
```

Notes:

You have to call Mac2PC.clear after every conversion to reset the encoding engine.
See also newer TextConverterMBS class.

33.0.82 How to convert ChartTime back to Xojo date?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have this example code:
Example:

```
Function ChartTimeToDate(ChartTime as Double) As date
static diff as Double = 0.0

if diff = 0.0 then
dim d2 as Double = CDBaseChartMBS.chartTime(2015, 1, 1)
dim da as new date(2015, 1, 1)
dim ts as Double = da.TotalSeconds

diff = ts - d2
end if

dim d as new date
d.TotalSeconds = diff + ChartTime

Return d
End Function
```

Notes: As you see we calculate the difference in base date from Date and ChartTime and later use difference to convert.

33.0.83 How to convert line endings in text files?

Plugin Version: all, Platform: macOS.

Answer: You can simply read file with TextInputStream and write with new line endings using TextOutputStream class.
Example:

```
dim inputfile as FolderItem = SpecialFolder.Desktop.Child("test.txt")
dim outputfile as FolderItem = SpecialFolder.Desktop.Child("output.txt")
dim it as TextInputStream = TextInputStream.Open(inputfile)
dim ot as TextOutputStream = TextOutputStream.Create(outputfile)

ot.Delimiter = EndOfLine.Windows // new line ending
while not it.EOF
ot.WriteLine it.ReadLine
wend
```

Notes: TextInputStream will read any input line endings and with delimiter property in TextOutputStream you can easily define your new delimiter.

33.0.84 How to convert picture to string and back?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use this plugin functions:
Notes: JPEG:

JPEGStringToPictureMBS(buf as string) as picture
JPEGStringToPictureMBS(buf as string,allowdamaged as Boolean) as picture
PictureToJPEGStringMBS(pic as picture,quality as Integer) as string

PNG:

PictureToPNGStringMBS(pic as picture, gamma as single) as string
PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single) as string
PictureToPNGStringMBS(pic as picture, gamma as single, Interlace as Boolean, FilterType as Integer) as string
PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single, Interlace as Boolean, FilterType as Integer) as string
PNGStringToPictureMBS(data as string, gamma as single) as picture
PNGStringToPNGPictureMBS(data as string, gamma as single) as PNGpictureMBS

Tiff:

TIFFStringToPictureMBS(data as string) as picture
TIFFStringToTiffPictureMBS(data as string) as TiffPictureMBS

BMP:

BMPStringtoPictureMBS(data as string) as picture
Picture.BMPDataMBS(ResolutionValueDPI as Integer=72) as string

GIF:

GifStringToGifMBS(data as string) as GIFMBS
GifStringToPictureMBS(data as string) as Picture

33.0.85 How to copy an array?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy an array:
Example:

```
Function CopyArray(a() as Double) as Double()
dim r() as Double
for each v as Double in a
r.Append v
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double.
For a deep copy of an array of objects, you need to change code to also make a copy of those objects.

33.0.86 How to copy an dictionary?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy a dictionary:
Example:

```
Function CopyDictionary(d as Dictionary) As Dictionary
dim r as new Dictionary
for each key as Variant in d.keys
r.Value(key) = d.Value(key)
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double.
For a deep copy of an dictionary of objects, you need to change code to also make a copy of those objects.

33.0.87 How to copy parts of a movie to another one?

Plugin Version: all, Platforms: macOS, Windows.

Answer: The code below copies ten seconds of the snowman movie to the dummy movie starting at the 5th second.

Example:

```
dim f as FolderItem
dim md as EditableMovie
dim ms as EditableMovie

f=SpecialFolder.Desktop.Child("Our First Snowman.mov")
ms=f.OpenEditableMovie

ms.SelectionStartMBS=5
ms.SelectionLengthMBS=10

f=SpecialFolder.Desktop.Child("dummy.mov")
md=f.CreateMovie

msgbox str(md.AddMovieSelectionMBS(ms))
```

Notes: If result is not 0, the method fails.

33.0.88 How to create a birthday like calendar event?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
// start a connection to the calendar database
dim s as new CalCalendarStoreMBS

// needed for the error details
dim e as NSErrorMBS

dim r as CalRecurrenceRuleMBS = CalRecurrenceRuleMBS.initYearlyRecurrence(1, nil) // repeat every year without end

dim a as new CalAlarmMBS // add alarm
a.action = a.CalAlarmActionDisplay
a.relativeTrigger = -3600*24 // 24 Hours before

// create a new calendar
dim c as new CalEventMBS

dim d as new date(2011, 04, 20) // the date

dim calendars() as CalCalendarMBS = s.calendars
```

```
// set properties
c.Title="Test Birthday"
c.startDate=d
c.recurrenceRule = r
c.calendar=calendars(0) // add to first calendar
c.addAlarm(a)
c.endDate = d
c.isAllDay = true

// save event
call s.saveEvent(c,s.CalSpanAllEvents, e)
if e<>nil then
MsgBox e.localizedDescription
else
MsgBox "New event was created."
end if
```

Notes: This adds an event to iCal for the given date with alarm to remember you and repeats it every year.

33.0.89 How to create a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the UUIDMBS class for this.

33.0.90 How to create a Mac picture clip file?

Plugin Version: all, Platform: Windows.

Answer: You can use code like this one.
Example:

```
dim f As FolderItem
dim p As Picture

f=SpecialFolder.Desktop.Child("Test.pictClipping")
if f=nil then Return

p=new Picture(300,200,32) 'Make a sample picture
p.Graphics.ForeColor=RGB(0,255,255)
p.Graphics.FillOval 0,0,99,99
```

```
p.Graphics.ForeColor=RGB(255,0,0)
p.Graphics.DrawOval 0,0,99,99

dim r As ResourceFork 'ResourceFork is needed for a clip file

// Please define a file type Any
r=f.CreateResourceFork("Any")

// get PICT data using plugin function
dim pictdata as string = p.PicHandleDataMBS
r.AddResource(pictdata,"PICT",256,"Picture")

dim m as new MemoryBlock(8)

m.LittleEndian = false
m.Int16Value(0) = 0
m.Int16Value(2) = 0
m.Int16Value(4) = p.Width
m.Int16Value(6) = p.Height

r.AddResource(m,"RECT",256,"")

'Values taken from a sample file and irrelevant to the problem
dim data as string = DecodeBase64("AQAAAAAAAAAAAAAAAAACAFRDRVIAAAABAAAAAAAAAABUQ0lQAAAAA
r.AddResource(data,"drag",128,"") 'ditto
r.Close
```

Notes: In general Apple has deprecated this, but a few application still support clippings.

33.0.91 How to create a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Check our DynaPDF plugin and the examples.
Notes: An alternative can be to use the CoreGraphics and Cocoa functions on Mac OS X.
For Windows, we can only suggest our DynaPDF plugin.

33.0.92 How to create EmailAttachment for PDF Data in memory?

Plugin Version: all, Platform: macOS.

Answer: You can use code like the one below:
Example:

```
Function EmailAttachmentFromPDFData(PDFData as string, filename as string) As EmailAttachment
dim a as new EmailAttachment

a.data = EncodeBase64(PDFData, 76)
a.ContentEncoding = "base64"
a.MIMEType = "application/pdf"
a.MacType = "PDF "
a.MacCreator = "prvw"
a.Name = filename

Return a
End Function
```

Notes: Compared to sample code from Xojo documentation, we set the mime type correct for PDF.
The MacType/MacCreator codes are deprecated, but you can still include them for older Mac email clients.
"prvw" is the creator code for Apple's preview app.

33.0.93 How to create PDF for image files?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use DynaPDF like this:
Example:

```
Function CreatePrintPDF(jpgFiles() as folderitem, pdfFile as FolderItem, PageWidth as Integer, PageHeight
as Integer) As Boolean
// have files?
If pdfFile = Nil Then Return False
If jpgFiles = Nil Then Return False

If jpgFiles.Ubound <0 Then Return False

// new DynaPDF
Dim pdf As New MyDynapdfMBS

// page width/height in MilliMeter
Dim pdfWidth as Integer = PageWidth * 72 / 25.4
Dim pdfHeight as Integer = PageHeight * 72 / 25.4

// put your license here
Call pdf.SetLicenseKey "Starter"

// create pdf
Call pdf.CreateNewPDF pdfFile
```

```
// set a couple of options
Call pdf.SetPageCoords(MyDynaPDFMBS.kpcTopDown)
Call pdf.SetResolution(300)
Call pdf.SetUseTransparency(False)
Call pdf.SetSaveNewImageFormat(False)
Call pdf.SetGStateFlags(MyDynaPDFMBS.kgfUseImageColorSpace, False)
Call pdf.SetJPEGQuality(100)

// set page size
Call pdf.SetBBox(MyDynaPDFMBS.kpbMediaBox, 0, 0, pdfWidth, pdfHeight)
Call pdf.SetPageWidth(pdfWidth)
Call pdf.SetPageHeight(pdfHeight)

// append pages with one image per page
For i as Integer = 0 To jpgFiles.Ubound
Call pdf.Append
Call pdf.InsertImageEx(0, 0, pdfWidth, pdfHeight, jpgFiles(i), 1)
Call pdf.EndPage
Next

// close
Call pdf.CloseFile

Return True
End Function
```

Notes: This is to join image files in paper size to a new PDF.
e.g. scans in A4 into an A4 PDF.

33.0.94 How to CURL Options translate to Plugin Calls?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a few tips on how to translate command line CURL calls to plugin calls.
Notes: curl -vX PUT http://localhost:5984/appserials/78569238475/DocumentRegister.docx?rev=3-25634563456 –data-binary @DocumentRegister.docx -H ”Content-Type: application/msword”

- The option -v means verbose. You can use OptionVerbose and listen for messages in the DebugMessage event.
- The option -X PUT means we want to do a HTTP PUT Request. So set OptionPut to true. Also you will want to set OptionUpload to true as you upload data.
- We have the URL which you put into OptionURL property.

- The –data-binary option tells CURL to pass the given data. With the @ before the data, it is intrepreted as a file name, so the data is read from the given file. You'll need to open this file and pass data with the Read event as needed. (See CURLS ftp file upload example project)
- The last option -H specifies an additional header for the upload. Pas this additional header with the SetOptionHTTPHeader method.

curl -X PUT http://127.0.0.1:5984/appserials/f2f4e540bf8bb60f61cfcd4328001c59 -d ' { "type":"Product","description":"Application Serial","acronym":"AppSerial","dateAdded":"2011-03-21 14:57:36" } '

- Option -X PUT like above.
- Pass the URL again in OptionURL
- This time data is passed in command line for CURL. You'd put this data in the quotes into a string and make it available in the Read event. (See CURLS ftp upload example project)

33.0.95 How to delete file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can set post/pre quotes to have ftp commands executed before or after the download/upload.
Example:

```
dim d as CURLMBS // your curl object

// delete file
dim ws() As String
ws.Append "DELE Temp.txt"

d.SetOptionPostQuote(ws)
```

Notes: Use SetOptionPostQuote, SetOptionPreQuote or SetOptionQuote.
The ftp commands you pass here are native ftp commands and not the commands you use with ftp applications. To delete use DELE and the file path.

33.0.96 How to detect display resolution changed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac OS X simply listen for display changed notifications.
Notes: Use the "Distribution Notification Center.rbp" example project as a base and use it to listen to notifications with the name "O3DeviceChanged".

33.0.97 How to detect retina?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use Window.BackingScaleFactorMBS to query the factor.
Example:

```
msgbox str(window1.BackingScaleFactorMBS)
```

33.0.98 How to disable force quit?

Plugin Version: all, Platform: macOS.

Answer:

Please visit this website and get the control panel for Mac OS 9 there:
http://www3.sk.sympatico.ca/tinyjohn/DFQ.html

For Mac OS X use the MBS Plugin with the SetSystemUIModeMBS method.
Notes:

Please use presentationOptions in NSApplicationMBS for Cocoa applications.

33.0.99 How to disable the error dialogs from Internet Explorer on javascript errors?

Plugin Version: all, Platform: Windows.

Answer: You can use this code in the htmlviewer open event:
Example:

```
if targetwin32 then
htmlviewer1._ole.Content.value("Silent") = True
end if
```

Notes: This disables the error dialogs from Internet Explorer.

33.0.100 How to display a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac OS X you can use CoreGraphics or PDFKit to display a PDF.
Notes: An alternative can be to load the PDF into a htmlviewer so the PDF plugin can display it.
On Windows you may need to use the Acrobat ActiveX control from Adobe or launch Acrobat Reader.

33.0.101 How to do a lottery in RB?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this function:
Example:

```
Sub Lotto(max as Integer,count as Integer,z() as Integer)
// Lotto count numbers of max put into the array z beginning at index 0
dim n(0) as Integer ' all the numbers
dim m as Integer ' the highest field in the current array
dim i,a,b,d as Integer ' working variables

'fill the array with the numbers
m=max-1
redim n(m)

for i=0 to m
n(i)=i+1
next

' unsort them by exchanging random ones
m=max*10
for i=1 to m
a=rnd*max
b=rnd*max

d=n(a)
n(a)=n(b)
n(b)=d
next

' get the first count to the dest array
m=count-1
redim z(m)
for i=0 to m
z(i)=n(i)
next

'sort the result
z.sort
End Sub
```

```
Sub Open()
// Test it

dim za(0) as Integer ' the array of the numbers

lotto 49,6,za ' 6 of 49 in Germany


' and display them
staticText1.text=str(za(0))+chr(13)+str(za(1))+chr(13)+str(za(2))+chr(13)+str(za(3))+chr(13)+str(za(4))+chr(13)+str(za
End Sub
```

33.0.102 How to do an asycron DNS lookup?

Plugin Version: all, Platform: Windows.

Answer: use CFHostMBS class (Mac OS X only).
Notes: Xojo internal functions and plugin DNS functions are sycronized.
You can use DNSLookupThreadMBS class for doing them asyncron.

33.0.103 How to draw a dushed pattern line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:
Example:

```
// call like this: DrawDushedPatternLine g,0,0,width,height,10

Sub DrawDushedPatternLine(g as graphics,x1 as Integer,y1 as Integer,x2 as Integer,y2 as Integer, partlen
as Integer)
dim x,y,ox,oy as Double
dim dx,dy as Double
dim w,h,d as Double
dim b as Boolean

w=x2-x1
h=y2-y1

d=sqrt(w*w+h*h)

dx=w/d*partlen
dy=h/d*partlen
```

```
b=true
x=x1
while (x<x2) and (y<y2)
ox=x
oy=y

x=x+dx
y=y+dy

if b then
g.DrawLine ox,oy,x,y
end if

b=not b
wend


End Sub
```

Notes: It would be possible to add this to the plugin, but I think it's better if you do it in plain Xojo code, so it even works on Windows.

33.0.104 How to draw a nice antialiased line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you althrough it's not perfect.
You need to set lc to the current color you use.
Example:

```
Sub drawLine(xs as Integer, ys as Integer, xe as Integer, ye as Integer, face as RGBSurface, lineColor as color)
dim intX, intY, count, n, xDiff, yDiff as Integer
dim v, v1, floatX, floatY, xx, yy, xStep, yStep as Double
dim c as color

const st=1.0

xDiff=xe-xs
yDiff=ye-ys
count=max(abs(xDiff), abs(yDiff))
xStep=xDiff/count
yStep=yDiff/count
```

```
xx=xs
yy=ys
for n=1 to count
intX=xx
intY=yy
floatX=xx-intX
floatY=yy-intY

v=(1-floatX)*(1-floatY)*st
v1=1-v
c=face.pixel(intX, intY)
face.pixel(intX, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*(1-floatY)*st
v1=1-v
c=face.pixel(intX+1, intY)
face.pixel(intX+1, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=(1-floatX)*floatY*st
v1=1-v
c=face.pixel(intX, intY+1)
face.pixel(intX, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*floatY*st
v1=1-v
c=face.pixel(intX+1, intY+1)
face.pixel(intX+1, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)

xx=xx+xStep
yy=yy+yStep
next

End Sub
```

Notes:

PS: st should be 1 and face should be a RGBSurface or a Graphics object.

33.0.105 How to dump java class interface?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In terminal you can use ”javap -s <classname>” to display the class with the method names and parameters.
Notes: For example show ResultSet class: javap -s java.sql.ResultSet

33.0.106 How to duplicate a picture with mask or alpha channel?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this function:
Example:

```
Function Duplicate(extends p as Picture) As Picture
#if RBVersion >= 2011.04 then
if p.HasAlphaChannel then

// create nw picture and copy content:
dim q as new Picture(p.Width, p.Height)
q.Graphics.DrawPicture p,0,0

Return q

end if
#endif

// create new picture
dim q as new Picture(p.Width, p.Height, 32)

// get mask
dim oldMask as Picture = p.mask(false)
if oldMask = nil then
// no mask, so simple copy
q.Graphics.DrawPicture p,0,0
Return q
end if

// remove mask
p.mask = nil

// copy picture and mask
q.Graphics.DrawPicture p, 0, 0
q.mask.Graphics.DrawPicture oldMask,0,0

// restore mask
p.mask = oldmask

Return q
End Function
```

Notes: Simply copy it to a module and call it like this: q = p.duplicate.
The code above works with old Xojo versions because of the #if even if your RS version does not support alpha channel pictures. This way it's future proof.

33.0.107 How to enable assistive devices?

Plugin Version: all, Platform: macOS.

Answer: You can use AppleScript code like below:
Notes: tell application "System Events"
activate

set UI elements enabled to true

return UI elements enabled
end tell

You can run this with AppleScriptMBS class.

33.0.108 How to encrypt a file with Blowfish?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:
Example:

```
dim fi as FolderItem = SpecialFolder.Desktop.Child("test.xojo_binary_project")
dim fo as FolderItem = SpecialFolder.Desktop.Child("test.encrypted")

// read input
dim bi as BinaryStream = BinaryStream.Open(fi)
dim si as string = bi.Read(bi.Length)
bi.Close

// encrypt
dim so as string = BlowfishMBS.Encrypt("MyKey",si)

// write output
dim bo as BinaryStream = BinaryStream.Create(fo)
bo.Write so
bo.Close
```

Notes: Of course you can decrypt same way, just use Decrypt function and of course swap files.

33.0.109 How to extract text from HTML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use both RemoveHTMLTagsMBS and DecodingFromHTMLMBS like this:
Example:

```
dim html as string = "<p><B>Gr&uuml;&szlig;e</B></P>"
dim htmltext as string = RemoveHTMLTagsMBS(html)
dim text as string = DecodingFromHTMLMBS(htmltext)

MsgBox text // shows: Gr√º√üe
```

Notes: You can use it together with RemoveHTMLTagsMBS to remove html tags. What you get will be the text without tags.
DecodingFromHTMLMBS turns HTML escapes back to unicode characters. Like ä to √§.

33.0.110 How to find empty folders in a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this code:
Example:

```
dim folder as folderitem // your folder

dim c as Integer = folder.count
for i as Integer = 1 to c
dim item as folderitem = folder.trueitem(i)
if item = nil then
// ignore
elseif item.directory then
// folder
if item.count = 0 then
// found empty folder
end if
end if
next
```

33.0.111 How to find iTunes on a Mac OS X machine fast?

Plugin Version: all, Platform: macOS.

Answer: You can try Launch Services.
Example:

```
dim f as FolderItem

f=LaunchServicesFindApplicationForInfoMBS("hook","com.apple.iTunes","iTunes.app")

MsgBox f.NativePath
```

33.0.112 How to find network interface for a socket by it's name?

Plugin Version: all, Platform: macOS.

Answer: You can use our plugin to build a lookup table.
Example:

```
Function FindNetworkInterface(name as string) As NetworkInterface
name = name.trim

if name.len = 0 then Return nil

// search by IP/MAC
dim u as Integer = System.NetworkInterfaceCount-1
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if n.IPAddress = name or n.MACAddress = name then
Return n
end if
next

// use MBS Plugin to build a mapping
dim interfaces() as NetworkInterfaceMBS = NetworkInterfaceMBS.AllInterfaces
dim map as new Dictionary

for each n as NetworkInterfaceMBS in interfaces
dim IPv4s() as string = n.IPv4s
dim IPv6s() as string = n.IPv6s

for each IPv4 as string in IPv4s
map.Value(IPv4) = n.Name
next
for each IPv6 as string in IPv6s
map.Value(IPv6) = n.Name
next
if n.MAC<>"" then
map.Value(n.MAC) = n.Name
```

```
end if
next

// now search interfaces by name, IPv4 or IPv6
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if map.Lookup(n.IPAddress, "") = name then
Return n
end if

if map.Lookup(n.MACAddress, "") = name then
Return n
end if
next

End Function
```

Notes: The code above uses a lookup table build using NetworkInterfaceMBS class to find the network interface by name.

33.0.113 How to find version of Microsoft Word?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:
Example:

```
// find Word
dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("","com.microsoft.Word","")

// open bundle
dim c as new NSBundleMBS(f)

// read info
dim d as Dictionary = c.infoDictionary

// show version
MsgBox d.Lookup("CFBundleVersion","")
```

Notes: Older versions of Word can be found with creator code "MSWD".

33.0.114 How to fix CURL error 60/53 on connecting to server?

Plugin Version: all, Platform: macOS.

Answer: You probably connect with SSL and you have no valid certificate.
Example:

```
dim d as new CURLSMBS

// Disable SSL verification
d.OptionSSLVerifyHost = 0 // don't verify server
d.OptionSSLVerifyPeer = 0 // don't proofs certificate is authentic

// With SSL Verification:
dim cacert as FolderItem = Getfolderitem("cacert.pem")
d.OptionCAInfo = cacert.NativePath
d.OptionSSLVerifyHost = 2 // verify server
d.OptionSSLVerifyPeer = 1 // proofs certificate is authentic
```

Notes: You can either use the code above to disable the SSL verification and have no security.
Or you use the cacert file and enable the verification. Than you only get a connection if the server has a valid certificate.

see also:
http://curl.haxx.se/ca/

33.0.115 How to format double with n digits?

Plugin Version: all, Platform: macOS.

Answer: You can use the FormatMBS function for this.
Example:

```
dim d as Double = 123.4567890
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)
listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)

d = 0.000000123456
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)
```

```
listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)
```

Notes: see FormatMBS for details.
In general %f is normal style, %e is scientific and %g is whichever gives best result for given space.

33.0.116 How to get a time converted to user time zone in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebSession.GMTOffset property.
Example:

```
Sub Open()
// current date on server
dim d as new date
dim s as string = d.LongTime

// adjust to client GMT offset
d.GMTOffset = d.GMTOffset + Session.GMTOffset

dim t as string = D.LongTime

MsgBox s+EndOfLine+t
End Sub
```

33.0.117 How to get an handle to the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

Answer: This function returns a handle for the frontmost window:
Example:

```
Function GetForegroundWindowHandle() as Integer
#if targetwin32 then
declare function GetForegroundWindow Lib "user32.dll" as Integer
Return GetForegroundWindow()
#endif
End Function
```

33.0.118 How to get CFAbsoluteTime from date?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use code like this:
Example:

```
dim d as new date
dim t as CFTimeZoneMBS = SystemCFTimeZoneMBS
dim g as new CFGregorianDateMBS
g.Day = d.Day
g.Month = d.Month
g.Year = d.Year
g.Minute = d.Minute
g.Hour = d.Hour
g.Second = d.Second

dim at as CFAbsoluteTimeMBS = g.AbsoluteTime(t)
dim x as Double = at.Value

MsgBox str(x)
```

Notes: As you see we need a timezone and put the date values in a gregorian date record.
Now we can query absolute time for the given timezone.

33.0.119 How to get client IP address on web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebSession.RemoteAddress property.
Example:

```
Sub Open()
Title = Session.RemoteAddress
End Sub
```

33.0.120 How to get fonts to load in charts on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use the SetFontSearchPath method in the CDBaseChartMBS class to specify where your fonts are.
Example:

```
if TargetLinux then
CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype;/usr/share/fonts/truetype/msttcorefonts"
else
// on Mac and Windows we use system fonts.
end if

// also you can later switch default fonts:

dim Chart as CDBaseChartMBS // your chart

#If TargetARM And TargetLinux Then
// use specific fonts on Linux on Raspberry Pi
Call Chart.setDefaultFonts("/usr/share/fonts/truetype/piboto/PibotoLt-Regular.ttf","/usr/share/fonts/truetype/piboto/Pi
#EndIf
```

Notes: On macOS, iOS and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

33.0.121 How to get fonts to load in DynaPDF on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use the AddFontSearchPath method in the DynaPDFMBS class to specify where your fonts are.
Example:

```
dim d as new DynaPDFMBS
if TargetLinux then
call d.AddFontSearchPath "/usr/share/fonts/truetype", true
else
// on Mac and Windows we use system fonts.
end if
```

Notes: On Mac OS X and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

33.0.122 How to get GMT time and back?

Plugin Version: all, Platform: macOS.

Answer: You can use the date class and the GMTOffset property.
Example:

```
// now
dim d as new date

// now in GMT
dim e as new date
e.GMTOffset = 0

// show
MsgBox str(d.TotalSeconds,"0.0")+" "+str(e.TotalSeconds, "0.0")

dim GMTTimeStamp as Double = e.TotalSeconds

// restore
dim f as new date

// add GMT offset here
f.TotalSeconds = GMTTimeStamp + f.GMTOffset*3600
// because here it's removed
f.GMTOffset = f.GMTOffset

MsgBox d.ShortTime+" ("+str(d.GMTOffset)+") "+str(d.TotalSeconds,"0.0")+EndOfLine+_
e.ShortTime+" ("+str(e.GMTOffset)+") "+str(e.TotalSeconds,"0.0")+EndOfLine+_
f.ShortTime+" ("+str(f.GMTOffset)+") "+str(f.TotalSeconds,"0.0")
```

Notes: It's sometimes a bit tricky with the date class as setting one property often changes the others.

33.0.123 How to get good crash reports?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Check this website from the webkit website:
Notes: http://webkit.org/quality/crashlogs.html

33.0.124 How to get list of all threads?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the runtime module like in this function:
Example:

```
Function Threads() As Thread()
#pragma DisableBackgroundTasks
dim t() as Thread

Dim o as Runtime.ObjectIterator=Runtime.IterateObjects
While o.MoveNext
if o.Current isa Thread then
t.Append thread(o.current)
end if
Wend

Return t
End Function
```

Notes: This returns an array of all thread objects currently in memory.
The pragma is important here as it avoids thread switches which may cause a thread to be created or deleted.

33.0.125 How to get parameters from webpage URL in Xojo Web Edition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the Webpage.ParametersReceived event.
Example:

```
Sub ParametersReceived(Variables As Dictionary)
for each key as Variant in Variables.keys
MsgBox key+" ->"+Variables.Value(key)
next
End Sub
```

Notes: The text encodings of this strings is not defined in Xojo 2010r5. Please use DefineEncoding.

33.0.126 How to get the color for disabled textcolor?

Plugin Version: all, Platform: macOS.

Answer: Ask the appearance manager:
Example:

```
Function GetThemeTextColor(inColor as Integer, inDepth as Integer, inColorDev as Boolean) As Color
declare function GetThemeTextColor lib "Carbon" (inColor as Integer, inDepth as Integer, inColorDev as Boolean, outColor as Ptr) as Integer

dim i as Integer
dim col as MemoryBlock

col = newMemoryBlock(6)

i = GetThemeTextColor(inColor, inDepth, inColorDev, col)

return RGB(col.UShort(0)\256, col.UShort(2)\256, col.UShort(4)\256)
End Function
```

Notes: The color for this is:

```
const kThemeTextColorDialogInactive = 2.

c = GetThemeTextColor(kThemeTextColorDialogInactive, Screen(0).Depth, true)
```

For Mac OS X you should use "CarbonLib" instead of "AppearanceLib" ...

33.0.127 How to get the current free stack space?

Plugin Version: all, Platform: macOS.

Answer: You can something like the code below:
Example:

```
Sub ShowStackSize()
dim threadid as Integer
dim size as Integer

declare function GetCurrentThread lib "Carbon" (byref threadid as Integer) as short
declare function ThreadCurrentStackSpace lib "Carbon" (threadid as Integer, byref size as Integer) as short

if GetCurrentThread(threadid)=0 then
if 0=ThreadCurrentStackSpace(threadid,size) then
MsgBox str(size)
end if
end if
```

```
End Sub
```

Notes: For Mac OS 9, use "ThreadLib" instead of "CarbonLib". You can use #if if you like for that.

33.0.128 How to get the current timezone?

Plugin Version: all, Platforms: macOS, Windows.

Answer:

You can use the TimeZoneMBS class or the CFTimeZoneMBS class.
Or code like below:
Example:

```
Function GMTOffsetInMinutes() as Integer
// Returns the offset of the current time to GMT in minutes.
// supports Mac OS and Windows, but not Linux yet (let me know if
// you have code for that, please)
//
// Note that the offset is not always an even multiple of 60, but
// there are also half hour offsets, even one 5:45h offset

// This version by Thomas Tempelmann (rb@tempel.org) on 25 Nov 2005
// with a fix that should also make it work with future Intel Mac targets.
//
// Using code from various authors found on the RB NUG mailing list

dim result, bias, dayLightbias as Integer
dim info as memoryBlock
dim offset as Integer

#if targetMacOS then

Declare Sub ReadLocation lib "Carbon" (location As ptr)

info = NewMemoryBlock(12)
ReadLocation info
if false then
// bad, because it does not work on Intel Macs:
'offset = info.short(9) * 256 + info.byte(11)
else
offset = BitwiseAnd (info.long(8), &hFFFFFF)
end

offset = info.short(9) * 256 + info.byte(11)
```

```
offset = offset \60
return offset

#endif

#if targetWin32 then

Declare Function GetTimeZoneInformation Lib "Kernel32" ( tzInfoPointer as Ptr ) as Integer
// returns one of
// TIME_ZONE_ID_UNKNOWN 0
// – Note: e.g. New Delhi (GMT+5:30) and Newfoundland (-3:30) return this value 0
// TIME_ZONE_ID_STANDARD 1
// TIME_ZONE_ID_DAYLIGHT 2

info = new MemoryBlock(172)
result = GetTimeZoneInformation(info)

bias = info.Long(0)
// note: the original code I found in the NUG archives used Long(84) and switched to Long(0)
// only for result=1 and result=2, but my tests found that Long(0) is also the right value for result=0

if result = 2 then
daylightBias = info.long(168)
end if
offset = - (bias + dayLightbias)
return offset

#endif

End Function
```

33.0.129 How to get the current window title?

Plugin Version: all, Platform: macOS.

Answer: The code below returns the current window title for the frontmost window on Mac OS X if Accessibilty services are
Example:

```
Function CurrentWindowTitle() As string
// your application needs permissions for accessibility to make this work!

dim SystemWideElement,FocusedApplicationElement,FocusedWindowElement as AXUIElementMBS
dim FocusedApplication,FocusedWindow,Title as AXValueMBS
dim s as String
dim cs as CFStringMBS
```

```
SystemWideElement=AccessibilityMBS.SystemWideAXUIElement
if SystemWideElement<>nil then
FocusedApplication=SystemWideElement.AttributeValue(AccessibilityMBS.kAXFocusedApplicationAttribute)
if FocusedApplication.Type=AccessibilityMBS.kAXUIElementMBSTypeID then
FocusedApplicationElement=new AXUIElementMBS
FocusedApplicationElement.Handle=FocusedApplication.Handle
FocusedApplicationElement.RetainObject

FocusedWindow=FocusedApplicationElement.AttributeValue(AccessibilityMBS.kAXFocusedWindowAttribute)

if FocusedWindow<>nil and AccessibilityMBS.kAXUIElementMBSTypeID=FocusedWindow.Type then

FocusedWindowElement=new AXUIElementMBS
FocusedWindowElement.Handle=FocusedWindow.Handle
FocusedWindowElement.RetainObject

Title=FocusedWindowElement.AttributeValue(AccessibilityMBS.kAXTitleAttribute)
if Title<>nil and Title.Type=kCFStringMBSTypeID then
cs=new CFStringMBS
cs.handle=Title.Handle
cs.RetainObject
Return cs.str
end if
end if
end if
end if
End Function
```

33.0.130 How to get the cursor blink interval time?

Plugin Version: all, Platform: macOS.

Answer: On Mac OS you can use GetCaretTime from the toolbox.
Example:

```
declare function GetCaretTime lib "Carbon" () as Integer

MsgBox str(GetCaretTime())+" ticks"
```

Notes: 60 ticks make one second.

33.0.131 How to get the list of the current selected files in the Finder?

Plugin Version: all, Platform: macOS.

Answer:

Use the AppleScript like this one:

```
tell application "finder"
return selection
end tell
```

Which translates into this AppleEvent:

```
Process("Finder").SendAE "core,getd,'—-':obj { form:prop, want:type(prop), seld:type(sele), from:'null'() }
"
```

and as Xojo code it looks like this:
Example:

```
dim ae as appleevent
dim o1 as appleeventObjectSpecifier
dim f as folderItem
dim aList as appleeventdescList
dim i as Integer
dim dateiname as string

// setup the AppleEvent
o1=getpropertyObjectDescriptor( nil, "sele")
ae= newappleEvent("core", "getd", "MACS")
ae.objectSpecifierParam("—-")=o1

// send it
if ae.send then
// got the list
alist=ae.replyDescList

// now show the list of filename into an editfield:

for i=1 to alist.count
f=alist.folderItemItem(i)

dateiname=f.name
// editfield1 with property "mulitline=true"!
editfield1.text=editfield1.text + dateiname + chr(13)
next
```

```
end if
```

33.0.132 How to get the Mac OS system version?

Plugin Version: all, Platform: macOS.

Answer: The following code queries the value and displays the version number:
Example:

```
dim first as Integer
dim second as Integer
dim third as Integer
dim l as Integer

if System.Gestalt("sysv",l) then

Third=Bitwiseand(l,15)
second=Bitwiseand(l\16,15)
first=Bitwiseand(l\256,15)+10*Bitwiseand(l\256\16,15)
end if

if First>=10 then
msgbox "Mac OS X "+str(First)+"."+str(Second)+"."+str(third)
else
msgbox "Mac OS "+str(First)+"."+str(Second)+"."+str(third)
end if
```

33.0.133 How to get the Mac OS Version using System.Gestalt?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
Dim s As String
Dim b As Boolean
Dim i, resp as Integer

// Systemversion
b = System.Gestalt("sysv", resp)
If b then
s = Hex(resp)
```

```
For i =Len(s)-1 DownTo 1
s=Left(s,i)+"."+Mid(s,i+1)
Next
MsgBox "Systemversion: Mac OS " + s
end if
```

Notes: The MBS Plugin has a SystemInformationMBS.OSVersionString function for this.

33.0.134 How to get the screensize excluding the task bar?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Notes: Use the Screen class with the available* properties.

33.0.135 How to get the size of the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Notes: Make yourself a class for the WindowRect with four properties:

```
Bottom as Integer
Left as Integer
Right as Integer
Top as Integer
```

Add the following method to your class:

```
Sub GetWindowRect(windowhandle as Integer)
dim err as Integer
dim mem as memoryBlock
#if targetwin32 then
Declare Function GetWindowRect Lib "user32.dll" (hwnd as Integer, ipRect As Ptr) as Integer

mem = newmemoryBlock(16)
err = GetWindowRect(windowhandle, mem)
Left = mem.long(0)
Top = mem.Long(4)
Right = mem.Long(8)
Bottom = mem.Long(12)
```

```
#endif
End Sub
```

Good to use for the MDI Master Window!

33.0.136 How to get the source code of a HTMLViewer?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
// for Windows:

msgbox HTMLViewer1.IEHTMLTextMBS

// for MacOS with WebKit 2.x:

msgbox HTMLViewer1.WKWebViewMBS.HTMLText
```

33.0.137 How to get Xojo apps running Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You need to install some requuire packages.
Notes: You need CUPS as well as GTK packages. On 64 bit systems also the ia32-libs package.

Please note that you need a x86 compatible Linux. So no PPC, Power, ARM or other CPUs.

33.0.138 How to handle really huge images with GraphicsMagick or ImageMagick?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sometimes it may be better to use an extra application to process images.
Notes: A typical 32 bit app made with Xojo can use around 1.8 GB on Windows and 3 GB on Mac OS X. Some images may be huge, so that processing them causes several copies of the image to be in memory. With a 500 MB image in memory, doing a scale or rotation may require a temp image. So with source, temp and dest images with each 500 MB plus your normal app memory usage, you may hit the limit of Windows with 1.8 GB.

In that case it may be worth running a tool like gm in the shell class. gm is the command line version of GraphicsMagick. There you can run the 64 bit version which is not limited in memory like your own application. Also you can monitor progress and keep your app responsive.

33.0.139 How to handle tab key for editable cells in listbox?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this function:
Example:

```
Function HandleTabInList(list as listbox, row as Integer, column as Integer, key as String) As Boolean
// Handle tab character in Listbox.CellKeyDown event

Select case asc(key)
case 9
if Keyboard.AsyncShiftKey then
// back

// look for column left
for i as Integer = column-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next

// not found, so look in row before
row = row - 1
if row >= 0 then
for i as Integer = list.ColumnCount-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
else
// forward

// look for column right
for i as Integer = column+1 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
```

```
// not found, so look in row below
row = row + 1
if row <list.ListCount then
for i as Integer = 0 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
end if
end Select
End Function
```

Notes: You call it from CellKeyDown event like this:

```
EventHandler Function CellKeyDown(row as Integer, column as Integer, key as String) As Boolean
if HandleTabInList(me, row, column, key) then Return true
End EventHandler
```

As you see in the code, we handle tab and shift + tab for moving back and forward. Also we wrap to previous/next row if needed. Feel free to extend this to wrap from last to first row or create a new row for editing.

33.0.140 How to hard link MapKit framework?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Our MapKit classes weak link the framework. If you need hard linking it for the App Store, you can add this method to a class:
Example:

```
Sub ReferenceMapKit()
// just put this in window or app class

#if TargetMachO and Target64Bit then
Declare sub testing Lib "MapKit" Selector "test" (id as ptr)
testing(nil)
#endif

End Sub
```

Notes: No need to call the method.
Just having it in a window or app, will cause the compiler to hard link the framework.

33.0.141 How to have a PDF downloaded to the user in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use a WebHTMLViewer control and load the PDF file with the PDF plugin from the browser.
Example:

```
dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMEType = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer
CurrentFile.ForceDownload = true

// start the download
showurl(CurrentFile.url)
```

Notes: See our Create PDF example for the Xojo Web Edition.

33.0.142 How to hide all applications except mine?

Platform: macOS.

Answer: The code below will on Mac OS hide all applications except your one:
Example:

```
dim p as new ProcessMBS

p.GetFirstProcess
do
if not p.FrontProcess then
p.Visible=false
end if
loop until not p.GetNextProcess
```

33.0.143 How to hide script errors in HTMLViewer on Windows?

Plugin Version: all, Platform: Windows.

Answer: Set Internet Explorer to silent mode with code like this:
Example:

```
htmlviewer1._ole.Content.value("Silent") = True
```

Notes: Simply put this code in the open event of your htmlviewer control (using me instead of htmlviewer1).

33.0.144 How to hide the grid/background/border in ChartDirector?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you want to hide something in a chart, simply assign the kTransparent constant as color.

33.0.145 How to hide the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:
Example:

```
Declare Sub HideCursor Lib "Carbon" () Inline68K("A852")

HideCursor
```

Notes: The MBS Plugin has this function and supports it on Windows, too.

33.0.146 How to insert image to NSTextView or TextArea?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to insert file:
Example:

```
// insert a file to textview

Public Sub InsertFile(textview as NSTextViewMBS, f as FolderItem)
// read to file
```

```
dim b as BinaryStream = BinaryStream.Open(f)
dim s as string = b.Read(b.Length)

// build wrapper
dim fileWrapper as NSFileWrapperMBS = NSFileWrapperMBS.initRegularFileWithContents(s)
fileWrapper.preferredFilename = f.name

// make attachment
dim fileAttachment as new NSTextAttachmentMBS(fileWrapper)
dim attributedString as NSAttributedStringMBS = NSAttributedStringMBS.attributedStringWithAttach-
ment(fileAttachment)

// add to a NSTextViewMBS
textview.insertText attributedString

End Sub
```

Notes: For TextArea you can query the underlaying NSTextViewMBS object via TextArea.NSTextViewMBS method.

33.0.147 How to jump to an anchor in a htmlviewer?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You can use javascript to change the current window's location.
Example:

```
// load website
htmlviewer1.LoadURL "http://www.monkeybreadsoftware.net/addressbook-abpersonmbs.shtml"

// later jump to anchor named "16":

if TargetWin32 then
call HTMLViewer1.IERunJavaScriptMBS "window.location = ""#16"""
end if
```

33.0.148 How to keep a movieplayer unclickable?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: To keep the user away from clicking on a playing Movie you can just drop a Canvas in front of the Movieplayer and take the clicks there.
Example:

```
Function Canvas1.MouseDown(X as Integer, Y as Integer) as boolean
return true // take it and do nothing
End Function
```

33.0.149 How to keep my web app from using 100% CPU time?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Linux and MacOS you can use renice command in the terminal. On Windows use the task manager to reduce priority.
Notes: If you launch your app with nohup on Linux or Mac OS X like this from the terminal or a script:

nohup /webapps/MyApp/MyApp &

you can simply have a second line saying this:

renice 20 $!

which tells the system to lower priority to lowest value for the latest background process.

33.0.150 How to kill a process by name?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can kill a process (or application) by name if you loop over all the processes and kill the one you need.
Example:

```
dim p as new ProcessMBS
p.GetfirstProcess ' get first
do
if p.name = "TextEdit" then
call p.KillProcess
Return
end if
loop until not p.GetNextProcess
```

Notes: You may want to check the result of killProcess function. Not every user is allowed to kill every application.

33.0.151 How to know how many CPUs are present?

Plugin Version: all, Platform: macOS.

Answer: Try this function:
Example:

```
Function GetCPUCount() as Integer
Declare Function MPProcessors Lib "Carbon" () as Integer

Return MPProcessors()
End Function
```

Notes: Your app will than need that library to launch on Classic. To avoid this the MBS plugin checks if this library is available and return 1 if it's not available.

33.0.152 How to know the calling function?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac you can use a helper function like this this code:
Example:

```
Public Function CallingFunction() as string
// Query name of calling function of a function

#Pragma BreakOnExceptions false

try

// raise a dummy exception
dim r as new NilObjectException
raise r

catch x as NilObjectException

// get stack
dim stack() as string = x.Stack

// pick function name and return
dim name as string = stack(2)
Return name

end try
End Function
```

Notes: You need to include function names in your application.

33.0.153 How to launch an app using it's creator code?

Plugin Version: all, Platform: macOS.

Answer: Send an AppleEvent "oapp" with the creator code to the Finder ("MACS"):
Example:

```
Dim a as AppleEvent
dim creator as string

creator = "MSIE" ' here the Internet Explorer

a = NewAppleEvent("aevt", "odoc", "MACS")
a.Timeout = -1

a.ObjectSpecifierParam("—-") = GetUniqueIDObjectDescriptor("appf", nil, creator)

if not a.send then
msgBox "An error has occured"
else

end if
```

33.0.154 How to launch disc utility?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use this code:
Example:

```
dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("","com.apple.DiskUtility","")

if f<>Nil then
f.Launch
end if
```

Notes: This works even if people renamed the disc utility or moved it to another folder.

33.0.155 How to make a lot of changes to a REAL SQL Database faster?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You may try to embed your changes to the database between two transaction calls.
Example:

```
dim db as Database // some database

db.SQLExecute "BEGIN TRANSACTION"
// Do some Stuff
db.SQLExecute "END TRANSACTION"
```

Notes: This can increase speed by some factors.

33.0.156 How to make a NSImage object for my retina enabled app?

Plugin Version: all, Platform: macOS.

Answer: You can use code like this:
Example:

```
Function NewRetinaImage(pic as Picture, mask as Picture = nil) As NSImageMBS
// first make a NSImageMBS from it
dim n as new NSImageMBS(pic, mask)

// now set to half the size, so we have 2x pixels for the image
n.size = new NSSizeMBS(n.width/2, n.height/2)

// and return
Return n
End Function
```

Notes: The thing to do is to have 2x the pixels, but assign a size to the image which gives it the right size in points.
You can pass the NSImageMBS from here to NSMenuItemMBS. For Retina displays, the full resolution is used. For others it will be reduced.

33.0.157 How to make a window borderless on Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this declares:
Example:

```
// Sets window to borderless popup type, and sets its initial dimensions.
// Call this method, then Win32SetBorderlessPos, and then RB's Show
// method. Use RB Frame type 7 (Global Floating Window).

Const SWP_NOMOVE = &H2
Const SWP_FRAMECHANGED = &H20
Const HWND_TOPMOST = -1
Const GWL_STYLE = -16
Const WS_POPUPWINDOW = &H80880000

Dim styleFlags as Integer

#If TargetWin32 Then

Declare Function SetWindowLong Lib "user32" Alias "SetWindowLongA" (hwnd as Integer, nIndex as Integer, dwNewLong as Integer) as Integer
Declare Function SetWindowPos Lib "user32" (hwnd as Integer, hWndInstertAfter as Integer, x as Integer, y as Integer, cx as Integer, cy as Integer, flags as Integer) as Integer

styleFlags = SetWindowLong( w.WinHWND, GWL_STYLE, WS_POPUPWINDOW )
styleFlags = BitwiseOr( SWP_FRAMECHANGED, SWP_NOMOVE )
styleFlags = SetWindowPos( w.WinHWND, HWND_TOPMOST, 0, 0, wd, ht, styleFlags )

#EndIf
```

33.0.158 How to make an alias using AppleEvents?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
Sub MakeAlias(folder as folderitem, target as folderitem, aliasname as string)
dim ev as AppleEvent
dim myResult as boolean
dim properties as AppleEventRecord

ev = NewAppleEvent("core","crel","MACS")
ev.MacTypeParam("kocl") = "alis"
ev.FolderItemParam("to ") = target
ev.FolderItemParam("insh") = folder

properties=new AppleEventRecord
```

```
properties.StringParam("pnam")=aliasname

ev.RecordParam("prdt")=properties

myResult = ev.send
// true on success, false on error
End Sub
```

Notes: Call it like this:
MakeAlias SpecialFolder.Desktop, SpecialFolder.Desktop.Child("Gif Copy.rb"), "test.rb alias"

Seems to not work on Mac OS X 10.6

33.0.159 How to make AppleScripts much faster?

Plugin Version: all, Platform: macOS.

Answer: use "ignoring application responses" like in this example:
Notes: on run { fn,fpx,fpy }
ignoring application responses
tell app "Finder" to set the position of folder fn to fpx,fpy
end ignoring
end run

33.0.160 How to make double clicks on a canvas?

Plugin Version: all, Platform: macOS.

Answer:

Update: Newer Xojo versions support DoubleClick event, so you don't need this code.

Here's my tip from the tips list on how to add a double-click event to the Canvas control. The technique could easily be used for a window or any Rectcontrol:

Because of its built-in drawing methods, the Canvas control is often used to create custom interface controls. But while the Canvas control has event handlers for most mouse events, it doesn't have an event handler for DoubleClick events. Fortunately, you can add a double-click event handler to a Canvas control easily. Basically, you're going to create a new class based on Canvas and add a double-click event to that. You can then use the new class anytime you need a Canvas with a double-click event.

To create a new Canvas class with a DoubleClick event handler, do this:

1. Add a new class to your project.
2. Set the Super property of the new class to "Canvas".
3. Change the name of this new class to "DoubleClickCanvas".

A double-click occurs when two clicks occur within the users double-click time (set in the Mouse control panel on both Macintosh and Windows) and within five pixels of each other. So, you'll need a few properties to store when and where the last click occurred.

4. Add a new property with the following declaration and mark it as private: lastClickTicks as Integer
5. Add a new property with the following declaration and mark it as private: lastClickX as Integer
6. Add a new property with the following declaration and mark it as private: lastClickY as Integer

Since the Canvas control doesn't have a DoubleClick event, you will need to add one.

7. Add a new event to your class by choosing New Event from the Edit menu and enter "DoubleClick" as the event name.

Double-clicks occur on MouseUp. In order for the mouseUp event to fire, you must return True in the MouseDown event.

8. In the MouseDown event, add the following code:
Return True

In the MouseUp event, you will need to determine what the users double-click time is. This value is represented on both the Mac and Windows in ticks. A tick is 1/60th of a second. Since there isn't a built-in function for this, you'll need to make a toolbox call. The mouseUp event code below makes the appropriate toolbox call for both Macintosh and Windows. It then compares the time of the users last click to the time of the current click and compares the location of the users last click to the location of the current click.

9. Add the following code to the MouseUp event:

```
dim doubleClickTime, currentClickTicks as Integer

#if targetMacOS then
Declare Function GetDblTime Lib "Carbon" () as Integer
doubleClickTime = GetDblTime()
#endif

#if targetWin32 then
Declare Function GetDoubleClickTime Lib "User32.DLL" () as Integer
```

```
doubleClickTime = GetDoubleClickTime()/60 // convert to ticks from milliseconds
#endif

currentClickTicks = ticks
//if the two clicks happened close enough together in time
if (currentClickTicks - lastClickTicks) <= doubleClickTime then
//if the two clicks occured close enough together in space
if abs(X - lastClickX) <= 5 and abs(Y - LastClickY) <= 5 then
DoubleClick //a double click has occured so call the event
end if
end if
lastClickTicks = currentClickTicks
lastClickX = X
lastClickY = Y
```

10. Now to test out your new DoubleClickCanvas, drag the class from the Project window to a window in your project to create an instance of it.

11. Double-click on the canvas you just added to your window to open the Code Editor. Notice that the canvas has a DoubleClick event handler. In this event handler, add the following code:

```
BEEP
```

33.0.161 How to make my Mac not sleeping?

Plugin Version: all, Platform: macOS.

Answer: Just inform the Mac OS about some system activity with code like this:
Example:

```
Sub UpdateSystemActivity()

#if TargetCarbon
declare function myUpdateSystemActivity lib "Carbon" alias "UpdateSystemActivity" (activity as Integer)
as short

const OverallAct = 0 // Delays idle sleep by small amount */
const UsrActivity = 1 // Delays idle sleep and dimming by timeout time */
const NetActivity = 2 // Delays idle sleep and power cycling by small amount */
const HDActivity = 3 // Delays hard drive spindown and idle sleep by small amount */
const IdleActivity = 4 // Delays idle sleep by timeout time */

dim e as Integer

e=myUpdateSystemActivity(UsrActivity)
```

```
// you may react on an error if e is not 0 after the call.

#endif
End Sub
```

Notes: You may use another constant if you prefer some different behavior.
Call it maybe every second.

33.0.162 How to make my own registration code scheme?

Plugin Version: all, Platform: Windows.

Answer: There are excellent articles about how to make a registratin code scheme, but you can also simply use our RegistrationEngineMBS class.
Notes: If you need a license text, why not use the one from Xojo as a starting point?

33.0.163 How to make small controls on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:
Example:

```
'/*
'* Use the control's default drawing variant. This does not apply to
'* Scroll Bars, for which Normal is Large.
'*/
const kControlSizeNormal = 0

'/*
'* Use the control's small drawing variant. Currently supported by
'* the Check Box, Combo Box, Radio Button, Scroll Bar, Slider and Tab
'* controls.
'*/
const kControlSizeSmall = 1

'/*
'* Use the control's small drawing variant. Currently supported by
'* the Indeterminate Progress Bar, Progress Bar and Round Button
'* controls.
'*/
const kControlSizeLarge = 2
```

```
'/*
'* Control drawing variant determined by the control's bounds. This
'* ControlSize is only available with Scroll Bars to support their
'* legacy behavior of drawing differently within different bounds.
'*/
const kControlSizeAuto = &hFFFF

const kControlSizeTag = "size"

declare function SetControlData lib "Carbon" (controlhandle as Integer, part as short, tagname as OSType, size as Integer, data as ptr) as short

dim m as MemoryBlock

m=NewMemoryBlock(2)
m.UShort(0)=kControlSizeSmall

Title=str(SetControlData(CheckBox1.Handle, 0, kControlSizeTag, 2, m))
```

33.0.164 How to mark my Mac app as background only?

Plugin Version: all, Platform: macOS.

Answer: You can run a build script on each build with this code:
Example:

```
Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSUIElement"" YES")
```

Notes: This will set the NSUIElement flag to YES.

33.0.165 How to move a file or folder to trash?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:
Example:

```
Function MoveToTrash(f as FolderItem) As Boolean
#if TargetMacOS then
dim r as FolderItem
dim e as Integer = MacFileOperationMBS.MoveObjectToTrashSync(f, r, MacFileOperationMBS.kFSFileOperationDefaultOptions)
```

```
if e = 0 then
Return true // Ok
end if

#elseif TargetWin32 then
dim w as new WindowsFileCopyMBS

dim flags as Integer = w.FileOperationAllowUndo + w.FileOperationNoErrorUI + w.FileOperationSilent
+ w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if

flags = w.FileOperationNoErrorUI + w.FileOperationSilent + w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if
#else
// Target not supported
break
Return false
#endif
End Function
```

Notes: If you want to move a file to trash, you could use f.movefileto f.trashfolder, but that will overwrite existing files in the trash. You can use our MacFileOperationMBS class to move a file on Mac to the trash. And it uses the same code as the Finder, so files are renamed when the same name is already in use in the trash:

On Windows we use WindowsFileCopyMBS class.
Requires Mac OS X 10.5.

33.0.166 How to move an application to the front using the creator code?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code ttxt) to the frontmost application:
Example:

```
dim a as appleevent

a=newappleEvent("misc","actv","ttxt")
```

```
if a.send then
end if
```

Notes: (Code is Mac only)

33.0.167 How to move file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can set post/pre quotes to have ftp commands executed before or after the download/upload.
Example:

```
dim d as CURLMBS // your curl object

// rename/move file
dim ws() As String
ws.Append "RNFR Temp.txt"
ws.append "RNTO MyFile.txt"

d.SetOptionPostQuote(ws)
```

Notes: Use SetOptionPostQuote, SetOptionPreQuote or SetOptionQuote.
The ftp commands you pass here are native ftp commands and not the commands you use with ftp applications. So rename is two commands. First RNFR to tell where to rename from and second RNTO with the new file name. To delete use DELE and the file path.

33.0.168 How to normalize string on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:
Example:

```
Function Normalize(t as string) As string
const kCFStringNormalizationFormD = 0 // Canonical Decomposition
const kCFStringNormalizationFormKD = 1 // Compatibility Decomposition
const kCFStringNormalizationFormC = 2 // Canonical Decomposition followed by Canonical Composition
const kCFStringNormalizationFormKC = 3 // Compatibility Decomposition followed by Canonical Composition

dim s as CFStringMBS = NewCFStringMBS(t)
dim m as CFMutableStringMBS = s.Normalize(kCFStringNormalizationFormD)
```

```
Return m.str
End Function
```

Notes: This uses Apple's CFString functions to normalize unicode variants.

33.0.169 How to obscure the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:
Example:

```
Declare Sub ObscureCursor Lib "Carbon" ()

ObscureCursor
```

Notes: The MBS Plugin has this function, but it's not supported for Windows.

33.0.170 How to open icon file on Mac?

Plugin Version: all, Platform: macOS.

Answer: Use the NSImageMBS class like this:
Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.ico")
dim n as new NSImageMBS(f)

window1.Backdrop = n.CopyPictureWithMask
```

33.0.171 How to open PDF in acrobat reader?

Plugin Version: all, Platform: macOS.

Answer: Try this code:
Example:

```
dim pdf as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
```

```
// open PDF in Acrobat Reader on Mac:

// find app
dim bundleID as string = "com.adobe.Reader"
dim app as FolderItem = LaunchServicesFindApplicationForInfoMBS("", bundleID, "")

if app<>nil then

// launch app with parameters

dim docs() as FolderItem
docs.Append pdf

dim param as new LaunchServicesLaunchParameterMBS
param.Defaults = true
param.Application = app

dim x as FolderItem = LaunchServicesOpenXMBS(docs, param)

// on failure, simply launch it
if x = nil then
pdf.Launch(true)
end if

else
pdf.Launch(true)
end if
```

Notes: On Windows, simply use pdf.launch or WindowsShellExecuteMBS.

33.0.172 How to open printer preferences on Mac?

Plugin Version: all, Platform: macOS.

Answer: You can use our OpenMacOSXPreferencesPaneMBS function like this:
Example:

```
dim e as Integer = OpenMacOSXPreferencesPaneMBS("PrintAndFax")
if 0 = e then
MsgBox "OK"
elseif e = -43 then
MsgBox "File not found."
else
MsgBox "Error: "+str(e)
end if
```

33.0.173 How to open special characters panel on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have functions for that in Cocoa and Carbon.
Example:

```
dim a as new NSApplicationMBS
a.orderFrontCharacterPalette
```

Notes: For Cocoa, you can use orderFrontCharacterPalette method in NSApplicationMBS class.

Or simply for Carbon and Cocoa the ShowCharacterPaletteMBS method.

33.0.174 How to optimize picture loading in Web Edition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebPicture class.
Notes: Take your picture and create a WebPicture object. Store this WebPicture in a property of the WebPage, Session or app (as global as possible). On the first time you use this picture on an user session, the browser will load it. Second time you use it, the browser will most likely pick it from the cache.
Having pictures in App or some module reuses the same picture for all sessions which reduces memory footprint.
This does not work well with pictures you change very often or use only for one webpage on one user.

If you like to see an example, check our Map example.

33.0.175 How to parse XML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:
Example:

```
dim s as string = "<test><test /></test>"

try
```

```
dim x as new XmlDocument(s)
MsgBox "OK"
catch xe as XmlException
MsgBox "invalid XML"
end try
```

Notes: If you got an exception, you have a parse error.

33.0.176 How to play audio in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the HTML5 audio tag and control it with javscript.
Notes: This is just another example app I made today. It plays a christmas song. The audio file is provided by the application to the server, so no external web server is needed and this application can run stand alone. To compile and run you need Xojo 2010r5.

In the open event we search the audio files and open them as binarystreams. We create the two webfile objects. Those webfiles are part of the app class, so we have them globally. There we set the data with the content of our streams. We also define file names and mime types. They are needed so browser know what we have here:

```
audioFileM4V = new WebFile
audioFileM4V.Data = bM.Read(BM.Length)
audioFileM4V.Filename = "music.m4a"
audioFileM4V.MIMEType = "audio/m4a"
```

```
audioFileOGG = new WebFile
audioFileOGG.Data = bO.Read(BO.Length)
audioFileOGG.Filename = "music.ogg"
audioFileOGG.MIMEType = "audio/ogg"
```

Next in the open event of the webpage we have a PageSource control. The location is set to be before content. In the open event we define the html code for this. First we pick the URLs for the audio files. Than we build the html to use the audio tag. As you see, we give it an ID for later use and have it preload automatically. If you add an autoplay tag, you can have the audio play right away. Inside the audio tag we have two sources so we provide audio for both Firefox (OGG) and Safari (MPEG4). Finally we have a text to display if HTML5 audio tag is not supported.

You can set the source in the EditSource event:

dim urlo as string = app.audioFileOGG.URL
dim urlm as string = app.audioFileM4V.URL
me.Source = ”<audio id=””mymusic”” preload=””auto””><source src=””””+urlo+”””” type=””audio/ogg”” /><source src=””””+urlm+”””” type=””audio/mpeg”” />Your browser does not support the audio element.</audio>”

Next in the Play button we execute code to play the audio. This is a short javascript code which searches in the html document for the element with the ID ”mymusic” which is the ID of our audio tag above. Once we got the object, we call it’s play method to start playback.

me.ExecuteJavaScript(”document.getElementById(’mymusic’).play();”)

same for pause:

me.ExecuteJavaScript(”document.getElementById(’mymusic’).pause();”)

and finally for changing volume:

me.ExecuteJavaScript(”document.getElementById(’mymusic’).volume=”+str(me.Value/100.0)+”;”)

33.0.177 How to pretty print xml?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the XML Transform method with the right XLS.
Notes: Learn more here:
http://docs.xojo.com/index.php/XMLDocument.Transform

33.0.178 How to print to PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: This code below shows how to redirect printing to a PDF file on Mac OS X.
Example:

```
// get Xojo printer setup
dim p as new PrinterSetup

// now put it into NSPrintInfo to manipulate
dim n as new NSPrintInfoMBS
n.SetupString = p.SetupString
```

```
// change destination to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
n.SetSaveDestination(f)

// move back
p.SetupString = n.SetupString

// and print as usual
dim g as Graphics = OpenPrinter(p)
g.DrawString "Hello World", 20, 20
```

Notes: And you can use normal graphics class for that.

33.0.179 How to query Spotlight's Last Open Date for a file?

Plugin Version: all, Platform: macOS.

Answer: You can use a MDItemMBS objec to query this value:
Example:

```
Function LastOpenedDate(Extends F As FolderItem, DefaultOtherDates As Boolean = True) As Date
#If TargetMacOS Then
Dim xMDItem as New MDItemMBS(F)
Dim xDate as Variant

If xMDItem <>Nil Then
xDate = xMDItem.GetAttribute(xMDItem.kMDItemLastUsedDate).DateValue
If xDate IsA Date Then Return xDate
Else
If xDate <>Nil Then Break
End If
#EndIf

If DefaultOtherDates Then
If F.ModificationDate <>Nil Then Return F.ModificationDate
If F.CreationDate <>Nil Then Return F.CreationDate
End If
End Function
```

Notes: Thanks for Josh Hoggan for this example code.

33.0.180 How to quit windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Example:

```
#if targetwin32 then
dim i1,i2,r as Integer
declare function ExitWindowsEx lib "user32" (uFlags as Integer, dwReserved as Integer) as Integer
i1 = 2
i2 = 0
r = ExitWindowsEx(i1,i2)
if r<>0 then
' Error()
end if

#endif
```

Notes: uFlags parameters:

```
'4 = EWX_Force
'0 = EWX_Logoff
'2 = EWX_Reboot
'1 = EWX_shutdown, should shut down computer
```

Also check the ExitWindowsMBS method.

33.0.181 How to read a CSV file correctly?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With all the rules for quotes and delimiters, you can simply use the SplitCommaSeparatedValuesMBS method in our plugins like this:
Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.csv")
dim t as TextInputStream = f.OpenAsTextFile

while not t.EOF
dim s as string = t.ReadLine(encodings.ASCII)

dim items() as string = SplitCommaSeparatedValuesMBS(s, ";", """")
```

```
List.AddRow ""
dim u as Integer = UBound(items)
for i as Integer = 0 to u
List.Cell(List.LastIndex,i) = items(i)
next

wend
```

Notes: Please make sure you choose the right text encoding.

33.0.182 How to read the command line on windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Example:

```
#if targetwin32 then
dim line as string
Dim mem as MemoryBlock

Declare Function GetCommandLineA Lib "kernel32" () As Ptr

mem=GetCommandLineA()
s=mem.cstring(0)

#endif
```

Notes: Newer Xojo versions have a system.commandline property.

33.0.183 How to render PDF pages with PDF Kit?

Plugin Version: all, Platform: Windows.

Answer: Try this code:
Example:

```
// choose a file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")

// open it as PDF Document
dim sourceFile as New PDFDocumentMBS(f)
```

```
if sourceFile.handle <>0 then // it is a PDF file

// get upper bound of pages
dim c as Integer = sourceFile.pageCount-1

// from first to last page
for n as Integer = 0 to c

// pick that page
dim page as PDFPageMBS = sourceFile.pageAtIndex(n)

// render to image
dim p as NSImageMBS = page.Render

// and convert to RB picture and display
Backdrop = p.CopyPictureWithMask

next

end if
```

Notes: PDFKit works only on Mac OS X.

33.0.184 How to restart a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:
Example:

```
dim ae as appleevent
ae=newappleEvent("FNDR","rest","MACS")
if not ae.send then
msgBox "The computer couldn't be restarted."
end if
```

33.0.185 How to resume ftp upload with curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: CURL supports that and you simply need to set the right options.

Notes: First of course OptionUpload must be true. Second OptionFTPAppend must be true so the OptionResumeFrom is used. Store there (or in OptionResumeFromLarge) your start value.
Don't forget to implement the read event and return data there as requested.

33.0.186 How to rotate a PDF page with CoreGraphics?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: This code opens a PDF and draws the first page into a new PDF with 90¬∞ rotation.
Example:

```
// Rotate a PDF page

// our files
dim sourcefile as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
dim destfile as FolderItem = SpecialFolder.Desktop.Child("rotated.pdf")

// open PDF
dim pdf as CGPDFDocumentMBS = sourcefile.OpenAsCGPDFDocumentMBS

// query media size of first page
dim r as CGRectMBS = pdf.MediaBox(1)

// create new PDF
dim c as CGContextMBS = destfile.NewCGPDFDocumentMBS(r,"title","Author","Creator")

// create rotated rectangle
dim nr as new CGRectMBS(0,0,r.Height,r.Width)

// create new page
c.BeginPage nr
c.SaveGState

const pi = 3.14159265

// rotate by 90¬∞
c.RotateCTM pi*1.5

// fix origin
c.TranslateCTM -r.width,0

// draw PDF
c.DrawCGPDFDocument pdf,r,1

// cleanup
c.RestoreGState
c.EndPage
```

```
c = nil

// show in PDF viewer
destfile.Launch
```

Notes: This code is Mac only as it needs CoreGraphics.

33.0.187 How to rotate image with CoreImage?

Plugin Version: all, Platform: macOS.

Answer: Use the code like the one below:
Example:

```
// Rotate image with CoreImage

// load image
dim f as FolderItem = SpecialFolder.Desktop.Child("test.png")
dim image as new CIImageMBS(f)

// rotate 45 degree
dim n as new NSAffineTransformMBS
n.rotateByDegrees(45)

dim TransformFilter as new CIFilterAffineTransformMBS
TransformFilter.inputImage = image
TransformFilter.inputTransform = n

// get result
dim resultImage as CIImageMBS = TransformFilter.outputImage

// for saving to file
dim outputImage as NSImageMBS = resultImage.RenderNSImage(false)

f = SpecialFolder.Desktop.Child("output.png")
dim b as BinaryStream = BinaryStream.Create(f, true)
b.Write outputImage.PNGRepresentation

// as Xojo picture object for display
dim pic as Picture = outputImage.CopyPictureWithMask

Backdrop = pic
```

33.0.188 How to run a 32 bit application on a 64 bit Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Install 32 bit compatibility libraries.
Notes: The package is called ia32-libs for ubuntu (and others).
Some applications need to be run on a 32 bit system as they need some hardware related libraries. Like libUSB or libHID for USB devices.

33.0.189 How to save HTMLViewer to PDF with landscape orientation?

Plugin Version: all, Platform: macOS.

Answer: You can use NSPrintInfoMBS to change the options for PrintToPDFFile function.
Example:

```
// make it landscape
dim n as NSPrintInfoMBS = NSPrintInfoMBS.sharedPrintInfo
n.orientation = n.NSLandscapeOrientation

// save html to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
call HTMLViewer1.PrintToPDFFileMBS(f,10,30,10,30)
```

Notes: You may want to reset options later.
This code is only for Mac OS X.

33.0.190 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to save to RTFD:
Example:

```
// save text as RTFD including image attachments
dim f as FolderItem = GetSaveFolderItem(FileTypes1.ApplicationRtfd, "test.rtfd")

if f = nil then Return

dim a as NSAttributedStringMBS = textView.textStorage
dim w as NSFileWrapperMBS = a.RTFDFileWrapperFromRange(0, a.length, DocumentAttributes)

dim e as NSErrorMBS
if w.writeToFile(f, e) then
```

```
else
MsgBox e.LocalizedDescription
end if
```

Notes: For TextArea you can query the underlaying NSTextViewMBS object via TextArea.NSTextViewMBS method.

33.0.191 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: How to load PDF to htmlviewer on desktop?
Example:

```
Public Sub LoadPDFData(viewer as HTMLViewer, PDFData as string)
Dim base64string As String = EncodeBase64(PDFData)

// remove line endings to make it a big line
base64string = ReplaceLineEndings(base64string, "")

// build data URL
// https://en.wikipedia.org/wiki/Data_URI_scheme
Dim dataURL As String = "data:application/pdf;base64," + base64string

// show in webviewer
HTMLViewer1.LoadURL(dataURL)

// may not work everywhere due to URL length limit
// for Web projects, use WebFile instead!
End Sub
```

Notes: This avoids a temporary file, which may also work.
For Web Apps, please use WebFile.

33.0.192 How to scale a picture proportionally with mask?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.
Example:

```
Function ProportinalScaledWithMask(extends pic as Picture, Width as Integer, Height as Integer) As Pic-
ture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)

// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// check if we have a mask and clear it
dim m as picture = pic.mask(False)
pic.mask = nil

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

if m <>nil then
// restore mask and scale it
pic.mask = m
NewPic.mask.Graphics.DrawPicture m, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height
end if


// return result
Return NewPic
End Function
```

Notes: This version handles mask. As you see we actually have to remove mask in order to copy the picture part correctly.

33.0.193 How to scale a picture proportionally?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.
Example:

```
Function ProportionalScaled(extends pic as Picture, Width as Integer, Height as Integer) As Picture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)
```

```
// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

// return result
Return NewPic
End Function
```

Notes: This does not handle mask, but you can scale the mask the same way and assign it to the new picture.
(see other FAQ entry with mask)

33.0.194 How to scale/resize a CIImageMBS?

Plugin Version: all, Platform: Windows.

Answer: Use the CIFilterLanczosScaleTransform filter to scale down a picture to a specific size.
Example:

```
Dim pic As Picture = LogoMBS(500)
Dim image As CIImageMBS = CIImageMBS.imageWithPicture(pic)

Dim filter As New CIFilterLanczosScaleTransformMBS

Const targetWidth = 600.0
Const targetHeight = 400.0

Dim scale As Double = targetHeight / image.Extent.Height
Dim aspect As Double = targetWidth / (image.Extent.Width * scale)

filter.inputImage = image
filter.inputScale = scale
filter.inputAspectRatio = aspect

Dim result As Picture = filter.outputImage.RenderPicture

Backdrop = result
```

Notes: This is same code as our scaleTo convenience method.

33.0.195 How to scale/resize a picture?

Plugin Version: all, Platform: Windows.

Answer: There are several ways to scale or resize a picture. The easiest way may be the ScaleMBS function in the Picture class.
Example:

```
dim Original,Scaled as Picture

Original=LogoMBS(500)
Scaled=Original.ScaleMBS(100,100,true)
```

Notes: The plugin ways:
- GraphicsMagick can scale/resize.
- CoreImage scale filter may result in the fastest and best images on Mac OS X 10.4.
- NSImageMBS can scale, but is Mac OS X only.
- CGImageMBS can scale, but is Mac OS X only.
- CIImageMBS can scale, but is Mac OS X only.
- QuickTime Graphics exporter and importer can be connected to scale. (this was used more often a few years ago)
- ImageMagick can scale very nice and crossplatform. But the ImageMagick libraries are big.
- The picture.ScaleMBS function is self written and results in equal output on Mac, Windows and Linux without any additional libraries installed.
- Picture.ScalingMBS does crossplatform scaling with several modes.

with pure Xojo:
- make a new picture and draw the old one with new size inside.

33.0.196 How to search with regex and use unicode codepoints?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can specify unicode characters in search string with backslash x and digits.
Example:

```
dim r as RegExMbs
dim s as string
dim c as Integer
```

```
s="123 √§√√º ABC 456"

r=new RegExMBS
if r.Compile(".√.") then
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if

r=new RegExMBS
if r.Compile(".\xF6.") then // finds √ using Unicode codepoint
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if
```

33.0.197 How to see if a file is invisible for Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: Try this function:
Example:

```
Function Invisible(F As FolderItem) As Boolean
Dim TIS As TextInputStream
Dim S,All As String
Dim I as Integer
dim g as folderitem

If Left(F.Name,1)="." or not f.visible Then
Return True
End If

g=F.Parent.Child(".hidden")
If g.Exists Then
TIS=g.OpenAsTextFile
if tis<>Nil then
All=TIS.ReadAll
For I=1 to CountFields(All,Chr(11))
S=NthField(All, Chr(11), I)
```

```
If S=F.name Then
Return True
End If
Next
end if
End if
End Function
```

33.0.198 How to set cache size for SQLite or REALSQLDatabase?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You use the pragma cache_size command on the database.
Example:

```
// set cache size to 20000 pages which is about 20 MB for default page size
dim db as REALSQLDatabase
db.SQLExecute "PRAGMA cache_size = 20000"
```

Notes: Default cache size is 2000 pages which is not much.
You get best performance if whole database fits in memory.
At least you should try to have a cache big enough so you can do queries in memory.
You only need to call this pragma command once after you opened the database.

33.0.199 How to set the modified dot in the window?

Plugin Version: all, Platform: macOS.

Answer: Try this declares:
Example:

```
window1.ModifiedMBS=true
```

33.0.200 How to show a PDF file to the user in a Web Application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use a WebHTMLViewer control and load the
Example:

```
dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMEType = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer

// load into html viewer
HTMLViewer1.URL = CurrentFile.URL
```

Notes: See our Create PDF example for the Xojo Web Edition.

33.0.201 How to show Keyboard Viewer programmatically?

Platform: macOS.

Answer: Use Xojo or AppleScript to launch the KeyboardViewerServer.app.
Example:

```
dim a as new AppleScriptMBS
dim text as string
dim lines(-1) as string

lines.append "set theApplication to ""KeyboardViewerServer"""
lines.append "set thePath to ""/System/Library/Components/KeyboardViewer.component/Contents/Shared-Support/KeyboardViewerServer.app"""
lines.append ""
lines.append "set POSIXPath to ((POSIX file thePath) as string)"
lines.append "tell application ""System Events"" to set isRunning to 0 <(count (application processes whose name is theApplication))"
lines.append "if isRunning then tell application POSIXPath to quit"
lines.append "delay 0.15"
lines.append ""
lines.append "ignoring application responses"
lines.append " tell application POSIXPath to run"
lines.append "end ignoring"

text=join(lines,EndOfLine.macintosh)

a.Compile text
a.Execute
```

Notes: AppleScript code:

set theApplication to ”KeyboardViewerServer”
set thePath to ”/System/Library/Components/KeyboardViewer.component/Contents/SharedSupport/KeyboardViewerServer.app”

set POSIXPath to ((POSIX file thePath) as string)
tell application ”System Events” to set isRunning to 0 <(count (application processes whose name is theApplication))
if isRunning then tell application POSIXPath to quit
delay 0.15

ignoring application responses
tell application POSIXPath to run
end ignoring

33.0.202 How to show the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:
Example:

Declare Sub ShowCursor Lib ”Carbon” ()

ShowCursor

Notes: The MBS Plugin has this function and supports it on Windows, too.

33.0.203 How to shutdown a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:
Example:

```
dim ae as appleevent
ae=newappleEvent(”FNDR”,”shut”,”MACS”)
if not ae.send then
msgBox ”The computer couldn’t be shutdown.”
end if
```

Notes: Or toolbox call (Attention: This method will stop the computer immediataly: No document asked to be saved, all applications quitting without knowing).

```
Declare Sub ShutDwnPower Lib "Carbon" ()
ShutDwnPower
```

33.0.204 How to sleep a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:
Example:

```
dim ae as appleevent
ae=newappleEvent("FNDR","slep","MACS")
if not ae.send then
msgBox "The computer doesn't want to sleep."
end if
```

33.0.205 How to speed up rasterizer for displaying PDFs with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Here a few speed tips:
Notes:

- Use the DynaPDFRasterizerMBS function instead of our render functions.
- Reuse DynaPDFRasterizerMBS as long as the target picture size doesn't change.
- Import only the PDF pages you want to display.
- Let DynaPDF do zooming, rotating or other effects instead of you change it.

33.0.206 How to use PDFLib in my RB application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The PDFlib plugin was discontinued in favor of our DynaPDF plugin.
Notes: If you need help to move, please contact us.

33.0.207 How to use quotes in a string?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Just double them.
Example:

msgbox "This String contains ""quotes""."

33.0.208 How to use Sybase in Web App?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use our MBS Xojo SQL Plugin to connect to a Sybase Database in your web application.
Notes: If you see db.Connect giving the error message "cs_ctx_alloc ->CS_MEM_ERROR", than some things are not setup right for Sybase.
The Apache process may not have all the SYBASE environment variables being set when the CGI was launched.

Adding these lines to /etc/httpd/conf/httpd.conf stopped the faux memory errors for us:

SetEnv LD_LIBRARY_PATH /opt/sybase/OCS-15_0/lib:/opt/sybase/OCS-15_0/lib3p64:/opt/sybase/OCS-15_0/lib3p:
SetEnv SYBROOT /opt/sybase
SetEnv SYBASE_OCS /opt/sybase
SetEnv SYBASE /opt/sybase

33.0.209 How to use the Application Support folder?

Plugin Version: all, Platform: macOS.

Answer:

I was saving a registration code for an app to the Preferencefolder.
People on the list have suggested that it would be better in
the ApplicationSupportFolder. How do I save the file called CWWPrefs
into that folder using MBS?

I have checked for examples and the docs but can't see how to apply it

//f = SpecialFolder.Preferences.child("CWWPrefs")
f = ApplicationSupportFolderMBS(-32768)

Example:

```
dim folder,file as FolderItem

folder = createApplicationSupportFolderMBS(-32763)

if folder=nil then
// Some very old Mac OS Versions may not support it
// or the plugin may fail for any reason
folder=SpecialFolder.Preferences
end if

file=folder.Child("CWWPrefs")

MsgBox file.NativePath
```

Notes:

You may not be able to write there with a normal user account!

33.0.210 How to use the IOPMCopyScheduledPowerEvents function in Xojo?

Plugin Version: all, Platform: macOS.

Answer: You can use the following code which does this using the SoftDeclareMBS class.
Example:

```
Sub Open()
dim c as CFDateMBS
dim t as CFAbsoluteTimeMBS

// get current date
c=NewCFDateMBS

// in absolute time (seconds since x)
t=c.AbsoluteTime

// add 600 seconds (= 10 Minutes)
t.Value=t.Value+600

// Make a Date from it
c=t.Date

// Schedule the event
// 0 on success
// E00002C1 for missing root rights
```

```
Title=hex(schedulePowerEvent(c, "wake"))

// Just for information, display the scheduled stuff
CFShowMBS CopyScheduledPowerEvents
End Sub

Function CopyScheduledPowerEvents() As cfarrayMBS
dim s as SoftDeclareMBS
dim m as MemoryBlock

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMCopyScheduledPowerEvents") then
if s.CallFunction(0,nil) then
Return NewCFArrayMBSHandle(s.Result,true)
else
MsgBox "Failed to Call IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOKit."
end if

Return nil
End Function

Function SchedulePowerEvent(time_to_wake as CFDateMBS, Type as CFStringMBS) as Integer
dim s as SoftDeclareMBS
dim m as MemoryBlock

'/*
'* Types of power event
'* These are potential arguments to IOPMSchedulePowerEvent().
'* These are all potential values of the kIOPMPowerEventTypeKey in the CFDictionaries
'* returned by IOPMCopyScheduledPowerEvents().
'*/
'/*!
'@define kIOPMAutoWake
'@abstract Value for scheduled wake from sleep.
'*/
'#define kIOPMAutoWake "wake"
'
'/*!
'@define kIOPMAutoPowerOn
'@abstract Value for scheduled power on from off state.
```

```
'*/
'#define kIOPMAutoPowerOn "poweron"
'
'/*!
'@define kIOPMAutoWakeOrPowerOn
'@abstract Value for scheduled wake from sleep, or power on. The system will either wake OR
'power on, whichever is necessary.
'*/
'
'#define kIOPMAutoWakeOrPowerOn "wakepoweron"
'/*!
'@define kIOPMAutoSleep
'@abstract Value for scheduled sleep.
'*/
'
'#define kIOPMAutoSleep "sleep"
'/*!
'@define kIOPMAutoShutdown
'@abstract Value for scheduled shutdown.
'*/
'
'#define kIOPMAutoShutdown "shutdown"

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMSchedulePowerEvent") then

m=NewMemoryBlock(12)
m.Long(0)=time_to_wake.handle
m.Long(4)=0 // nil
m.Long(8)=type.Handle

if s.CallFunction(3,m) then
Return s.Result
end if
end if
end if

End Function
```

Notes: Requires Mac OS X and to execute root rights.

33.0.211 How to validate a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use this function below which uses a regular expression to verify that the string is a valid UUID/GUID:
Example:

```
Function IsGUID(guid as string) As Boolean
dim r as new RegEx

r.SearchPattern = "^(\{ { 0,1 } ( [ 0-9a-fA-F ] ) { 8 } -( [ 0-9a-fA-F ] ) { 4 } -( [ 0-9a-fA-F ] ) { 4 } -( [ 0-9a-fA-F ] ) { 4 } -( [ 0-9a-fA-F ] ) { 12 } \} { 0,1 } )$ "

Return r.Search(guid)<>nil
End Function
```

Notes: Simply parsing the GUID with CFUUIDMBS does not give the same result as CFUUIDMBS will also take a string like "DDDD".

33.0.212 How to walk a folder hierarchie non recursively?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this one:
Example:

```
Sub Walk(folder as FolderItem)
dim folders() as FolderItem

folders.Append folder

while UBound(folders)>=0

dim currentFolder as FolderItem = folders.pop

dim c as Integer = currentFolder.Count
for i as Integer = 1 to c
dim item as FolderItem = currentFolder.TrueItem(i)

if item = Nil then
// no permission
elseif item.Visible then // only visible

if item.Directory then
folders.Append item
```

```
else
// work with file here
end if

end if

next

wend
End Sub
```

Notes: As you see we go with a long loop which runs until we don't have more folders to process.
We ignore items we can't access due to permission limits.
And we only work visible items.
If you like, check folderitem.isBundleMBS on item to handle packages and applications better on Mac OS X.

33.0.213 I got this error: PropVal, QDPictMBS.Name (property value), Type mismatch error. Expected CGDataProviderMBS, but got Variant, Name:QDPictMBS

Plugin Version: all, Platform: macOS.

Answer: The plugins MacOSX and MacOSXCF belong together. If you use one part, please also install the other part.
Notes: We splitted the plugin because the Xojo IDE on Windows crashed on compilation.

33.0.214 I registered the MBS Plugins in my application, but later the registration dialog is shown.

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There are two main reasons.
Notes: 1. you may use the plugin before registering them. This is often the case if you register in a window open event and use the plugin in a control open event.
On the console on Mac OS X or Windows, you may see a message like this "MBS Plugins were used by the application before the RegisterMBSPlugin function was called. Please fix this in your code!".

2. you may have mixed different plugin versions which are not compatible.
In this case you can see a message "Internal plugin registration error." on the console on Mac OS X. Newer plugins may show a message dialog reporting this. Older version simply think they are not registered.

If the installer just merges old and new applications, users may have libraries of older and newer plugin versions in the libs folder. If your application loads the wrong version, the registration fails.

If you use remote debugging, make sure you clear the tempory files there, too. Otherwise you may have old DLLs on your hard disc which may disturb your application.

You can run into issues if you use your registration code on different places of your app. Please register only once in app.open (or app Constructor). If you have several codes, simply call them one after the other.

Also check that you only call RegisterMBSPlugin with valid serial number. If you later call RegisterMBSPlugin with Demo like in example code above, you remove the license.

Next check if you can clear the Xojo caches and that helps. This includes the Xojo Scratch folder and the Plugins & Project caches. Simply locate those folders and delete them. For Windows look in hidden AppData folder in your user folder. For Mac, please check
textasciitilde /Library/Caches and your temp folders.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

33.0.215 I want to accept Drag & Drop from iTunes

Plugin Version: all, Platform: macOS.

Answer: You need to accept AcceptMacDataDrop "itun" and Handle the DropObject.
Example:

```
Sub Open()
window1.AcceptMacDataDrop "itun"
End Sub

Sub DropObject(obj As DragItem)
dim s as string
dim f as folderItem
dim d as CFDictionaryMBS
dim o as CFObjectMBS
dim key as CFStringMBS
dim dl as CFDictionaryListMBS
dim i,c as Integer
dim u as CFURLMBS
dim file as FolderItem

if obj.MacDataAvailable("itun") then
s = obj.MacData("itun")
```

```
// Parse XML
o=NewCFObjectMBSFromXML(NewCFBinaryDataMBSStr(s))

// Make dictionary
if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

// get Tracks Dictionary
key=NewCFStringMBS("Tracks")
o=d.Value(key)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)
dl=d.List

// Walk over all entries in the Tracks dictionary
c=dl.Count-1
for i=0 to c
o=dl.Value(i)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

key=NewCFStringMBS("Location")
o=d.Value(key)
if o isa CFStringMBS then
u=NewCFURLMBSCFStringMBS(CFStringMBS(o),nil)

file=u.file
if file<>nil then
MsgBox file.NativePath
end if
end if
end if
next
end if
end if
end if
End Sub
```

Notes: The code above inside a window on Xojo 5.5 with MBS Plugin 5.3 will do it nice and show the paths.

33.0.216 I'm drawing into a listbox but don't see something.

Plugin Version: all.

Answer: If you draw this in a listbox cellbackground, you need to draw on the correct position
Example:

```
Function CellBackgroundPaint(g As Graphics, row as Integer, column as Integer) As Boolean
dim f as FolderItem
f=SpecialFolder.Desktop
f.DrawWideIconMBS(g,listbox1.left,listbox1.top+row*20,16)
Return true
End Function
```

Notes: Try this in a listbox. The Graphics object there has a cliping and an offset which the plugin doesn't know about.

33.0.217 I'm searching for a method or so to move a window from position x.y to somewhere else on the screen.

Platform: macOS.

Answer:

The code I produced in RB isn't smooth enough. Is there a call in MBS, if not, can it be done? The speed of it has to be like the show of a DrawerWindow.

Try the declare below for Carbon. With WindowLib it will work on Mac OS 8.5 and newer.
Notes:

See Window.Transition functions.

33.0.218 If I use one of your plug-ins under windows, would this then impose the use of dll after compilation or my would my compiled soft still be a stand-alone single file software?

Platforms: macOS, Linux, Windows.

Answer: Stand alone.
Notes: Xojo compiles all used plugins into the application binary.
Some plugin parts need external dlls but you will find that in the documentation. (e.g. pdflib for some classes)

33.0.219 Is the fn key on a powerbook keyboard down?

Plugin Version: all, Platform: macOS.

Answer: I am unable to figure out how or if it is possible to detect if the fn key is down on a powerbook keyboard. Is it possible?
Example:

```
' Window.Open Event of a blank project:

dim i as Integer

for i=0 to 127
if keyboard.asynckeydown(i) then
title=str(i) // found
return
end if
next
title="" // not found
```

Notes: This test application shows the keycode (decimal) 63 for the fn key.

33.0.220 Is there a case sensitive Dictionary?

Plugin Version: all.

Answer: The MBS Plugin has several classes which can work as a replacement.
Notes: First you could use VariantToVariantHashMapMBS or VariantToVariantOrderedMapMBS.
If you know that all keys are Strings or Integers only, you can use the specialized classes which are a little bit faster due to avoiding variants:

IntegerToIntegerHashMapMBS class
IntegerToIntegerOrderedMapMBS class
IntegerToStringHashMapMBS class
IntegerToStringOrderedMapMBS class
IntegerToVariantHashMapMBS class
IntegerToVariantOrderedMapMBS class
StringToStringHashMapMBS class
StringToStringOrderedMapMBS class
StringToVariantHashMapMBS class
StringToVariantOrderedMapMBS class

33.0.221 Is there a way to use the MBS plugin to get only the visible item and folder count on a volume?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the DirectorySizeMBS class for this as in the example below:
Example:

```
dim d as DirectorySizeMBS

d=new DirectorySizeMBS

// volume(1) as my boot volume is very full
if d.update(volume(1),true,0) then
MsgBox str(d.VisibleItemCount)+" visible items, "+str(d.HiddenItemCount)+" invisible items."
end if
```

Notes: Complete Question: Is there a way to use the MBS plugin to get only the visible item and folder count on a volume? The FileCount and FolderCount properties of VolumeInformationMBS seem to provide the total # of items including invisible items such as .DS_Store and more importantly .Trashes which is causing me a great amount of difficulty during a recursive scan of a volume. I've got a progress bar which uses the total of the filecount and foldercount properties as the maximum value, but my routine needs to filter out all invisible items, as it is creating a catalog of a volume for archiving purposes. Any thoughts how I could get accurate number.

33.0.222 Is there an easy way I can launch the Displays preferences panel?

Plugin Version: all, Platform: macOS.

Answer: Use the code below:
Example:

```
dim error as Integer

error=OpenMacOSXPreferencesPaneMBS("Displays")
if error<>0 then
MsgBox "Failed to launch QuickTime System Preferences panel."
end if
```

33.0.223 List of Windows Error codes?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have a list of windows error codes on our website.
Notes: http://www.monkeybreadsoftware.de/xojo/winerror.shtml

33.0.224 Midi latency on Windows problem?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The issue is system related, not a problem with RB or the plugin.
Notes: Two things will adversely affect the timing:

(1) latency of the software synthesizer output driver. The default Windows wavetable synthesizer has considerable latency. I don't know how many milliseconds, but it is noticeable.

(2) latency of the digital audio output driver. Different systems have different drivers for different audio hardware. My Dell laptop has a minimum 15ms latency in the audio driver.

These two things put together were causing a very sluggish MIDI response. I was able to verify these as the culprits by routing MIDI directly out of RB into a sample player, which only introduces the latency of (2) and does not include latency of (1).

I don't know how widely known are these facts, if not then you may want to add this information to the documentation, since Windows programmers using the MIDI plugin may not know those problems, and might mistakenly blame your plugin, as I did :) Sorry about that!

(From Aaron Andrew Hunt)

33.0.225 My Xojo Web App does not launch. Why?

Plugin Version: all, Platform: macOS.

Answer: Here is a list of checks to do for linux apache installations with Xojo or Xojo Web applications:
Notes: Just a list of checks to do for linux apache installations:

- You have 64bit linux? Than you need 32 bit compatibility libraries.
- The folder of your app is writable? Set permissions to 777.
- The cgi script is executable? Set permissions to 755.

- The app file itself is executable? Set permissions to 755.
- You uploaded cgi file as text, so it has unix line endings? (this often gives error ”Premature end of script headers” in apache log)
- You uploaded config.cfg file and made it writable? Set permissions to 666.
- Your apache allows execution of cgi scripts? You enabled cgi for apache and uncommented addhandler command for CGI on a new apache installation?
- You uploaded the app file and libraries as binary files? Upload as text breaks them.
- You did upload the libs folder?
- You don’t have code in app.open, session.open and other events which crashes app right at launch?
- You don”t have a print command in your app.open event? (see feedback case 23817)
- You allowed htaccess file to overwrite permissions?

33.0.226 SQLDatabase not initialized error?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Before you can use SQLDatabaseMBS, it must be initialized.
Example:

```
dim d as new SQLDatabaseMBS
```

Notes: This happens normally when you use ”new SQLDatabaseMBS”.
But if you just have a SQLConnectionMBS and get a recordset there, the initialization may not have happend, yet.
So please simply add a line ”dim d as new SQLDatabaseMBS” to your app.open code after registration, so the plugin part can initialize and late provide recordsets.

33.0.227 Textconverter returns only the first x characters. Why?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Some older Xojo versions limit the Textconverter to around 1024 characters in input and output.
This should be fixed with RB5.
Notes:

Xojo seems not to support Textconverters at all on Windows.

33.0.228 The type translation between CoreFoundation/Foundation and Xojo data types.

Plugin Version: all, Platform: macOS.

Answer: The plugin does conversion between Cocoa/Carbon data types and native Xojo data types. The following list help you knowing what the current plugins support:
Notes: Cocoa NSObject to Variant:

nil ->nil
NSDictionary ->Dictionary
NSData ->MemoryBlock
NSString ->String
NSAttributedString ->NSAttributedStringMBS
NSDate ->Date
NSNumber ->double/integer/Int64/UInt64/UInt32/Boolean
NSURL ->String
NSValue with NSRect ->NSRectMBS
NSValue with NSPoint ->NSPointMBS
NSValue with NSSize ->NSSizeMBS
NSValue with NSRange ->NSRangeMBS
NSValue with QTTime ->QTTimeMBS
NSValue with QTTimeRange ->QTTimeRangeMBS
NSArray ->Array of Variant
QuartzFilter ->QuartzFilterMBS

- ->*MBS

Variant to Cocoa NSObject:

nil ->nil
Dictionary ->NSDictionary
Boolean ->NSNumber
Integer ->NSNumber
Color ->NSColor
Int64 ->NSNumber
Single ->NSNumber
Double ->NSNumber
Date ->NSDate
MemoryBlock ->NSData
String ->NSString
NSImageMBS ->NSImage
NSAttributedStringMBS ->NSAttributedString
NSColorMBS ->NSColor
NSRectMBS ->NSValue with NSRect
NSSizeMBS ->NSValue with NSSize

NSPointMBS ->NSValue with NSPoint
NSRangeMBS ->NSValue with NSRange
NSBurnMBS ->NSBurn
NSViewMBS ->NSView
NSFontMBS ->NSFont
NSParagraphStyleMBS ->NSParagraphStyle
NSAttributedStringMBS ->NSAttributedString
WebPolicyDelegateMBS ->WebPolicyDelegate
WebUIDelegateMBS ->WebUIDelegate
WebFrameLoadDelegateMBS ->WebFrameLoadDelegate
WebResourceLoadDelegateMBS ->WebResourceLoadDelegate
NSIndexSetMBS ->NSIndexSet
QTTimeMBS ->QTTime
QTTimeRangeMBS ->QTTimeRange
Array of Variant ->NSArray
Array of String ->NSArray
CFStringMBS ->NSString
CFNumberMBS ->NSNumber
CFDataMBS ->NSData
CFURLMBS ->NSURL
CFArrayMBS ->NSArray
CFDictionaryMBS ->NSDictionary
CFBinaryDataMBS ->NSDate

Carbon CFTypeRef to Variant:

CFDictionaryRef ->Dictionary
CFStringRef ->String
CFDataRef ->String
CFURL ->String
CFNumber ->Integer/Double/Int64
CFArray ->Array
CFDate ->date
nil ->nil
CGColorSpace ->CGColorSpaceMBS
CGColor ->CGColorMBS
CGImage ->CGImageMBS
CF* ->CF*MBS

Variant to Carbon CFTypeRef:

Dictionary ->CFDictionaryRef
Boolean ->CFBooleanRef
Color ->CFNumberRef
Integer ->CFNumberRef

Int64 ->CFNumberRef
Single ->CFNumberRef
Double ->CFNumberRef
String ->CFStringRef
Color ->CGColorRef
Date ->CFDateRef
nil ->nil
Memoryblock ->CFDataRef
FolderItem ->CFURLRef
Dictionary ->CFDictionaryRef
Array of Variant/String/Date/Double/Single/Int64/Integer ->CFArray
CGRectMBS ->CGRect as CFDataRef
CGSizeMBS ->CGSize as CFDataRef
CGPointMBS ->CGPoint as CFDataRef
CGColorMBS ->CGColor
CGColorSpaceMBS ->CGColorSpace
CGImageMBS ->CGImage
CGDataConsumerMBS ->CGDataConsumer
CGDataProviderMBS ->CGDataProvider
CF*MBS ->CF*

Strings without encodings should be put into dictionaries as memoryblocks.

33.0.229 Uploaded my web app with FTP, but it does not run on the server!

Plugin Version: all, Platform: Windows.

Answer: If you see errors like a simple "Segmentation Fault" on Linux or some other wired errors, you may want to check your FTP upload mode. It must be binary for web apps. ASCII mode corrupts the application.

33.0.230 What classes to use for hotkeys?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use CarbonHotKeyMBS class on Mac and WindowsKeyFilterMBS on Windows.
Notes: CarbonHotKeyMBS will also work fine in Cocoa apps.

33.0.231 What do I need for Linux to get picture functions working?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In order to get our plugins working on Linux systems without GUI, the plugin loads graphics

libraries dynamically.
Notes: To get it working, the plugin tries to load gtk with this paths:

- libgtk-x11-2.0.so"
- libgtk-x11-2.0.so.0"
- /usr/lib/libgtk-x11-2.0.so"
- /usr/lib32/libgtk-x11-2.0.so"
- /usr/lib/libgtk-x11-2.0.so.0"
- /usr/lib32/libgtk-x11-2.0.so.0"

gdk is loaded with this paths:

- libgdk-x11-2.0.so"
- libgdk-x11-2.0.so.0"
- /usr/lib/libgdk-x11-2.0.so"
- /usr/lib32/libgdk-x11-2.0.so"
- /usr/lib/libgdk-x11-2.0.so.0"
- /usr/lib32/libgdk-x11-2.0.so.0"

For the paths without explicit path, the system will search in /lib, /usr/lib and all directories in the LD_LIBRARY_PATH environment variable.

33.0.232 What does the NAN code mean?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

33.0.233 What font is used as a 'small font' in typical Mac OS X apps?

Plugin Version: all, Platform: macOS.

Answer:

Xojo 4.5 has a constant "SmallSystem" to use for a font name.
For older versions try this code:
Example:

```
Sub GetThemeFont(fontType as Integer, ByRef fontName as String, ByRef fontSize as Integer, ByRef
fontStyle as Integer)
dim err as Integer
dim theFont, theFontSize, theFontStyle as MemoryBlock

const smSystemScript = -1

Declare Function GetThemeFont Lib "Carbon" (inFontID as Integer, inScript as Integer, outFontName
as Ptr, outFontSize as Ptr, outStyle as Ptr) as Integer

theFont = NewMemoryBlock(256) //Str255
theFontSize = NewMemoryBlock(2) //SInt16
theFontStyle = NewMemoryBlock(1) //Style

err = GetThemeFont(fontType, smSystemScript, theFont, theFontSize, theFontStyle)

if err = 0 then
fontName = theFont.PString(0)
fontSize = theFontSize.UShort(0)
fontStyle = theFontStyle.Byte(0)
else
fontName = ""
fontSize = 0
fontStyle = 0
end if
End Sub
```

33.0.234 What is last plugin version to run on Mac OS X 10.4?

Plugin Version: all, Platform: Windows.

Answer: Last Version with 10.4 support is version 15.4.
Notes: With version 15.4 you can build applications for OS X 10.4 and newer.
For Version 16.0 we disabled 10.4 and moved minimum to 10.5. We may be able to enable it again to build a version of 16.x, but may need to charge for this by hour.

33.0.235 What is last plugin version to run on PPC?

Plugin Version: all, Platform: Windows.

Answer: Last Version with PPC is 15.4.
Notes: With version 15.4 you can build PPC applications for OS X 10.4 and newer.
For Version 16.0 we disabled PPC. We may be able to enable it again to build a PPC version of 16.x, but may need to charge for this by hour.

33.0.236 What is last version of the plugins for macOS 32-bit?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use version 23.0 or older.
Notes: We stopped including 32-bit code for macOS in version 23.1.
Please us older versions if you use an old Xojo.

Xojo 2017r3 and newer load our 64-bit plugins.

33.0.237 What is the difference between Timer and WebTimer?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Time is server side and WebTimer client side.
Notes: Timer is the normal timer class in Xojo. It runs on the server. On the side the WebTimer runs on the client. It triggers a request to the server to perform the action. So a WebTimer is good to keep the connection running and the website updated regularly. A timer on the server is good to make regular jobs like starting a database backup every 24 hours.

33.0.238 What is the list of Excel functions?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a list of function names known by LibXL.
Notes: LibXL parses the functions and writes tokens to the excel file. So even if Excel can do more functions, we can only accept the ones known by LibXL.

ABS, ABSREF, ACOS, ACOSH, ACTIVE.CELL, ADD.BAR, ADD.COMMAND, ADD.MENU, ADD.TOOLBAR, ADDRESS, AND, APP.TITLE, AREAS, ARGUMENT, ASC, ASIN, ASINH, ATAN, ATAN2, ATANH, AVEDEV, AVERAGE, AVERAGEA, BAHTTEXT, BETADIST, BETAINV, BINOMDIST, BREAK, CALL, CALLER, CANCEL.KEY, CEILING, CELL, CHAR, CHECK.COMMAND, CHIDIST, CHIINV, CHITEST, CHOOSE, CLEAN, CODE, COLUMN, COLUMNS, COMBIN, CONCATENATE, CONFIDENCE, CORREL, COS, COSH, COUNT, COUNTA, COUNTBLANK, COUNTIF, COVAR, CREATE.OBJECT, CRITBINOM, CUSTOM.REPEAT, CUSTOM.UNDO, DATE, DATEDIF, DATESTRING, DATEVALUE, DAVERAGE, DAY, DAYS360, DB, DBCS, DCOUNT, DCOUNTA, DDB, DEGREES, DELETE.BAR, DELETE.COMMAND, DELETE.MENU, DELETE.TOOLBAR, DEREF, DEVSQ, DGET, DIALOG.BOX, DIRECTORY, DMAX, DMIN, DOCUMENTS, DOLLAR, DPRODUCT, DSTDEV, DSTDEVP, DSUM, DVAR, DVARP, ECHO, ELSE, ELSE.IF, ENABLE.COMMAND, ENABLE.TOOL, END.IF, ERROR, ERROR.TYPE, EVALUATE, EVEN, EXACT, EXEC, EXECUTE, EXP, EXPONDIST, FACT, FALSE, FCLOSE, FDIST, FILES, FIND, FINDB, FINV, FISHER, FISHERINV, FIXED, FLOOR, FOPEN, FOR, FOR.CELL, FORECAST,

FORMULA.CONVERT, FPOS, FREAD, FREADLN, FREQUENCY, FSIZE, FTEST, FV, FWRITE, FWRITELN, GAMMADIST, GAMMAINV, GAMMALN, GEOMEAN, GET.BAR, GET.CELL, GET.CHART.ITEM, GET.DEF, GET.DOCUMENT, GET.FORMULA, GET.LINK.INFO, GET.MOVIE, GET.NAME, GET.NOTE, GET.OBJECT, GET.PIVOT.FIELD, GET.PIVOT.ITEM, GET.PIVOT.TABLE, GET.TOOL, GET.TOOLBAR, GET.WINDOW, GET.WORKBOOK, GET.WORKSPACE, GETPIVOTDATA, GOTO, GROUP, GROWTH, HALT, HARMEAN, HELP, HLOOKUP, HOUR, HYPERLINK, HYPGEOMDIST, IF, INDEX, INDIRECT, INFO, INITIATE, INPUT, INT, INTERCEPT, IPMT, IRR, ISBLANK, ISERR, ISERROR, ISLOGICAL, ISNA, ISNONTEXT, ISNUMBER, ISPMT, ISREF, ISTEXT, ISTHAIDIGIT, KURT, LARGE, LAST.ERROR, LEFT, LEFTB, LEN, LENB, LINEST, LINKS, LN, LOG, LOG10, LOGEST, LOGINV, LOGNORMDIST, LOOKUP, LOWER, MATCH, MAX, MAXA, MDETERM, MEDIAN, MID, MIDB, MIN, MINA, MINUTE, MINVERSE, MIRR, MMULT, MOD, MODE, MONTH, MOVIE.COMMAND, N, NA, NAMES, NEGBINOMDIST, NEXT, NORMDIST, NORMINV, NORMSDIST, NORMSINV, NOT, NOTE, NOW, NPER, NPV, NUMBERSTRING, ODD, OFFSET, OPEN.DIALOG, OPTIONS.LISTS.GET, OR, PAUSE, PEARSON, PERCENTILE, PERCENTRANK, PERMUT, PHONETIC, PI, PIVOT.ADD.DATA, PMT, POISSON, POKE, POWER, PPMT, PRESS.TOOL, PROB, PRODUCT, PROPER, PV, QUARTILE, RADIANS, RAND, RANK, RATE, REFTEXT, REGISTER, REGISTER.ID, RELREF, RENAME.COMMAND, REPLACE, REPLACEB, REPT, REQUEST, RESET.TOOLBAR, RESTART, RESULT, RESUME, RETURN, RIGHT, RIGHTB, ROMAN, ROUND, ROUNDBAHTDOWN, ROUNDBAHTUP, ROUNDDOWN, ROUNDUP, ROW, ROWS, RSQ, RTD, SAVE.DIALOG, SAVE.TOOLBAR, SCENARIO.GET, SEARCH, SEARCHB, SECOND, SELECTION, SERIES, SET.NAME, SET.VALUE, SHOW.BAR, SIGN, SIN, SINH, SKEW, SLN, SLOPE, SMALL, SPELLING.CHECK, SQRT, STANDARDIZE, STDEV, STDEVA, STDEVP, STDEVPA, STEP, STEYX, SUBSTITUTE, SUBTOTAL, SUM, SUMIF, SUMPRODUCT, SUMSQ, SUMX2MY2, SUMX2PY2, SUMXMY2, SYD, T, TAN, TANH, TDIST, TERMINATE, TEXT, TEXT.BOX, TEXTREF, THAIDAYOFWEEK, THAIDIGIT, THAIMONTHOFYEAR, THAINUMSOUND, THAINUMSTRING, THAISTRINGLENGTH, THAIYEAR, TIME, TIMEVALUE, TINV, TODAY, TRANSPOSE, TREND, TRIM, TRIMMEAN, TRUE, TRUNC, TTEST, TYPE, UNREGISTER, UPPER, USDOLLAR, USERDEFINED, VALUE, VAR, VARA, VARP, VARPA, VDB, VIEW.GET, VLOOKUP, VOLATILE, WEEKDAY, WEIBULL, WHILE, WINDOW.TITLE, WINDOWS, YEAR and ZTEST.

33.0.239 What is the replacement for PluginMBS?

Plugin Version: all, Platform: macOS.

Answer: Use the SoftDeclareMBS class to load libraries dynamically.

33.0.240 What to do on Xojo reporting a conflict?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

I get an error like ”This item conflicts with another item of the same name” when using one of the plugin functions.

Xojo just wants to tell you that you dropped something in the plugins folder what is not a plugin.
Notes:

Some users dropped the examples, the documentation or other files into the plugins folder. Don't do it.

33.0.241 What to do with a NSImageCacheException?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You need to add exception handlers for NSExceptionMBS in order to catch this exception.
Notes: You may also add code to write the stack of the exception into a log file for later locating the error source.

A NSImage has several image representations in memory. So basicly you pass in the base image and for whatever size an image is needed, the NSImage class will create a cache image representation of the requested size so on the next query it can use that cache for the same requested size.

33.0.242 What to do with MySQL Error 2014?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can get this error on MySQL if you have a recordset open while you create another one.

33.0.243 What to do with SQL Plugin reporting Malformed string as error?

Plugin Version: all, Platform: macOS.

Answer: Please make sure the table and/or database fields have a text encoding set.
Notes: For Firebird our plugin tries to use UTF-8 encoding if possible and to correctly convert between various tables, the tables and their fields need to have a text encoding defined.
e.g. if the text field in the table is windows-1252 and the other ISO 8859-5, then the Firebird database can convert them to UTF-8 and deliver texts to the plugin.
If encoding is set to none, it may get confused for non-ascii text.

33.0.244 Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetActiveDisplayList.

33.0.245 Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithPoint.

33.0.246 Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithRect.

33.0.247 Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetOnlineDisplayList.

33.0.248 Where is GetObjectClassNameMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use this replacement method:
Example:

```
Function GetObjectClassNameMBS(o as Object) As string
dim t as Introspection.TypeInfo = Introspection.GetType(o)
Return t.FullName
End Function
```

Notes: GetObjectClassNameMBS was removed from the plugins.

33.0.249 Where is NetworkAvailableMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We removed NetworkAvailableMBS some versions ago. It was not working right and basicly it's not useful. If you want to check whether you have a network, than do a DNS resolve:
Example:

```
// two independend domain names
const domain1 = "www.google.com"
const domain2 = "www.macsw.de"

// resolve IPs
dim ip1 as string = DNSNameToAddressMBS(Domain1)
dim ip2 as string = DNSNameToAddressMBS(Domain2)

// if we got IPs and not the same IPs (error/login pages)
if len(ip1)=0 or len(ip2)=0 or ip1=ip2 then
MsgBox "no connection"
else
MsgBox "have connection"
end if
```

Notes: This way you can detect whether you got something from DNS. And you can make sure that a DNS redirection to a login page won't catch you.

33.0.250 Where is StringHeight function in DynaPDF?

Plugin Version: all, Platform: Windows.

Answer: Use the function GetFTextHeight or GetFTextHeightEx.
Notes: Be aware that GetFTextHeight works with format commands and you may want to escape your text if you don't use them.

33.0.251 Where is XLSDocumentMBS class?

Plugin Version: all, Platform: macOS.

Answer: This class has been removed in favor of XLBookMBS class.
Notes: This classes have been removed XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

33.0.252 Where to get information about file formats?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Please visit this web page:
http://www.wotsit.org

33.0.253 Where to register creator code for my application?

Plugin Version: all, Platform: macOS.

Answer:

Register at Apple:
http://developer.apple.com/dev/cftype/information.html

33.0.254 Which Mac OS X frameworks are 64bit only?

Plugin Version: all, Platform: macOS.

Answer: Some frameworks from Mac OS X do not support 32 bit applications, so we can't provide plugins for Xojo until 64bit target is available.
Notes: For Mac OS X 10.8:

- Accounts
- EventKit
- GLKit
- Social

and in 10.9:

- Accounts
- AVKit
- EventKit
- GameController
- GLKit
- MapKit
- MediaLibrary
- Social
- SpriteKit

In general Apple makes all new frameworks being 64 bit only.

33.0.255 Which plugins are 64bit only?

Plugin Version: all, Platform: macOS.

Answer: Some of our plugins work only in 64 bit modes as operation systems do not provide 32 bit code.
Notes: This effects currently: EventKit, Accounts, Social frameworks from Apple and our matching plugins.

33.0.256 Why application doesn't launch because of a missing ddraw.dll!?

Plugin Version: all, Platform: Windows.

Answer: Some RB versions require that you install DirectX from Microsoft on your Windows.

33.0.257 Why application doesn't launch because of a missing shlwapi.dll!?

Plugin Version: all, Platform: Windows.

Answer: Some RB versions require that you install the Internet Explorer from Microsoft on your Windows.
Notes: This bug is for several older Windows 95 editions.

33.0.258 Why do I hear a beep on keydown?

Plugin Version: all, Platform: Windows.

Answer: When the user presses a key, RB goes through all keydown event handlers till on returns true.
Notes: If no keydown event handler returns true for the key, a beep is performed.

33.0.259 Why does folderitem.item return nil?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Because Xojo fails to make a folderitem for you. Reason may be an alias file which can't be resolved or simply that you don't have enough access rights to read the folder content.
Notes: A more rarely reason is that the directory changed and the file with the given index or name does no longer exist.

33.0.260 Why doesn't showurl work?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

There are three main reasons:

1. showurl is not supported by Xojo in 68k applications.
2. there is now application defined for the protocol (e.g. http) in the Internet Control panel.
3. You don't have Internet Config installed.

You can use the InternetConfigMBS class to check for this stuff.

33.0.261 Why don't the picture functions not work on Linux?

Plugin Version: all, Platform: macOS.

Answer: Please make sure libcairo is installed.
Notes: For accessing pictures on Linux, the MBS Plugin relays on the cairo library.
Please install the package if you don't have it already.
Our plugin looks for library called libcairo.so or libcairo.so.2.

33.0.262 Why have I no values in my chart?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You have no data points visible, there may be several reasons:
Notes: For example one of the data values may be infinite or invalid.
Or the scaling may be out of range, so you simply see nothing.

33.0.263 Will application size increase with using plugins?

Plugin Version: all, Platform: Windows.

Answer: All plugins used by your application will be included in the application.
Notes: If you use no plugins, your application will not change size.
And if you use one class from the plugins, your application size will increase by a few kilobytes.
The documentation of the plugins include a list of all plugin parts and their sizes for the different platforms.

33.0.264 XLS: Custom format string guidelines

Plugin Version: all, Platform: macOS.

Answer: You have to download the source code and compile a static version of the library.
Notes: Up to four sections of format codes can be specified. The format codes, separated by semicolons, define the formats for positive numbers, negative numbers, zero values, and text, in that order. If only two sections are specified, the first is used for positive numbers and zeros, and the second is used for negative numbers. If only one section is specified, it is used for all numbers. Four sections example:

#,###.00_); [Red] (#,###.00);0.00;"sales "@

The following table describes the different symbols that are available for use in custom number formats.

Specify colors

To set the text color for a section of the format, type the name of one of the following eight colors in square brackets in the section. The color code must be the first item in the section.

Instead of using the name of the color, the color index can be used, like this [Color3] for Red. Valid numeric indexes for color range from 1 to 56, which reference by index to the legacy color palette.
Specify conditions

To set number formats that will be applied only if a number meets a specified condition, enclose the condition in square brackets. The condition consists of a comparison operator and a value. Comparison operators include: = Equal to; >Greater than; <Less than; >= Greater than or equal to, <= Less than or equal to, and <>Not equal to. For example, the following format displays numbers that are less than or equal to 100 in a red font and numbers that are greater than 100 in a blue font.
[Red] [<=100] ; [Blue] [>100]
If the cell value does not meet any of the criteria, then pound signs ("#") are displayed across the width of the cell.
Dates and times

Examples

33.0.265 Xojo doesn't work with your plugins on Windows 98.

Plugin Version: all, Platform: Windows.

Answer: Please upgrade your Windows version.

33.0.266 Xojo or my RB application itself crashes on launch on Mac OS Classic. Why?

Plugin Version: all.

Answer:

You may check if the application has enough memory to be loaded.
RB should have on Mac OS Classic more than 20 MB of RAM.
I prefered to use 50 MB and for an application a 10 MB partition is a good way to start.

Parameter	Description
x	The x value of the data point. For an enumerated x-axis (see Axis.setLabels on what is an enumerated axis), the first data point is 0, and the nth data point is (n-1).
xLabel	The bottom x-axis label of the data point.
x2Label	The top x-axis label of the data point.
value	The value of the data point.
accValue	The sum of values of all data points that are in the same x position and same data group as the current data point, and with data set number less than or equal to the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
totalValue	The sum of values of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
percent	The percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
accPercent	The accumulated percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
gpercent	The percentage of the data point based on the total value of all data points in a layer.
dataSet	The data set number to which the data point belongs. The first data set is 0. The nth data set is (n-1).
dataSetName	The name of the data set to which the data point belongs.
dataItem	The data point number within the data set. The first data point is 0. The nth data point is (n-1).
dataGroup	The data group number to which the data point belongs. The first data group is 0. The nth data group is (n-1).
dataGroupName	The name of the data group to which the data point belongs.
layerId	The layer number to which the data point belongs. The first layer is 0. The nth layer is (n-1).
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using Layer.addExtraField, Layer.addExtraField2, BaseChart.addExtraField or BaseChart.addExtraField2.

diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by data set number. The Pth data set corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth data set corresponds to the Pth element of the (N + Q)th extra field.

Parameter	Description
zx	The symbol scale in the x dimension. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.
zy	The symbol scale in the y dimension. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.
z	The symbol scale without distinguishing the dimension to use. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.

Parameter	Description
slope	The slope of the trend line.
intercept	The y-intercept of the trend line.
corr	The correlation coefficient in linear regression analysis.
stderr	The standard error in linear regression analysis.

Parameter	Description
top	The value of the top edge of the box-whisker symbol.
bottom	The value of the bottom edge of the box-whisker symbol.
max	The value of the maximum mark of the box-whisker symbol.
min	The value of the minimum mark of the box-whisker symbol.
med	The value of the median mark of the box-whisker symbol.

Parameter	Description
high	The high value.
low	The low value.
open	The open value.
close	The close value.

Parameter	Description
dir	The direction of the vector.
len	The length of the vector.

Parameter	Description
radius	The radial value of the data point.
value	Same as { radius } . See above.
angle	The angular value of the data point.
x	Same as { angle } . See above.
label	The angular label of the data point.
xLabel	Same as { label } . See above.
name	The name of the layer to which the data point belongs.
dataSetName	Same as { name } . See above.
i	The data point number. The first data point is 0. The nth data point is (n-1).
dataItem	Same as { i } . See above.
z	The symbol scale. Applicable for layers with symbol scales set by PolarLayer.setSymbolScale.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using Layer.addExtraField, Layer.addExtraField2, BaseChart.addExtraField or BaseChart.addExtraField2.

diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by layer index. The Pth layer corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth layer corresponds to the Pth element of the (N + Q)th extra field.

Parameter	Description
dir	The direction of the vector.
len	The length of the vector.

Parameter	Description
value	The axis value at the tick position.
label	The axis label at the tick position.

Parameter	Description
[param]	The name of the parameter
[a]	If this field a number, it specifies the number of decimal places (digits to the right of the decimal point).

[b] The thousand separator. Should be a non-alphanumeric character (not 0-9, A-Z, a-z). Use ' textasciitilde ' for no thousand separator. The default is ' textasciitilde ', which can be modified using BaseChart.setNumberFormat.

[c] The decimal point character. The default is '.', which can be modified using BaseChart.setNumberFormat.

[d] The negative sign character. Use ' textasciitilde ' for no negative sign character. The default is '-', which can be modified using BaseChart.setNumberFormat.

Parameter	Description
yyyy	The year in 4 digits (e.g. 2002)
yyy	The year showing only the least significant 3 digits (e.g. 002 for the year 2002)
yy	The year showing only the least significant 2 digits (e.g. 02 for the year 2002)
y	The year showing only the least significant 1 digits (e.g. 2 for the year 2002)
mmm	The month formatted as its name. The default is to use the first 3 characters of the english month name (Jan, Feb, Mar ...). The names can be configured using BaseChart.setMonthNames.
mm	The month formatted as 2 digits from 01 - 12, adding leading zero if necessary.
m	The month formatted using the minimum number of digits from 1 - 12.
MMM	The first 3 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
MM	The first 2 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
M	The first character of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
dd	The day of month formatted as 2 digits from 01 - 31, adding leading zero if necessary.
d	The day of month formatted using the minimum number of digits from 1 - 31.
w	The name of the day of week. The default is to use the first 3 characters of the english day of week name (Sun, Mon, Tue ...). The names can be configured using BaseChart.setWeekDayNames.
hh	The hour of day formatted as 2 digits, adding leading zero if necessary. The 2 digits will be 00 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
h	The hour of day formatted using the minimum number of digits. The digits will be 0 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
nn	The minute formatted as 2 digits from 00 - 59, adding leading zero if necessary.
n	The minute formatted using the minimum number of digits from 00 - 59.
ss	The second formatted as 2 digits from 00 - 59, adding leading zero if necessary.
s	The second formatted using the minimum number of digits from 00 - 59.
a	Display either 'am' or 'pm', depending on whether the time is in the morning or afternoon. The text 'am' and 'pm' can be modified using BaseChart.setAMPM.

Shape Id	Value	Description
SquareShape	1	Square shape. See (1, 1) above.
DiamondShape	2	Diamond shape. See (2, 1) above.
TriangleShape	3	Triangle shape pointing upwards. See (3, 1) above.
RightTriangleShape	4	Triangle shape pointing rightwards. See (4, 1) above.
LeftTriangleShape	5	Triangle shape pointing leftwards. See (5, 1) above.
InvertedTriangleShape	6	Triangle shape pointing downwards. See (1, 2) above.
CircleShape	7	Circle shape. See (2, 2) above.
StarShape	[Method]	Star shapes of various points. See (2, 3), (2, 4), (2, 5), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5) above for stars with 3 to 10 points.
PolygonShape	[Method]	Polygon shapes symmetrical about a vertical axis with a vertex at the top center position. See (4, 1), (4, 3), (4, 5), (5, 1) for polygons of 5 to 8 sides.
Polygon2Shape	[Method]	Polygon shapes symmetrical about a vertical axis but without any vertex at the top center position. See (4, 2), (4, 4) for polygons of 5 and 6 sides.
CrossShape	[Method]	'+' shapes. See (5, 2), (5, 3), (5, 4), (5, 5), (6, 1), (6, 2), (6. 3) for '+' shape with arm width of 0.1 - 0.7.
Cross2Shape	[Method]	'X' shapes. See (6, 4), (6, 5), (7, 1), (7, 2), (7, 3), (7, 4), (7, 5) for 'X' shapes with arm width of 0.1 - 0.7.

langEnglish	0	Roman script
langFrench	1	Roman script
langGerman	2	Roman script
langItalian	3	Roman script
langDutch	4	Roman script
langSwedish	5	Roman script
langSpanish	6	Roman script
langDanish	7	Roman script
langPortuguese	8	Roman script
langNorwegian	9	Roman script
langHebrew	10	Hebrew script
langJapanese	11	Japanese script
langArabic	12	Arabic script
langFinnish	13	Roman script
langGreek	14	Greek script using smRoman script code
langIcelandic	15	modified smRoman/Icelandic script
langMaltese	16	Roman script
langTurkish	17	modified smRoman/Turkish script
langCroatian	18	modified smRoman/Croatian script
langTradChinese	19	Chinese (Mandarin) in traditional characters
langUrdu	20	Arabic script
langHindi	21	Devanagari script
langThai	22	Thai script
langKorean	23	Korean script

Nan	Meaning
1	Invalid square root (negative number, usually)
2	Invalid addition (indeterminate such as infinity + (-infinity))
4	Invalid division (indeterminate such as 0/0)
8	Invalid multiplication (indeterminate such as 0*infinity)
9	Invalid modulo such as (a mod 0)
17	Try to convert invalid string to a number like val(”x7”)
33	Invalid argument in a trig function
34	Invalid argument in an inverse trig function
36	Invalid argument in a log function
37	Invalid argument in Pow function
38	Invalid argument in toolbox financial function
40	Invalid argument in hyperbolic function
42	Invalid argument in a gamma function

Symbol	Description and result
0	Digit placeholder. For example, if the value 8.9 is to be displayed as 8.90, use the format #.00
#	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall not display extra zeros when the number typed has fewer digits on either side of the decimal than there are # symbols in the format. For example, if the custom format is #.##, and 8.9 is in the cell, the number 8.9 is displayed.
?	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall put a space for insignificant zeros on either side of the decimal point so that decimal points are aligned in the column. For example, the custom format 0.0? aligns the decimal points for the numbers 8.9 and 88.99 in a column.
. (period)	Decimal point.
%	Percentage. If the cell contains a number between 0 and 1, and the custom format 0% is used, the application shall multiply the number by 100 and adds the percentage symbol in the cell.
, (comma)	Thousands separator. The application shall separate thousands by commas if the format contains a comma that is enclosed by number signs (#) or by zeros. A comma that follows a placeholder scales the number by one thousand. For example, if the format is #.0,, and the cell value is 12,200,000 then the number 12.2 is displayed.
E- E+ e- e+	Scientific format. The application shall display a number to the right of the "E" symbol that corresponds to the number of places that the decimal point was moved. For example, if the format is 0.00E+00, and the value 12,200,000 is in the cell, the number 1.22E+07 is displayed. If the number format is #0.0E+0, then the number 12.2E+6 is displayed.
$ -+/():space	Displays the symbol. If it is desired to display a character that differs from one of these symbols, precede the character with a backslash (\). Alternatively, enclose the character in quotation marks. For example, if the number format is (000), and the value 12 is in the cell, the number (012) is displayed.
\	Display the next character in the format. The application shall not display the backslash. For example, if the number format is 0\!, and the value 3 is in the cell, the value 3! is displayed.
*	Repeat the next character in the format enough times to fill the column to its current width. There shall not be more than one asterisk in one section of the format. If more than one asterisk appears in one section of the format, all but the last asterisk shall be ignored. For example, if the number format is 0*x, and the value 3 is in the cell, the value 3xxxxxx is displayed. The number of x characters that are displayed in the cell varies based on the width of the column.
_ (underline)	Skip the width of the next character. This is useful for lining up negative and positive values in different cells of the same column. For example, the number format _(0.0_);(0.0) aligns the numbers 2.3 and -4.5 in the column even though the negative number is enclosed by parentheses.
"text"	Display whatever text is inside the quotation marks. For example, the format 0.00 "dollars" displays 1.23 dollars when the value 1.23 is in the cell.
@	Text placeholder. If text is typed in the cell, the text from the cell is placed in the format where the at symbol (@) appears. For example, if the number format is "Bob "@" Smith" (including quotation marks), and the value "John" is in the cell, the value Bob John Smith is displayed.

[Black] [Green] [White] [Blue] [Magenta] [Yellow] [Cyan] [Red]

To display	As	Use this code
Months	1-12	m
Months	01-12	mm
Months	Jan-Dec	mmm
Months	January-December	mmmm
Months	J-D	mmmmm
Days	1-31	d
Days	01-31	dd
Days	Sun-Sat	ddd
Days	Sunday-Saturday	dddd
Years	00-99	yy
Years	1900-9999	yyyy
Hours	0-23	h
Hours	00-23	hh
Minutes	0-59	m
Minutes	00-59	mm
Seconds	0-59	s
Seconds	00-59	ss
Time	4 AM	h AM/PM
Time	4:36 PM	h:mm AM/PM
Time	4:36:03 P	h:mm:ss A/P
Time	4:36:03.75	h:mm:ss.00
Elapsed time	1:02	[h] :mm
Elapsed time	62:16	[mm] :ss
Elapsed time	3735.80	[ss] .00

To display	As	Use this code
1234.59	1234.6	####.#
8.9	8.900	#.000
.631	0.6	0.#
12	12.0	#.0#
1234.568	1234.57	#.0#
44.398	44.398	???.???
102.65	102.65	???.???
2.8	2.8	???.???
5.25	5 1/4	# ??/??
5.3	5 3/10	# ??/??
12000	12,000	#,###
12000	12	#,
12400000	12.4	0.0„