

MBS MountainLion Plugin Documentation

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0.1 Introduction

This is the PDF version of the documentation for the Xojo (Real Studio) Plug-in from Monkeybread Software Germany. Plugin part: MBS MountainLion Plugin

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Chapter 3

Collaboration

3.1 class CBGroupIdentityMBS

3.1.1 class CBGroupIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 CBIIdentityAuthorityMBS = CBIIdentityAuthorityMBS.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 CBIIdentityMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

3.1.2 Methods

3.1.3 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

3.1.4 copy as CBGroupIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of the object.

3.1.5 groupIdentityWithPosixGID(groupId as Integer, authority as CBIentityAuthorityMBS) as CBGroupIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the group identity with the given POSIX GID in the specified identity authority.

Example:

```
// get staff group
dim a as CBIentityAuthorityMBS = CBIentityAuthorityMBS.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.

3.1.6 members as CBIentityMBS()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of CBIentity objects each representing a member of the group identity.

Example:

```
// get staff group
dim a as CBIIdentityAuthorityMBS = CBIIdentityAuthorityMBS.localIdentityAuthority
dim i as CBGroupIdentityMBS = CBGroupIdentityMBS.groupIdentityWithPosixGID(20,a)

MsgBox i.fullName

dim members() as CBIIdentityMBS = i.members
for each m as CBIIdentityMBS 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.

3.1.7 posixGID as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.2 class CBIIdentityAuthorityMBS

3.2.1 class CBIIdentityAuthorityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An identity authority is a database that stores information about identities.

Notes:

The CBIIdentityAuthority class defines one or more identity authorities. This database can be searched for identities in conjunction with the CBIIdentity class factory methods.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

3.2.2 Methods

3.2.3 Available as Boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this class is available.

Example:

```
if CBIIdentityAuthorityMBS.Available then
  MsgBox "CBIIdentityAuthorityMBS class is available"
else
  MsgBox "CBIIdentityAuthorityMBS class is not available"
end if
```

Notes: Returns true on Mac OS X 10.5 and newer.

3.2.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

3.2.5 CSIdentityAuthority as Variant

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.2.6 `defaultIdentityAuthority` as `CBIdentityAuthorityMBS`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.2.7 `identityAuthorityWithCSIdentityAuthority(CSIdentityAuthority as Variant)` as `CBIdentityMBS`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.2.8 `localIdentityAuthority` as `CBIdentityAuthorityMBS`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.2.9 `localizedName` as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.2.10 `managedIdentityAuthority` as `CBIdentityAuthorityMBS`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.2.11 Properties

3.2.12 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

3.3 class CBIIdentityMBS

3.3.1 class CBIIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A CBIIdentity 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 CBIIdentity object from one of the following class factory methods: `identityWithName`, `identityWithUUIDString`, `identityWithPersistentReference`, or `identityWithCSIdentity`.

There are two subclasses of CBIIdentity: `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.

3.3.2 Methods

3.3.3 aliases as string()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.3.4 authority as CBIIdentityAuthorityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the identity authority where the identity is stored.

3.3.5 Available as Boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this class is available.

Notes: Returns true on Mac OS X 10.5 and newer.

3.3.6 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

3.3.7 copy as CIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of the object.

3.3.8 CIdentity as Variant

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns an opaque object for use with the Core Services Identity API.

Notes:

This method, along with `identityWithCIdentity`, is used for interoperability with the Core Services Identity API.

Available in OS X v10.5 and later.

3.3.9 emailAddress as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the email address of an identity.

Notes: The email address of an identity or "" if none exists.

3.3.10 fullName as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the full name of the identity.

3.3.11 identityWithCSIdentity(CSIdentity as Variant) as CBIIdentityMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.3.12 identityWithName(name as string, authority as CBIIdentityAuthorityMBS) as CBUserIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 CBIIdentityAuthorityMBS = CBIIdentityAuthorityMBS.localIdentityAuthority
dim i as CBUserIdentityMBS = CBUserIdentityMBS.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.

3.3.13 identityWithPersistentReference(ref as Memoryblock) as CBUserIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.3.14 `identityWithUUIDString(uuid as string, authority as CBIIdentityAuthorityMBS) as CBUUserIdentityMBS`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.3.15 `image as NSImageMBS`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the image associated with an identity.

Notes: The image associated with an identity, or nil if none exists.

3.3.16 `isHidden as boolean`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.3.17 `isMemberOfGroup(g as CBGroupIdentityMBS) as boolean`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.3.18 persistentReference as MemoryBlock

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.3.19 posixName as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 @.

3.3.20 UUIDString as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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).

3.3.21 Properties

3.3.22 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

3.4 class CBIIdentityPickerMBS

3.4.1 class CBIIdentityPickerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A CBIIdentityPicker 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 CBIIdentityPickerMBS
c.Title = "Please choose your identity"

dim n as Integer = c.runModal
if n = c.NSOKButton then
for each i as CBIIdentityMBS 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.

3.4.2 Methods

3.4.3 Available as Boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this class is available.

Notes: Returns true on Mac OS X 10.5 and newer.

3.4.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

3.4.5 identities as CBIIdentityMBS()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns an array of the identities selected using the identity picker.

3.4.6 runModal as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.4.7 runModalForWindow(win as window)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

3.4.8 Properties

3.4.9 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

3.4.10 allowsMultipleSelection as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

3.4.11 title as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The title of the identity picker.

Example:

```
dim c as new CBIIdentityPickerMBS
c.Title = "Please choose your identity"
```

Notes: (Read and Write computed property)

3.4.12 Events

3.4.13 identityPickerDidEnd(returnCode as Integer)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when `runModalForWindow` finished.

Notes: ReturnCode is `NSOKButton` if the user selected OK; otherwise, `NSCancelButton`.

3.4.14 Constants

3.4.15 NSCancelButton = 0

Plugin Version: 12.3. **Function:** One of the result codes you may need with this class.

3.4.16 NSOKButton = 1

Plugin Version: 12.3. **Function:** One of the result codes you may need with this class.

3.5 class CBUserIdentityMBS

3.5.1 class CBUserIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 CBIIdentityMBS class.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

3.5.2 Methods

3.5.3 authenticateWithPassword(password as string) as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.5.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

3.5.5 copy as CBUserIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of the object.

3.5.6 isEnabled as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.5.7 posixUID as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.5.8 userIdentityWithPosixUID(userID as Integer, authority as CBIIdentityAuthorityMBS) as CBUserIdentityMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the user identity with the given POSIX UID in the specified identity authority.

Example:

```
// get first user
dim a as CBIIdentityAuthorityMBS = CBIIdentityAuthorityMBS.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.

Returns 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.

3.6 class CSIdentityAuthorityMBS

3.6.1 class CSIdentityAuthorityMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.6.2 Methods

3.6.3 Available as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the CSIdentityAuthority functions are available.

Example:

```
if not CSIdentityAuthorityMBS.Available then
MsgBox "not supported."
end if
```

3.6.4 Constructor

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

3.6.5 defaultIdentityAuthority as CSIdentityAuthorityMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.6.6 localIdentityAuthority as CSIdentityAuthorityMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the identity authority for identities defined on the local host.

Example:

```
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.localIdentityAuthority
MsgBox a.localizedName
```

3.6.7 localizedName as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the localized name of an identity authority.

Example:

```
dim a as CSIdentityAuthorityMBS = CSIdentityAuthorityMBS.localIdentityAuthority
MsgBox a.localizedName
```

3.6.8 managedIdentityAuthority as CSIdentityAuthorityMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.6.9 Properties

3.6.10 Handle as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

3.7 class CSIdentityMBS

3.7.1 class CSIdentityMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 identifier (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.

3.7.2 Methods

3.7.3 AddAlias(alias as string)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.4 AddMember(user as CSIdentityMBS)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.5 Aliases as string()

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.6 AuthenticateUsingPassword(password as string) as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Attempt to authenticate a password for a user identity.

Notes:

password: The password to authenticate

Returns true if the password is correct for the specified user.

Please call only on user identity.

3.7.7 Authority as CSIdentityAuthorityMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the identity authority of an identity.

Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox u.Authority.localizedName
```

3.7.8 Available as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the CSIdentity functions are available.

Example:

```
if not CSIdentityMBS.Available then
  MsgBox "not supported."
end if
```

3.7.9 Commit as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 3.7.10 Commit(byref error as Variant) as Boolean 50

3.7.10 Commit(byref error as Variant) as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 3.7.9 Commit as Boolean 50

3.7.11 Constructor(identityClass as Integer, fullName as string, posixName as string, flags as Integer, authority as CSIdentityAuthorityMBS)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 automatically 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.

3.7.12 copy as CSIdentityMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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
```

3.7.13 CurrentUser as CSIdentityMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries current user identity.

Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox u.fullName
```

3.7.14 Delete

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Permanently delete an identity from the identity database.

Notes: Sets an identity to deleted state. This change must be committed.

3.7.15 GroupMembershipQuery as CSIdentityQueryMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.16 IdentityClass as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns an identity's class.

Example:

```
dim u as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox str(u.IdentityClass) // shows 1 for user
```

3.7.17 ImageData as memoryblock

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.18 ImageDataType as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.19 IsCommitting as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Determine if a commit operation is in progress.

Notes: Returns true if a commit operation is in progress.

3.7.20 IsGroup as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Checks if identity class is group.

Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox str(c.IsUser)+" "+str(c.IsGroup)
```

3.7.21 IsHidden as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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

3.7.22 IsMemberOfGroup(group as CSIdentityMBS) as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Check if an identity is a member 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

3.7.23 IsUser as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Checks if identity class is user.

Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox str(c.IsUser)+" "+str(c.IsGroup)
```

3.7.24 kCSIIdentityGeneratePosixName as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A special string for posix names to use to auto generate the posix name.

3.7.25 PersistentReference as memoryblock

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Create an opaque, persistent data reference to an identity.

Example:

```
// get a reference
dim u as CSIIdentityMBS = CSIIdentityMBS.CurrentUser
dim p as MemoryBlock = u.PersistentReference
u = nil

// and search back later:
dim q as CSIIdentityQueryMBS = CSIIdentityQueryMBS.CreateForPersistentReference(p)
if q.Execute then
dim r() as CSIIdentityMBS = 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.).

3.7.26 PosixID as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Retrieve POSIX ID of an identity.

Example:

```
dim c as CSIIdentityMBS = CSIIdentityMBS.CurrentUser
MsgBox str(c.PosixID)
```

Notes: Returns an identity's POSIX identifier (a UID or GID).

3.7.27 PosixName as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.28 RemoveAlias(alias as string)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.29 RemoveClient

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.30 RemoveMember(user as CSIdentityMBS)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.31 SetEmailAddress(email as string = "")

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.32 SetFullName(name as string)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.33 SetImageData(data as memoryblock = nil, datatype as string = "public.jpeg")

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 identifier (UTI) of the image data. Currently, kUTTypeJPEG ("public.jpeg") is the only type supported.
This change must be committed.

3.7.34 SetImageURL(URL as string)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.35 SetIsEnabled(value as boolean)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.7.36 SetPassword(password as string)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Set a user password.

Notes:

Please call only on user identities.

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.

3.7.37 UUID as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns an identity's UUID as string.

Example:

```
dim c as CSIdentityMBS = CSIdentityMBS.CurrentUser
MsgBox c.UUID
```

3.7.38 Properties**3.7.39 Handle as Integer**

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

3.7.40 EmailAddress as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 computed property)

3.7.41 FullName as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 computed property)

3.7.42 ImageURL as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 nil if there is no image URL.
(Read and Write computed property)

3.7.43 IsEnabled as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 computed property)

3.7.44 Constants

3.7.45 kCSIdentityClassGroup = 2

Plugin Version: 13.0. **Function:** One of the class constants.

Notes: The class value for group identities.

3.7.46 kCSIdentityClassUser = 1

Plugin Version: 13.0. **Function:** One of the class constants.

Notes: The class value for user identities.

3.7.47 kCSIdentityFlagHidden = -1

Plugin Version: 13.0. **Function:** One of the flags for identity creation.

Notes: 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.

3.7.48 kCSIdentityFlagNone = 0

Plugin Version: 13.0. **Function:** One of the flags for identity creation.

Notes: Use this flag to set no optional attributes for a new identity.

3.8 class CSIdentityQueryMBS

3.8.1 class CSIdentityQueryMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 identities 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.

3.8.2 Methods

3.8.3 Available as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the CSIdentityQuery functions are available.

Example:

```
if not CSIdentityQueryMBS.Available then
  MsgBox "not supported."
end if
```

3.8.4 Constructor

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

3.8.5 Create(identityClass as Integer, authority as CSIdentityAuthorityMBS) as CSIdentityQueryMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.8.6 CreateForCurrentUser as CSIdentityQueryMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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

```

3.8.7 CreateForName(name as string, comparisonMethod as Integer, identityClass as Integer, authority as CSIdentityAuthorityMBS) as CSIdentityQueryMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 comparison 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.

3.8.8 CreateForPersistentReference(data as memoryblock) as CSIdentityQueryMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.8.9 CreateForPosixID(posixID as Integer, identityClass as Integer, authority as CSIdentityAuthorityMBS) as CSIdentityQueryMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.kCSIdentityClassUser, 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

3.8.10 CreateForUUID(uuid as string, authority as CSIdentityAuthorityMBS) as CSIdentityQueryMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

3.8.11 Execute(flags as Integer = 0) as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 3.8.12 Execute(flags as Integer, byref error as Variant) as Boolean

3.8.12 Execute(flags as Integer, byref error as Variant) as Boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 3.8.11 Execute(flags as Integer = 0) as Boolean

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3.8.13 Results as CSIdentityMBS()

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Retrieve the results of executing an identity query.

3.8.14 Stop

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 a query will no longer be used, prior to releasing the final query reference.

3.8.15 Properties

3.8.16 Handle as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

3.8.17 Constants

3.8.18 kCSIdentityQueryGenerateUpdateEvents = 1

Plugin Version: 13.0. **Function:** Execution options for an identity query.

Notes: After the initial query phase is complete, monitor the result set for live updates.

3.8.19 kCSIdentityQueryIncludeHiddenIdentities = 2

Plugin Version: 13.0. **Function:** Execution options for an identity query.

Notes: Include all matching identities in the result set, including hidden "system" users and groups (root, www, etc.).

3.8.20 kCSIdentityQueryStringBeginsWith = 2

Plugin Version: 13.0. **Function:** Options for querying the database by name.

Notes:

The identity name must begin with the search string.

When searching for identities by name, this value specifies the string comparison function.

3.8.21 kCSIdentityQueryStringEquals = 1

Plugin Version: 13.0. **Function:** Options for querying the database by name.

Notes:

The identity name must equal the search string.

When searching for identities by name, this value specifies the string comparison function.

Chapter 4

GameKit

4.1 class GameKitMBS

4.1.1 class GameKitMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 Real Studio 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.

4.1.2 Methods

4.1.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.1.4 GKErrorDomain as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The Game Kit framework error domain.

Notes: For NSErrorMBS.

4.1.5 showBannerWithTitle(title as string, message as string, duration as Double, tag as Variant)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.NotificationBannerCompleted event.

See also:

- 4.1.6 showBannerWithTitle(title as string, message as string, tag as Variant)

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4.1.6 showBannerWithTitle(title as string, message as string, tag as Variant)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.NotificationBannerCompleted` event.

See also:

- 4.1.5 `showBannerWithTitle(title as string, message as string, duration as Double, tag as Variant)` 72

4.1.7 Events

4.1.8 `acceptInviteCompleted(match as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)`

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.9 `achievementViewControllerDidFinish(viewController as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.10 `addPlayersToMatchCompleted(MatchMaker as GKMatchmakerMBS, match as GKMatchMBS, matchRequest as GKMatchRequestMBS, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.11 `authenticateCompleted(localPlayer as GKLocalPlayerMBS, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.12 `authenticateHandler(LocalPlayer as GKLocalPlayerMBS, viewController as NSViewControllerMBS, error as NSErrorMBS, tag as Variant, viewControllerHandle as Integer)`

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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, the `GKLocalPlayer` 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.

4.1.13 challengesViewControllerDidFinish(viewController as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The challengesViewController did finish.

Notes:

Called by GKChallengesViewControllerMBS if needed.
Available on Mac OS X 10.8.2 and newer.

4.1.14 chooseBestHostPlayerCompleted(match as GKMatchMBS, playerID as string, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.15 declineInviteCompleted(match as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.16 `didRequestMatchWithOtherPlayers(players() as GKPlayerMBS)`

Plugin Version: 15.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Initiates a match from Game Center with the requested players. (required)

Notes:

`player`: The GKPlayer object containing the current players 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.

4.1.17 `endMatchInTurnWithMatchDataCompleted(match as GKTurnBasedMatchMBS, matchData as Dictionary, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.18 `endTurnWithNextParticipant(match as GKTurnBasedMatchMBS, nextParticipant as GKTurnBasedParticipantMBS, matchData as Dictionary, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.19 `endTurnWithNextParticipantsCompleted(match as GKTurnBasedMatchMBS, nextParticipants() as GKTurnBasedParticipantMBS, timeout as Double, matchData as Dictionary, error as NSErrorMBS, tag as Variant)`

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.20 findMatchForRequestCompleted(MatchMaker as GKMatchmakerMBS, request as GKMatchRequestMBS, match as GKMatchMBS, TurnBasedMatch as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.21 findPlayersForHostedMatchRequestCompleted(MatchMaker as GKMatchmakerMBS, request as GKMatchRequestMBS, playerIDs() as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.22 `friendRequestComposeViewControllerDidFinish(viewController as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The compose view has finished.

Notes: viewController: The GKFriendRequestComposeViewControllerMBS object.

4.1.23 `gameCenterViewControllerDidFinish(gameCenterViewController as Variant)`

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when gameCenterViewController did finish.

Notes: Available on Mac OS X 10.8.2 and newer.

4.1.24 `handleInviteFromGameCenter(playersToInvite() as string)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.25 `handleMatchEnded(match as GKTurnBasedMatchMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.26 `handleTurnEventForMatch(match as GKTurnBasedMatchMBS, didBecomeActive as boolean)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.27 `Invited(MatchMaker as GKMatchmakerMBS, acceptedInvite as GKInviteMBS, playersToInvite() as string)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.28 `inviteeResponseHandler(MatchRequest as GKMatchRequestMBS, PlayerID as string, response as Integer, tag as Variant)`

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.29 `leaderboardViewControllerDidFinish(viewController as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The leaderboard view has finished.

Notes: viewController: The GKLeaderboardViewControllerMBS object.

4.1.30 `loadAchievementDescriptionsCompleted(achievements() as GKAchievementDescriptionMBS, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.31 `loadAchievementsCompleted(achievements() as GKAchievementMBS, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.32 `loadCategoriesCompleted(categories() as string, titles() as string, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.33 loadDefaultLeaderboardCategoryIDCompleted(LocalPlayer as GKLocalPlayerMBS, categoryID as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.34 loadFriendPlayersCompleted(localPlayer as GKLocalPlayerMBS, friendPlayers() as GKPlayerMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 15.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.35 loadFriendsCompleted(localPlayer as GKLocalPlayerMBS, friends() as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.36 loadImageCompleted(description as GKAchievementDescriptionMBS, image as NSImageMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.37 loadLeaderboardsCompleted(Leaderboards() as GKLeaderboardMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Leaderboards have been loaded.

Notes: Available on Mac OS X 10.8.2 and newer.

4.1.38 loadMatchDataCompleted(match as GKTurnBasedMatchMBS, matchData as Dictionary, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.39 loadMatchesCompleted(matches() as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.40 loadMatchWithIDCompleted(TurnBasedMatch as GKTurnBasedMatchMBS, matchID as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.41 loadPhotoForSizeCompleted(player as GKPlayerMBS, size as Integer, photo as NSImageMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.42 `loadPlayersForIdentifiersCompleted(identifiers() as string, players() as GKPlayerMBS, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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`.

4.1.43 `loadReceivedChallengesCompleted(challenges() as GKChallengeMBS, error as NSErrorMBS, tag as Variant)`

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.44 `loadScoresCompleted(Leaderboard as GKLeaderboardMBS, scores() as GKScoreMBS, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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`.

4.1.45 localPlayerDidCompleteChallenge(challenge as GKChallengeMBS)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.46 localPlayerDidReceiveChallenge(challenge as GKChallengeMBS)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.47 localPlayerDidSelectChallenge(challenge as GKChallengeMBS)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.48 matchConnectionWithPlayerFailed(match as GKMatchMBS, playerID as string, error as NSErrorMBS)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.49 `matchDidChangeState(match as GKMatchMBS, playerID as string, state as Integer)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.50 `matchDidFailWithError(match as GKMatchMBS, error as NSErrorMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.51 `matchDidReceiveData(match as GKMatchMBS, data as Dictionary, playerId as string)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.52 matchEnded(player as GKPlayerMBS, match as GKTurnBasedMatchMBS)

Plugin Version: 15.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when the match has ended. (required)

Notes:

player: The GKPlayer object containing the current players information.

match: The GKTurnBasedMatch object containing the current game data.

Available in OS X v10.10 and later.

4.1.53 matchForInviteCompleted(Matchmaker as GKMatchmakerMBS, invite as GKInviteMBS, match as GKMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.54 matchmakerViewControllerDidFailWithError(viewController as Variant, error as NSErrorMBS)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.55 matchmakerViewControllerDidFindMatch(viewController as Variant, match as GKMatchMBS)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.56 `matchmakerViewControllerDidFindPlayers(viewController as Variant, playerIDs() as string)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.57 `matchmakerViewControllerDidReceiveAcceptFromHostedPlayer(viewController as Variant, playerID as string)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.58 matchmakerViewControllerWasCancelled(viewController as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when the user cancels the matchmaking request (required)

Notes: viewController: The view controller that received the cancellation. (GKMatchmakerViewControllerMBS)

4.1.59 matchShouldReinvitePlayer(match as GKMatchMBS, playerID as string) as boolean

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.60 NotificationBannerCompleted(title as string, message as string, duration as Double, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.61 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, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.62 `participantQuitOutOfTurnWithOutcomeCompleted(match as GKTurnBasedMatchMBS, matchOutcome as Integer, error as NSErrorMBS, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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`.

4.1.63 `PlayerAuthenticationDidChange(player as GKPlayerMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Player's authentication changed.

4.1.64 `playerChanged(player as GKPlayerMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The player changed.

4.1.65 `playerStateUpdate(playerID as string, state as Integer, tag as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.66 queryActivityCompleted(MatchMaker as GKMatchmakerMBS, activity as Integer, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.67 queryPlayerGroupActivityCompleted(MatchMaker as GKMatchmakerMBS, playerGroup as Integer, activity as Integer, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.68 receivedTurnEventForMatch(player as GKPlayerMBS, match as GKTurnBasedMatchMBS, didBecomeActive as boolean)

Plugin Version: 15.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Activates the players turn. (required)

Notes:

This method is called when the it becomes the players 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.

4.1.69 `recipientResponseHandler`(`MatchRequest` as `GKMatchRequestMBS`, `Player` as `GKPlayerMBS`, `response` as `Integer`, `tag` as `Variant`)

Plugin Version: 15.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.70 `rematchCompleted`(`TurnMatch` as `GKTurnBasedMatchMBS`, `match` as `GKMatchMBS`, `error` as `NSErrorMBS`, `tag` as `Variant`)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.71 `remotePlayerDidCompleteChallenge`(`challenge` as `GKChallengeMBS`)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.72 removeCompleted(match as GKTurnBasedMatchMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.73 reportAchievementCompleted(score as GKAchievementMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.74 reportAchievementsCompleted(achievements() as GKAchievementMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when GKAchievementMBS.reportAchievements completes.

Notes: Available on Mac OS X 10.8.2 and newer.

4.1.75 reportScoreCompleted(score as GKScoreMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.76 reportScoresCompleted(scores() as GKScoreMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.77 resetAchievementsCompleted(error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.78 saveCurrentTurnWithMatchDataCompleted(match as GKTurnBasedMatchMBS, matchData as Dictionary, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.79 selectChallengeablePlayerIDsCompleted(Achievement as GKAchievementMBS, playerIDs() as string, challengeablePlayerIDs() as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called by GKAchievementMBS.selectChallengeablePlayerIDs on completion

Notes: Available on Mac OS X 10.8.2 and newer.

4.1.80 setDefaultLeaderboardCategoryIDCompleted(LocalPlayer as GKLocalPlayerMBS, categoryID as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called by GKLocalPlayerMBS.setDefaultLeaderboardCategoryID when completed.

Notes: Available on Mac OS X 10.8.2 and newer.

4.1.81 setDefaultLeaderboardCompleted(categoryID as string, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.82 shouldShowBannerForLocallyCompletedChallenge(challenge as GKChallengeMBS) as boolean

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.83 shouldShowBannerForLocallyReceivedChallenge(challenge as GKChallengeMBS) as boolean

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.84 `shouldShowBannerForRemotelyCompletedChallenge(challenge as GKChallengeMBS)` as boolean

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.85 `startBrowsingForNearbyPlayersCompleted(Matchmaker as GKMatchmakerMBS, playerId as string, reachable as boolean, tag as Variant)`

Plugin Version: 13.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when `startBrowsingForNearbyPlayers` method found a player.

Notes: Available on Mac OS X 10.8.2 and newer.

4.1.86 `turnBasedMatchmakerViewControllerDidFailWithError(viewController as Variant, error as NSErrorMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.87 `turnBasedMatchmakerViewControllerDidFindMatch(viewController as Variant, match as GKTurnBasedMatchMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.88 `turnBasedMatchmakerViewControllerPlayerQuitForMatch(viewController as Variant, match as GKTurnBasedMatchMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.89 `turnBasedMatchmakerViewControllerWasCancelled(viewController as Variant)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

4.1.90 Constants

4.1.91 `GKErrorAuthenticationInProgress = 7`

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: The local player is currently authenticating.

4.1.92 `GKErrorCancelled = 2`

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: The requested operation was canceled.

4.1.93 `GKErrorChallengeInvalid = 19`

Plugin Version: 13.0. **Function:** One of the GameKit error constants.

Notes:

The challenge was invalid.

Available on Mac OS X 10.8.2 and newer.

4.1.94 `GKErrorCommunicationsFailure = 3`

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: An error occurred when communicating with Game Center.

4.1.95 `GKErrorGameUnrecognized = 15`

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: nGame Center does not recognize the application that made the request. Make sure the bundle identifier is set properly for the application.

4.1.96 `GKErrorInvalidCredentials = 5`

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: The operation failed because the player's user name or password or both are incorrect.

4.1.97 `GKErrorInvalidParameter = 17`

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes:

One or more of the parameters was incorrect.

For example, this error code may be returned if your application attempts to post a score and provides a category string that does not match a category you configured for your leaderboards on iTunes Connect.

4.1.98 GKErrorInvalidPlayer = 8

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: A player object or identifier is invalid.

4.1.99 GKErrorMatchRequestInvalid = 13

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: The match request's properties are impossible to fulfill. For example, the minimum number of players cannot be larger than the maximum number of players.

4.1.100 GKErrorNotAuthenticated = 6

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: The local player has not been authenticated.

4.1.101 GKErrorNotSupported = 16

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: The device does not support Game Center.

4.1.102 GKErrorOffline = 25

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes:

The user went offline.

In Mac OS X 10.8.2 and newer this constant has value 25. In older versions it has value 19.

4.1.103 GKErrorParentalControlsBlocked = 10

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: The feature has been blocked by the user.

4.1.104 GKErrorScoreNotSet = 9

Plugin Version: 12.3. **Function:** One of the GameKit error constants.

Notes: A score value was not set before attempting to post the score.

4.1.105 GKErrorTurnBasedInvalidParticipant = 22

Plugin Version: 13.0. **Function:** One of the GameKit error constants.

Notes:

One of the participant objects you provided was invalid.
Available on Mac OS X 10.8.2 and newer.

4.1.106 GKErrorTurnBasedInvalidState = 24

Plugin Version: 13.0. **Function:** One of the GameKit error constants.

Notes:

The requested operation could not be completed because the session is in an invalid state.
Available on Mac OS X 10.8.2 and newer.

4.1.107 GKErrorTurnBasedInvalidTurn = 23

Plugin Version: 13.0. **Function:** One of the GameKit error constants.

Notes:

The requested operation could not be completed because the specified participant does not have the required turn state.
Available on Mac OS X 10.8.2 and newer.

4.1.108 GKErrorTurnBasedMatchDataTooLarge = 20

Plugin Version: 13.0. **Function:** One of the GameKit error constants.

Notes:

Your game submitted data that exceeded the maximum size that Game Center permits for a turn-based game.
Available on Mac OS X 10.8.2 and newer.

4.1.109 GKErrorTurnBasedTooManySessions = 21

Plugin Version: 13.0. **Function:** One of the GameKit error constants.

Notes:

The requested operation could not be completed because it would exceed the maximum number of sessions.
Available on Mac OS X 10.8.2 and newer.

4.1.110 GKErrorUnderage = 14

Plugin Version: 12.3. **Function:** One of the GameKit error constants.
Notes: The feature is disabled because the local player is underage.

4.1.111 GKErrorUnexpectedConnection = 18

Plugin Version: 12.3. **Function:** One of the GameKit error constants.
Notes: An unexpected player has connected to a match.

4.1.112 GKErrorUnknown = 1

Plugin Version: 12.3. **Function:** One of the GameKit error constants.
Notes: An unexpected error occurred.

4.1.113 GKErrorUserDenied = 4

Plugin Version: 12.3. **Function:** One of the GameKit error constants.
Notes: The operation was denied by the user.

4.1.114 GKInviteeResponseAccepted = 0

Plugin Version: 13.0. **Function:** One of the possible responses from an invitation to a remote player.
Notes:

The player accepted the invitation.
Available on Mac OS X 10.8.2 and newer.

4.1.115 GKInviteeResponseDeclined = 1

Plugin Version: 13.0. **Function:** One of the possible responses from an invitation to a remote player.
Notes:

The player rejected the invitation.
Available on Mac OS X 10.8.2 and newer.

4.1.116 GKInviteeResponseFailed = 2

Plugin Version: 13.0. **Function:** One of the possible responses from an invitation to a remote player.
Notes:

The invitation was unable to be delivered.
Available on Mac OS X 10.8.2 and newer.

4.1.117 GKInviteeResponseIncompatible = 3

Plugin Version: 13.0. **Function:** One of the possible responses from an invitation to a remote player.
Notes:

The invitee is not running a compatible version of your game.
Available on Mac OS X 10.8.2 and newer.

4.1.118 GKInviteeResponseNoAnswer = 5

Plugin Version: 13.0. **Function:** One of the possible responses from an invitation to a remote player.
Notes:

The invitation timed out without an answer.
Available on Mac OS X 10.8.2 and newer.

4.1.119 GKInviteeResponseUnableToConnect = 4

Plugin Version: 13.0. **Function:** One of the possible responses from an invitation to a remote player.
Notes:

The invitee could not be contacted.
Available on Mac OS X 10.8.2 and newer.

4.1.120 GKInviteRecipientResponseAccepted = 0

Plugin Version: 15.0. **Function:** One of the possible responses from an invitation to a remote player.
Notes:

The player accepted the invitation.
Available in OS X v10.10 and later.

4.1.121 GKInviteRecipientResponseDeclined = 1

Plugin Version: 15.0. **Function:** One of the possible responses from an invitation to a remote player.

Notes:

The player rejected the invitation.
Available in OS X v10.10 and later.

4.1.122 GKInviteRecipientResponseFailed = 2

Plugin Version: 15.0. **Function:** One of the possible responses from an invitation to a remote player.

Notes:

The invitation was unable to be delivered.
Available in OS X v10.10 and later.

4.1.123 GKInviteRecipientResponseIncompatible = 3

Plugin Version: 15.0. **Function:** One of the possible responses from an invitation to a remote player.

Notes:

The invitee is not running a compatible version of your game.
Available in OS X v10.10 and later.

4.1.124 GKInviteRecipientResponseNoAnswer = 5

Plugin Version: 15.0. **Function:** One of the possible responses from an invitation to a remote player.

Notes:

The invitation timed out without an answer.
Available in OS X v10.10 and later.

4.1.125 GKInviteRecipientResponseUnableToConnect = 4

Plugin Version: 15.0. **Function:** One of the possible responses from an invitation to a remote player.

Notes:

The invitee could not be contacted.
Available in OS X v10.10 and later.

4.2 class GKAchievementChallengeMBS

4.2.1 class GKAchievementChallengeMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.2.2 Methods

4.2.3 achievement as GKAchievementMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The achievement the player must complete.

Notes: (read-only)

4.2.4 Constructor

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

4.3 class GKAchievementDescriptionMBS

4.3.1 class GKAchievementDescriptionMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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/
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

4.3.2 Methods

4.3.3 achievedDescription as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A localized description of the completed achievement. (read-only)

4.3.4 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.3.5 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

4.3.6 groupIdentifier as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The group identifier for the achievement, if one exists.

Notes: Available on Mac OS X 10.8.2 and newer.

4.3.7 identifier as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.3.8 image as NSImageMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.3.9 incompleteAchievementImage as NSImageMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A common image for incomplete achievements.

4.3.10 isHidden as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.3.11 isReplayable as boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.3.12 loadAchievementDescriptions(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.3.13 loadImage(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.3.14 maximumPoints as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The number of points earned by completing this achievement. (read-only)

4.3.15 placeholderCompletedAchievementImage as NSImageMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.3.16 title as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A localized title for the achievement. (read-only)

4.3.17 unachievedDescription as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A localized description of the achievement, to be used when the achievement has not been completed. (read-only)

4.3.18 Properties

4.3.19 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.4 class GKAchievementMBS

4.4.1 class GKAchievementMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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

4.4.2 Methods

4.4.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.4.4 Constructor(identifier as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.4.5 isCompleted as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.4.6 isHidden as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.4.7 issueChallengeToPlayers(playerIDs() as string, message as string)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.4.8 lastReportedDate as date

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.4.9 loadAchievements(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.4.10 reportAchievement(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.4.11 `reportAchievements(achievements())` as `GKAchievementMBS`, tag as `Variant = nil`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 invoked. 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.

4.4.12 resetAchievements(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.4.13 selectChallengeablePlayerIDs(playerIDs() as string, tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.4.14 Properties

4.4.15 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.4.16 identifier as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.4.17 percentComplete as Double

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.4.18 showsCompletionBanner as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.5 class GKAchievementViewControllerMBS

4.5.1 class GKAchievementViewControllerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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/Referen
Subclass of the NSViewControllerMBS class.

4.5.2 Methods

4.5.3 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.6 class GKChallengeMBS

4.6.1 class GKChallengeMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.6.2 Methods

4.6.3 Available as boolean

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this class is available.

Notes: Returns true on Mac OS X 10.8.2 and newer.

4.6.4 completionDate as date

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.6.5 Constructor

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.6.6 decline

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.6.7 issueDate as date

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The date the challenge was issued. (read-only).

Notes: Available on Mac OS X 10.8.2 and newer.

4.6.8 issuingPlayerID as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The player identifier for the player who issued the challenge. (read-only).

Notes: Available on Mac OS X 10.8.2 and newer.

4.6.9 loadReceivedChallenges(tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.6.10 message as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A text message that describes the challenge. (read-only).

Notes: Available on Mac OS X 10.8.2 and newer.

4.6.11 receivingPlayerID as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The player identifier for the player who received the challenge. (read-only).

Notes: Available on Mac OS X 10.8.2 and newer.

4.6.12 state as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current state of the challenge. (read-only).

Notes:

See GKChallengeState* constants.

Available on Mac OS X 10.8.2 and newer.

4.6.13 Properties

4.6.14 Handle as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes:

Available on Mac OS X 10.8.2 and newer.
(Read and Write property)

4.6.15 Constants

4.6.16 GKChallengeStateCompleted = 2

Plugin Version: 13.0. **Function:** Possible states that a challenge can live in.

Notes:

The receiving player successfully completed the challenge.
Available on Mac OS X 10.8.2 and newer.

4.6.17 GKChallengeStateDeclined = 3

Plugin Version: 13.0. **Function:** Possible states that a challenge can live in.

Notes:

The receiving player declined the challenge.
Available on Mac OS X 10.8.2 and newer.

4.6.18 GKChallengeStateInvalid = 0

Plugin Version: 13.0. **Function:** Possible states that a challenge can live in.

Notes:

An error occurred. The state of this challenge is not valid.
Available on Mac OS X 10.8.2 and newer.

4.6.19 GKChallengeStatePending = 1

Plugin Version: 13.0. **Function:** Possible states that a challenge can live in.

Notes:

The challenge has been issued, but is not yet completed nor declined.
Available on Mac OS X 10.8.2 and newer.

4.7 class GKChallengesViewControllerMBS

4.7.1 class GKChallengesViewControllerMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.7.2 Methods

4.7.3 Constructor

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.8 class GKDialogControllerMBS

4.8.1 class GKDialogControllerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.8.2 Methods

4.8.3 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.8.4 dismiss

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Dismisses the currently displayed view controller.

4.8.5 parentWindow as NSWindowMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.8.6 presentViewController(GKViewController as NSViewControllerMBS) as boolean

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.8.7 setParentWindow(parentWindow as NSWindowMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the parent window.

See also:

- 4.8.8 setParentWindow(parentWindow as Window) 123

4.8.8 setParentWindow(parentWindow as Window)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Sets the parent window to the given Real Studio Window.

Notes: Should work fine in Cocoa, but may fail in Carbon.

See also:

- 4.8.7 setParentWindow(parentWindow as NSWindowMBS) 123

4.8.9 sharedDialogController as GKDialogControllerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.9 class GKFriendRequestComposeViewControllerMBS

4.9.1 class GKFriendRequestComposeViewControllerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.9.2 Methods

4.9.3 addRecipientsWithEmailAddresses(playerIDs() as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 `numberOfRecipients` recipients, these methods will throw an exception.

4.9.4 addRecipientsWithPlayerIDs(playerIDs() as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 `numberOfRecipients` recipients, these methods will throw an exception.

4.9.5 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.9.6 `maxNumberOfRecipients` as `UInt64`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Get the maximum number of recipients permitted.

4.9.7 `setMessage(message as string)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Specify the message sent to the invitee. A default message will be used if you don't specify one.

4.10 class GKGameCenterViewControllerMBS

4.10.1 class GKGameCenterViewControllerMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.10.2 Methods

4.10.3 Constructor

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

Notes: Available on Mac OS X 10.8.2 and newer.

4.10.4 Properties

4.10.5 leaderboardCategory as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 leader-

board. 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)

4.10.6 `leaderboardTimeScope` as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.10.7 `viewState` as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.10.8 Constants

4.10.9 StateAchievements = 1

Plugin Version: 13.0. **Function:** Possible values for the viewState property.

Notes:

Indicates that the view controller presents achievements content.

Available on Mac OS X 10.8.2 and newer.

4.10.10 StateChallenges = 2

Plugin Version: 13.0. **Function:** Possible values for the viewState property.

Notes:

Indicates that the view controller presents challenges content.

Available on Mac OS X 10.8.2 and newer.

4.10.11 StateDefault = -1

Plugin Version: 13.0. **Function:** Possible values for the viewState property.

Notes:

Indicates that the view controller should present the default screen.

Available on Mac OS X 10.8.2 and newer.

4.10.12 StateLeaderboards = 0

Plugin Version: 13.0. **Function:** Possible values for the viewState property.

Notes:

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.

4.11 class GKInviteMBS

4.11.1 class GKInviteMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.11.2 Methods

4.11.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.11.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.11.5 inviter as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The identifier for the player who invited the local user to join a match. (read-only)

4.11.6 isHosted as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.11.7 `playerAttributes` as `UInt32`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Player attributes from inviter's match request.

Notes: Available on Mac OS X 10.8.2 and newer.

4.11.8 `playerGroup` as `Integer`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Player group from inviter's match request.

Notes: Available on Mac OS X 10.8.2 and newer.

4.11.9 Properties

4.11.10 `Handle` as `Integer`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.12 class GKLeaderboardMBS

4.12.1 class GKLeaderboardMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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

4.12.2 Methods

4.12.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.12.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 4.12.5 Constructor(playerIDs() as string)

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4.12.5 Constructor(playerIDs() as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 4.12.4 Constructor

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4.12.6 `groupIdIdentifier` as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.12.7 `isLoading` as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.12.8 `loadCategories(tag as Variant = nil)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.12.9 `loadLeaderboards(tag as Variant = nil)`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Loads the leaderboards.

Notes:

Calls `GameKitMBS.loadLeaderboardsCompleted` later when completed.

Available on Mac OS X 10.8.2 and newer.

4.12.10 loadScores(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.12.11 localPlayerScore as GKScoreMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.12.12 maxRange as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.12.13 scores as GKScoreMBS()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.12.14 `setDefaultLeaderboard(categoryID as string, tag as Variant = nil)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.setDefaultLeaderboardCompleted` event.

If an error occurs and was a network error, your game should periodically resend the request until it completes.

4.12.15 `title as string`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.12.16 `Properties`

4.12.17 `Handle as Integer`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.12.18 `category as string`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.12.19 playerScope as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.12.20 range as NSRangeMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.12.21 timeScope as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.12.22 Constants

4.12.23 GKLeaderboardPlayerScopeFriendsOnly = 1

Plugin Version: 12.3. **Function:** One for the constants for the scope of players to be searched for scores.

Notes: Only friends of the local player should be considered when generating the list of scores.

4.12.24 GKLeaderboardPlayerScopeGlobal = 0

Plugin Version: 12.3. **Function:** One for the constants for the scope of players to be searched for scores.

Notes: All players on Game Center should be considered when generating the list of scores.

4.12.25 GKLeaderboardTimeScopeAllTime = 2

Plugin Version: 12.3. **Function:** One of the constants for period of time to which a player's best score is restricted.

Notes: Each player's best score is returned.

4.12.26 GKLeaderboardTimeScopeToday = 0

Plugin Version: 12.3. **Function:** One of the constants for period of time to which a player's best score is restricted.

Notes: Each player is restricted to scores recorded in the past 24 hours.

4.12.27 GKLeaderboardTimeScopeWeek = 1

Plugin Version: 12.3. **Function:** One of the constants for period of time to which a player's best score is restricted.

Notes: Each player is restricted to scores recorded in the past week.

4.13 class GKLeaderboardViewControllerMBS

4.13.1 class GKLeaderboardViewControllerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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/GKLeaderboardViewController_Ref/Reference/Reference.html

Subclass of the NSViewControllerMBS class.

4.13.2 Methods

4.13.3 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.13.4 Properties

4.13.5 category as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The category.

Notes: (Read and Write computed property)

4.13.6 timeScope as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The time scope.

Notes: (Read and Write computed property)

4.14 class GKLocalPlayerMBS

4.14.1 class GKLocalPlayerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.14.2 Methods

4.14.3 authenticate(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Prompts the player to confirm their identity.

Deprecated: This item is deprecated and should no longer be used. You can use SetAuthenticateHandler instead. **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.

4.14.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates new object pointing to the shared instance of the local player.

4.14.5 friends as string()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.14.6 GKPlayerAuthenticationDidChangeNotificationName as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The notification name fo the notification to inform about an authentication change.

Notes: Posted after the authenticated property of the shared local player object changes.

4.14.7 loadDefaultLeaderboardCategoryID(tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.14.8 `loadFriendPlayers(tag as Variant = nil)`

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Retrieves a list of player identifiers for the local players 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.

4.14.9 `loadFriends(tag as Variant = nil)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.14.10 `localPlayer as GKLocalPlayerMBS`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.14.11 SetAuthenticateHandler(tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.14.12 setDefaultLeaderboardCategoryID(categoryID as string, tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.14.13 Properties

4.14.14 isAuthenticated as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.14.15 `isUnderage` as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.15 class GKMatchmakerMBS

4.15.1 class GKMatchmakerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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

4.15.2 Methods

4.15.3 addPlayersToMatch(match as GKMatchMBS, matchRequest as GKMatchRequestMBS, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.15.4 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.15.5 cancel

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Cancels a pending matchmaking request.

Notes: The completion event receives a callback with a `GKErrorCancelled` error.

4.15.6 `cancelInviteToPlayer(playerID as string)`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Cancel a pending invitation to a player.

Notes: Available on Mac OS X 10.8.2 and newer.

4.15.7 **Constructor**

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.15.8 **Destructor**

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

4.15.9 `findMatchForRequest(request as GKMatchRequestMBS, tag as Variant = nil)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.15.10 `findPlayersForHostedMatchRequest(request as GKMatchRequestMBS, tag as Variant = nil)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.findPlayers-ForHostedMatchRequestCompleted` 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.

4.15.11 `finishMatchmakingForMatch(match as GKMatchMBS)`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Call this when finished with all programmatic P2P invites/matchmaking, for compatibility with connected players using `GKMatchmakerViewController`.

Notes: Available on Mac OS X 10.8.2 and newer.

4.15.12 `matchForInvite(invite as GKInviteMBS, tag as Variant = nil)`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.15.13 `maxPlayersAllowedForMatchOfType(type as Integer) as Integer`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** To determine the maximum allowed players for each type of match supported.

Notes: Available on Mac OS X 10.8.2 and newer.

4.15.14 queryActivity(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.15.15 queryPlayerGroupActivity(playerGroup as Integer, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.15.16 sharedMatchmaker as GKMatchmakerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the singleton matchmaker instance.

Notes: Games do not create a GKMatchmaker object. Instead, they retrieve the shared singleton by calling this method.

4.15.17 startBrowsingForNearbyPlayers(tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.15.18 stopBrowsingForNearbyPlayers

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Stop browsing for nearby players.

Notes: Available on Mac OS X 10.8.2 and newer.

4.15.19 Properties

4.15.20 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.15.21 Constants

4.15.22 GKMatchTypeHosted = 1

Plugin Version: 13.0. **Function:** One of the match types.

Notes:

Hosted Match

Available on Mac OS X 10.8.2 and newer.

4.15.23 GKMatchTypePeerToPeer = 0

Plugin Version: 13.0. **Function:** One of the match types.

Notes:

Peer to Peer Match.

Available on Mac OS X 10.8.2 and newer.

4.15.24 GKMatchTypeTurnBased = 2

Plugin Version: 13.0. **Function:** One of the match types.

Notes:

Turn based match.

Available on Mac OS X 10.8.2 and newer.

4.16 class GKMatchmakerViewControllerMBS

4.16.1 class GKMatchmakerViewControllerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.16.2 Methods

4.16.3 addPlayersToMatch(match as GKMatchMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.16.4 Constructor

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

See also:

- 4.16.5 Constructor(invite as GKInviteMBS)

- 4.16.6 Constructor(request as GKMatchRequestMBS) 150

4.16.5 Constructor(invite as GKInviteMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 4.16.4 Constructor 149
- 4.16.6 Constructor(request as GKMatchRequestMBS) 150

4.16.6 Constructor(request as GKMatchRequestMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 4.16.4 Constructor 149
- 4.16.5 Constructor(invite as GKInviteMBS) 150

4.16.7 matchRequest as GKMatchRequestMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The configuration for the desired match. (read-only)

4.16.8 setHostedPlayer(playerID as string, connected as boolean)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.16.9 Properties

4.16.10 DefaultInvitationMessage as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.16.11 Hosted as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 `matchmakerViewControllerDidFindPlayers` 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)

4.17 class GKMatchMBS

4.17.1 class GKMatchMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.17.2 Methods

4.17.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.17.4 chooseBestHostPlayer(tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.chooseBestHost-PlayerCompleted event.

4.17.5 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.17.6 disconnect

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.17.7 expectedPlayerCount as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.17.8 playerIDs as string()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.17.9 rematch(tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.17.10 `sendDataToAllPlayers(data as Dictionary, mode as Integer, byref error as NSErrorMBS)` as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.17.11 `sendDataToPlayers(players() as string, data as Dictionary, mode as Integer, byref error as NSErrorMBS)` as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.17.12 voiceChatWithName(name as string) as GKVoiceChatMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.17.13 Properties

4.17.14 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.17.15 Constants

4.17.16 GKMatchSendDataReliable = 0

Plugin Version: 12.3. **Function:** One of the mechanism constants used to transmit data to other players.

Notes:

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.

4.17.17 GKMatchSendDataUnreliable = 1

Plugin Version: 12.3. **Function:** One of the mechanism constants used to transmit data to other players.

Notes:

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.

4.17.18 GKPlayerStateConnected = 1

Plugin Version: 12.3. **Function:** One of the state constants.

Notes: Connected to the match.

4.17.19 GKPlayerStateDisconnected = 2

Plugin Version: 12.3. **Function:** One of the state constants.

Notes: Disconnected from the match.

4.17.20 GKPlayerStateUnknown = 0

Plugin Version: 12.3. **Function:** One of the state constants.

Notes: Initial player state.

4.18 class GKMatchRequestMBS

4.18.1 class GKMatchRequestMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.18.2 Methods

4.18.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.18.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.18.5 playersToInvite as string()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.18.6 recipients as GKPlayerMBS()

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 match-making 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.

4.18.7 SetInviteeResponseHandler(tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.18.8 setPlayersToInvite(playerIDs() as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.18.9 SetRecipientResponseHandler(tag as Variant = nil)

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.18.10 setRecipients(players()) as GKPlayerMBS

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 match-making 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.

4.18.11 Properties

4.18.12 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.18.13 defaultNumberOfPlayers as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 match-making 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)

4.18.14 inviteMessage as string

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.18.15 `maxPlayers` as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.18.16 `minPlayers` as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.18.17 `playerAttributes` as UInt32

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.18.18 playerGroup as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.19 class GKPlayerMBS

4.19.1 class GKPlayerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.19.2 Methods

4.19.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.19.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

4.19.5 GKPlayerDidChangeNotificationName as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of the notification posted when a player object's data changes.

Notes: Used internally for GameKitMBS.playerChanged event.

4.19.6 loadPhotoForSize(size as Integer, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.19.7 `loadPlayersForIdentifiers(identifiers() as string, tag as Variant = nil)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.19.8 Properties

4.19.9 `alias as string`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.19.10 `displayName as String`

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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's alias.

Available in Mac OS X 10.8 and newer.

(Read only property)

4.19.11 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.19.12 isFriend as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.19.13 playerID as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.19.14 Constants

4.19.15 GKPhotoSizeNormal = 1

Plugin Version: 12.3. **Function:** One of the size constants of a photo loaded by Game Center.

Notes: Load a normal sized photo.

4.19.16 GKPhotoSizeSmall = 0

Plugin Version: 12.3. **Function:** One of the size constants of a photo loaded by Game Center.

Notes: Load a small photo.

4.20 class GKScoreChallengeMBS

4.20.1 class GKScoreChallengeMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.20.2 Methods

4.20.3 Constructor

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.20.4 score as GKScoreMBS

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The score to beat. (read-only)

Notes: Available on Mac OS X 10.8.2 and newer.

4.21 class GKScoreMBS

4.21.1 class GKScoreMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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

4.21.2 Methods

4.21.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.21.4 Constructor(category as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.21.5 date as date

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.21.6 formattedValue as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.21.7 issueChallengeToPlayers(playerIDs() as string, message as string)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.21.8 playerID as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.21.9 rank as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.21.10 `reportScore(tag as Variant = nil)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.21.11 `reportScores(scores() as GKScoreMBS, tag as Variant = nil)`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.21.12 Properties

4.21.13 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.21.14 category as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.21.15 context as UInt64

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.21.16 shouldSetDefaultLeaderboard as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.21.17 value as Int64

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.22 class GKTurnBasedMatchmakerViewControllerMBS

4.22.1 class GKTurnBasedMatchmakerViewControllerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.22.2 Methods

4.22.3 Constructor

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

See also:

- 4.22.4 Constructor(request as GKMatchRequestMBS) 171

4.22.4 Constructor(request as GKMatchRequestMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes a new matchmaker view controller.

Notes: request: A match request with parameters for the match.

See also:

- 4.22.3 Constructor 171

4.22.5 Properties

4.22.6 showExistingMatches as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.23 class GKTurnBasedMatchMBS

4.23.1 class GKTurnBasedMatchMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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/Refer

4.23.2 Methods

4.23.3 acceptInvite(tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.4 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.23.5 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

4.23.6 `creationDate` as `date`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The date that the match was created. (read-only)

4.23.7 `currentParticipant` as `GKTurnBasedParticipantMBS`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.8 `declineInvite(tag as Variant = nil)`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.declineInvite-Completed` event.

Available on Mac OS X 10.8.2 and newer.

4.23.9 `endMatchInTurnWithMatchData(matchData as Dictionary, tag as Variant = nil)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.10 endTurnWithNextParticipant(nextParticipant as GKTurnBasedParticipantMBS, matchData as Dictionary, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.11 endTurnWithNextParticipants(nextParticipants() as GKTurnBasedParticipantMBS, timeout as Double, matchData as Dictionary, tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.12 findMatchForRequest(request as GKMatchRequestMBS, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.13 loadMatchData(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.14 loadMatches(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.15 loadMatchWithID(matchID as string, tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.16 matchData as Dictionary

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.17 matchDataMaximumSize as Integer

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.18 matchID as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.19 message as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.20 participantQuitInTurnWithOutcome(matchOutcome as Integer, nextParticipant as GKTurnBasedParticipantMBS, matchData as Dictionary, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 4.23.21 `participantQuitInTurnWithOutcome(matchOutcome as Integer, nextParticipants() as GKTurnBasedParticipantMBS, timeout as Double, matchData as Dictionary, tag as Variant = nil)` 179

4.23.21 `participantQuitInTurnWithOutcome(matchOutcome as Integer, nextParticipants() as GKTurnBasedParticipantMBS, timeout as Double, matchData as Dictionary, tag as Variant = nil)`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 4.23.20 `participantQuitInTurnWithOutcome(matchOutcome as Integer, nextParticipant as GKTurnBasedParticipantMBS, matchData as Dictionary, tag as Variant = nil)` 178

4.23.22 `participantQuitOutOfTurnWithOutcome(matchOutcome as Integer, tag as Variant = nil)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.23 `participants as GKTurnBasedParticipantMBS()`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.24 `rematch(tag as Variant = nil)`

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.25 remove(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.26 saveCurrentTurnWithMatchData(matchData as Dictionary, tag as Variant = nil)

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.27 `status` as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current state of the match. (read-only)

4.23.28 `TimeoutDefault` as Double

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.29 `TimeoutNone` as Double

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.23.30 Properties

4.23.31 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.23.32 Constants

4.23.33 GKTurnBasedMatchStatusEnded = 2

Plugin Version: 12.3. **Function:** One of the states a match can enter.

Notes: The match has been completed.

4.23.34 GKTurnBasedMatchStatusMatching = 3

Plugin Version: 12.3. **Function:** One of the states a match can enter.

Notes: The match is currently being played.

4.23.35 GKTurnBasedMatchStatusOpen = 1

Plugin Version: 12.3. **Function:** One of the states a match can enter.

Notes: Game Center is still searching for other players to join the match.

4.23.36 GKTurnBasedMatchStatusUnknown = 0

Plugin Version: 12.3. **Function:** One of the states a match can enter.

Notes: The match is in an unexpected state.

4.23.37 GKTurnBasedParticipantStatusActive = 4

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant has joined the match and is an active player in it.

4.23.38 GKTurnBasedParticipantStatusDeclined = 2

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant declined the invitation to join the match. When any participant declines an invitation to join a match, the match is automatically terminated.

4.23.39 GKTurnBasedParticipantStatusDone = 5

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant has exited the match. Your game sets the matchOutcome property to state why the participant left the match.

4.23.40 GKTurnBasedParticipantStatusInvited = 1

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant was invited to the match, but has not responded to the invitation.

4.23.41 GKTurnBasedParticipantStatusMatching = 3

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant is an unfilled position in the match that Game Center promises to fill when needed. When your game sets this participant as the current participant in the match, Game Center fills the position and updates the status and playerID properties.

4.23.42 GKTurnBasedParticipantStatusUnknown = 0

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant is in an unexpected state.

4.24 class GKTurnBasedParticipantMBS

4.24.1 class GKTurnBasedParticipantMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.24.2 Methods

4.24.3 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

4.24.4 Properties

4.24.5 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.24.6 lastTurnDate as date

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.24.7 matchOutcome as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.24.8 player as GKPlayerMBS

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.24.9 playerID as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.24.10 status as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.24.11 timeoutDate as date

Plugin Version: 13.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.24.12 Constants

4.24.13 GKTurnBasedMatchOutcomeCustomRange = & h00FF0000

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: A mask used to allow your game to provide its own custom outcome. Any custom value must fit inside the mask.

4.24.14 GKTurnBasedMatchOutcomeFirst = 6

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant finished first.

4.24.15 GKTurnBasedMatchOutcomeFourth = 9

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant finished fourth.

4.24.16 GKTurnBasedMatchOutcomeLost = 3

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant lost the match.

4.24.17 GKTurnBasedMatchOutcomeNone = 0

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant's outcome has not been set yet (typically because the match is still in progress).

4.24.18 GKTurnBasedMatchOutcomeQuit = 1

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant forfeited the match.

4.24.19 GKTurnBasedMatchOutcomeSecond = 7

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant finished second.

4.24.20 GKTurnBasedMatchOutcomeThird = 8

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant finished third.

4.24.21 GKTurnBasedMatchOutcomeTied = 4

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant tied the match.

4.24.22 GKTurnBasedMatchOutcomeTimeExpired = 5

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant was ejected from the match because he or she did not act in a timely fashion.

4.24.23 GKTurnBasedMatchOutcomeWon = 2

Plugin Version: 12.3. **Function:** One of the states the participant was in when they left the match.

Notes: The participant won the match.

4.24.24 GKTurnBasedParticipantStatusActive = 4

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant has joined the match and is an active player in it.

4.24.25 GKTurnBasedParticipantStatusDeclined = 2

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant declined the invitation to join the match. When any participant declines an invitation to join a match, the match is automatically terminated.

4.24.26 GKTurnBasedParticipantStatusDone = 5

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant has exited the match. Your game sets the matchOutcome property to state why the participant left the match.

4.24.27 GKTurnBasedParticipantStatusInvited = 1

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant was invited to the match, but has not responded to the invitation.

4.24.28 GKTurnBasedParticipantStatusMatching = 3

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant is an unfilled position in the match that Game Center promises to fill when needed. When your game sets this participant as the current participant in the match, Game Center fills the position and updates the status and playerID properties.

4.24.29 GKTurnBasedParticipantStatusUnknown = 0

Plugin Version: 12.3. **Function:** One of the states the participant is in during the match.

Notes: The participant is in an unexpected state.

4.25 class GKVoiceChatMBS

4.25.1 class GKVoiceChatMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.25.2 Methods

4.25.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** True if the class is available.

Notes: Should always be true on Mac OS X 10.8 and newer.

4.25.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor for a new voice chat.

4.25.5 enablePlayerStateUpdate(tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.25.6 isVoIPAllowed as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.25.7 name as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of the voice chat (read-only).

4.25.8 playerIDs as string()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of player identifiers for the players connected to the channel. (read-only)

4.25.9 setMute(mute as boolean, playerID as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.25.10 start

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.25.11 stop

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

4.25.12 Properties

4.25.13 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

4.25.14 active as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.25.15 volume as Double

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

4.25.16 Constants

4.25.17 GKVoiceChatPlayerConnected = 0

Plugin Version: 12.3. **Function:** One of the states returned to your game about other players in a voice chat.

Notes: A new player connected to the chat.

4.25.18 GKVoiceChatPlayerConnecting = 4

Plugin Version: 13.0. **Function:** One of the states returned to your game about other players in a voice chat.

Notes: A new player is connecting to the chat.

4.25.19 GKVoiceChatPlayerDisconnected = 1

Plugin Version: 12.3. **Function:** One of the states returned to your game about other players in a voice chat.

Notes: A player left the chat.

4.25.20 GKVoiceChatPlayerSilent = 3

Plugin Version: 12.3. **Function:** One of the states returned to your game about other players in a voice chat.

Notes: A player stopped speaking.

4.25.21 GKVoiceChatPlayerSpeaking = 2

Plugin Version: 12.3. **Function:** One of the states returned to your game about other players in a voice chat.

Notes: A player began speaking.

Chapter 5

Process

5.1 class NSXPCConnectionMBS

5.1.1 class NSXPCConnectionMBS

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The NSXPC-Connection 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.

5.1.2 Methods

5.1.3 Available as boolean

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this class is available.

5.1.4 CallMethod(name as string, tag as Variant, params() as Variant)

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Calls method and passes parameters.

Notes: Returns array of variant.

5.1.5 Close

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Closes the connection.

5.1.6 Constructor(endpoint as NSXPCListenerEndpointMBS)

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes an NSXPCCConnection 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:

- 5.1.7 Constructor(MachOSserviceName as string, flags as Integer) 196
- 5.1.8 Constructor(ServiceName as string) 197

5.1.7 Constructor(MachOSserviceName as string, flags as Integer)

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes an NSXPCCConnection 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 `~/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 NSXPCCConnectionPrivileged option.

Available in OS X v10.8 and later.

See also:

- 5.1.6 Constructor(endpoint as NSXPCListenerEndpointMBS) 196
- 5.1.8 Constructor(ServiceName as string) 197

5.1.8 Constructor(ServiceName as string)

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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:

- 5.1.6 Constructor(endpoint as NSXPCLISTENERENDPOINTMBS) 196
- 5.1.7 Constructor(MachOSERVICE_NAME as string, flags as Integer) 196

5.1.9 Destructor

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

5.1.10 invalidate

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

5.1.11 resume

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

5.1.12 suspend

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

5.1.13 Properties**5.1.14 auditSessionIdentifier as Integer**

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

5.1.15 effectiveGroupIdentifier as Integer

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

5.1.16 effectiveUserIdentifier as Integer

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

5.1.17 endpoint as NSXPCListenerEndpointMBS

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** If the connection was created with an NSXPCListenerEndpoint object, returns the endpoint object used.

Notes: (Read only property)

5.1.18 Handle as Integer

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

5.1.19 processIdentifier as Integer

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

5.1.20 serviceName as String

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of the XPC service that this connection was configured to connect to.

Notes: (Read only property)

5.1.21 Events

5.1.22 CallMethodReturned(name as string, tag as Variant, Parameters() as Variant, Results() as Variant)

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when method returns.

5.1.23 ErrorHandler(error as NSErrorMBS)

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The error event for errors happening when calling method.

5.1.24 InterruptionHandler

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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).

5.1.25 InvalidationHandler

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

5.1.26 Constants

5.1.27 NSXPCCConnectionPrivileged = 1

Plugin Version: 14.2. **Function:** One of the options that you can pass to a connection.

Notes:

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.

5.2 class NSXPCListenerEndpointMBS

5.2.1 class NSXPCListenerEndpointMBS

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Class that "names" a specific NSXPCListener object.

Notes:

An instance may be retrieved from an NSXPCListener and sent over existing NSXPConnections. A process may then use it to create a new NSXPConnection 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 NSXPInterface.

This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

5.2.2 Methods

5.2.3 Available as boolean

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this class is available.

5.2.4 Constructor

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

5.2.5 Properties

5.2.6 Handle as Integer

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

5.3 class NSXPCListenerMBS

5.3.1 class NSXPCListenerMBS

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 NSXPConnection object, then asks the delegate to inspect, configure, and resume the connection object by calling the delegate's shouldAcceptNewConnection event.

5.3.2 Methods

5.3.3 Available as boolean

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this class is available.

5.3.4 Close

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Closes listener.

5.3.5 Constructor(Anonymous as boolean = false)

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.html

See also:

- 5.3.6 Constructor(Name as string)

5.3.6 Constructor(Name as string)

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 `/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:

- 5.3.5 Constructor(Anonymous as boolean = false)

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5.3.7 Destructor

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

5.3.8 invalidate

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

5.3.9 resume

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

5.3.10 suspend

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

5.3.11 Properties

5.3.12 endpoint as NSXPCListenerEndpointMBS

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

5.3.13 Handle as Integer

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

5.3.14 Events

5.3.15 CallMethod(Name as string, Parameters() as Variant) as Variant()

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called on the listener side when a method was called on the connection.

Notes: Return array of variant for the results.

**5.3.16 shouldAcceptNewConnection(newConnection as NSXPConnectionMBS)
as boolean**

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 6

Social

6.1 class CustomNSSharingServiceMBS

6.1.1 class CustomNSSharingServiceMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.1.2 Methods

6.1.3 Constructor(title as string, image as NSImageMBS, alternateImage as NSImageMBS = nil, delegate as NSSharingServiceDelegateMBS = nil, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.1.4 Events

6.1.5 performCustomService(tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when user selected this service and you need to perform your work.

6.2 class NSSharingServiceDelegateMBS

6.2.1 class NSSharingServiceDelegateMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.2.2 Methods

6.2.3 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

6.2.4 Destructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

6.2.5 Properties

6.2.6 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

6.2.7 Events

6.2.8 didFailToShareItems(service as NSSharingServiceMBS, items as NSSharingServiceItemsMBS, error as NSErrorMBS)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.2.9 `didShareItems(service as NSSharingServiceMBS, items as NSSharingServiceItemsMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.2.10 `sourceFrameOnScreenForShareItem(service as NSSharingServiceMBS, item as Variant) as NSRectMBS`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.2.11 `sourceWindowForShareItems(service as NSSharingServiceMBS, items as NSSharingServiceItemsMBS, scope as Integer) as NSWindowMBS`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.2.12 `transitionImageForShareItem(service as NSSharingServiceMBS, item as Variant, contentRect as NSRectMBS) as NSImageMBS`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.2.13 `willShareItems(service as NSSharingServiceMBS, items as NSSharingServiceItemsMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.2.14 Constants

6.2.15 `NSSharingContentScopeFull = 2`

Plugin Version: 12.3. **Function:** One of the sharing scope constants to specify the nature of the things you are sharing.

Notes:

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.

6.2.16 NSSharingContentScopeItem = 0

Plugin Version: 12.3. **Function:** One of the sharing scope constants to specify the nature of the things you are sharing.

Notes:

Used when sharing a clearly identified item, for example, a file represented by its icon.
Available in OS X v10.8 and later.

6.2.17 NSSharingContentScopePartial = 1

Plugin Version: 12.3. **Function:** One of the sharing scope constants to specify the nature of the things you are sharing.

Notes:

Used when sharing a portion of a more global content, for example, part of a webpage.
Available in OS X v10.8 and later.

6.3 class NSSharingServiceItemsMBS

6.3.1 class NSSharingServiceItemsMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.3.2 Methods

6.3.3 AddAttributedString(AttributedString as NSAttributedStringMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds one attributed string to the collection.

See also:

- 6.3.4 AddAttributedString(AttributedString() as NSAttributedStringMBS) 213

6.3.4 AddAttributedString(AttributedString() as NSAttributedStringMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds attributed strings to the collection.

See also:

- 6.3.3 AddAttributedString(AttributedString as NSAttributedStringMBS) 213

6.3.5 AddFile(file as folderitem)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds one file to the collection.

6.3.6 AddFiles(files() as folderitem)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds an array of files to the collection.

6.3.7 AddImage(image as NSImageMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds one image to the collection.

6.3.8 AddImages(images() as NSImageMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds an array of images to the collection.

6.3.9 AddText(text as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds one text to the collection.

See also:

- 6.3.10 AddText(texts() as string) 214

6.3.10 AddText(texts() as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds an array of texts to the collection.

See also:

- 6.3.9 AddText(text as string) 214

6.3.11 AddURL(URL as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Add one URL to the collection.

See also:

- 6.3.12 AddURL(URLs() as string) 215

6.3.12 AddURL(URLs() as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds an array of URLs to the collection.

See also:

- 6.3.11 AddURL(URL as string)

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6.3.13 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

6.3.14 count as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the number of items in this collection.

6.3.15 Images as NSImageMBS()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns all images in the collection.

6.3.16 objectAtIndex(index as Integer) as Variant

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns object at the given index.

Notes:

Index is from 0 to count-1.

Returns URLs and files as string with URL.

6.3.17 Texts as string()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns array with all texts in this collection.

6.3.18 URLs as string()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns array with all URLs.

Notes: As files are also handled as URLs, the array contains also files in the collections as URLs.

6.3.19 Properties

6.3.20 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

6.4 class NSSharingServiceMBS

6.4.1 class NSSharingServiceMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.4.2 Methods

6.4.3 alternateImage as NSImageMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The alternate image representing the sharing service. (read-only)

Notes: Available in OS X v10.8 and later.

6.4.4 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether sharing services are available.

Notes: Returns true on Mac OS X 10.8.

6.4.5 canPerformWithItems(items as NSSharingServiceItemsMBS) as Boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.4.6 Close

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Closes the sharing services.

Notes: Same as destructor, but closes now, not later.

6.4.7 Constructor(name as string)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Create a sharing service instance representing the specified service name.

Notes: name: The service name. See NSSharingServiceName* methods.

6.4.8 Destructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

6.4.9 image as NSImageMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The primary image representing the sharing service. (read-only)

6.4.10 NSSharingServiceNameAddToAperture as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Adds the content to Aperture.

Available in OS X v10.8 and later.

6.4.11 NSSharingServiceNameAddToIPhoto as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Adds the content to iPhoto.
Available in OS X v10.8 and later.

6.4.12 NSSharingServiceNameAddToSafariReadingList as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Add the content to the Safari Reading List.
Available in OS X v10.8 and later.

6.4.13 NSSharingServiceNameComposeEmail as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Creates an email messages with the content.
Available in OS X v10.8 and later.

6.4.14 NSSharingServiceNameComposeMessage as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Creates a Messages methods with the content.
Available in OS X v10.8 and later.

6.4.15 NSSharingServiceNamePostImageOnFlickr as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Posts the image on Flickr.
Available in OS X v10.8 and later.

6.4.16 NSSharingServiceNamePostOnFacebook as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Post the content to Facebook.
Available in OS X v10.8 and later.

6.4.17 NSSharingServiceNamePostOnSinaWeibo as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.4.18 NSSharingServiceNamePostOnTwitter as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Posts the content on Twitter.
Available in OS X v10.8 and later.

6.4.19 NSSharingServiceNamePostVideoOnTudou as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.4.20 NSSharingServiceNamePostVideoOnVimeo as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.4.21 NSSharingServiceNamePostVideoOnYouku as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.4.22 NSSharingServiceNameSendViaAirDrop as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Sends the file via Air Drop.
Available in OS X v10.8 and later.

6.4.23 NSSharingServiceNameUseAsDesktopPicture as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.4.24 NSSharingServiceNameUseAsTwitterProfileImage as string

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** One of the sharing service names.

Notes:

Replaces the Twitter profile image with the content.
Available in OS X v10.8 and later.

6.4.25 performWithItems(items as NSSharingServiceItemsMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.4.26 SetDelegate(delegate as NSSharingServiceDelegateMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Specifies the delegate of the sharing service.

6.4.27 sharingServiceNamed(name as string) as NSSharingServiceMBS

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.4.28 sharingServicesForItems(items as NSSharingServiceItemsMBS) as NSSharingServiceMBS()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.4.29 title as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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

```

6.4.30 Properties

6.4.31 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

6.5 class NSSharingServicePickerMBS

6.5.1 class NSSharingServicePickerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.5.2 Methods

6.5.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether sharing services are available.

Notes: Returns true on Mac OS X 10.8.

6.5.4 Constructor(items as NSSharingServiceItemsMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes a new sharing service picker for the selected items.

Notes: Available in OS X v10.8 and later.

6.5.5 Destructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

6.5.6 showRelativeToRect(r as NSRectMBS, view as NSViewMBS, preferredEdge as Integer)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

6.5.7 Properties

6.5.8 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

6.5.9 Events

6.5.10 `delegateForSharingService(service as NSSharingServiceMBS) as NSSharingServiceDelegateMBS`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.5.11 `didChooseSharingService(service as NSSharingServiceMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.5.12 sharingServicesForItems(items as NSSharingServiceItemsMBS, proposedServices() as NSSharingServiceMBS) as NSSharingServiceMBS()

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

6.5.13 Constants

6.5.14 NSMaxXEdge = 2

Plugin Version: 12.3. **Function:** One of the Cocoa edge constants.

Notes: the maximum X edge. Typically right side.

6.5.15 NSMaxYEdge = 3

Plugin Version: 12.3. **Function:** One of the Cocoa edge constants.

Notes: The maximum Y edge. Typically the top edge of a window.

6.5.16 NSMinXEdge = 0

Plugin Version: 12.3. **Function:** One of the Cocoa edge constants.

Notes: the minimum X edge. Typically left side.

6.5.17 NSMinYEdge = 1

Plugin Version: 12.3. **Function:** One of the Cocoa edge constants.

Notes: Minimum Y. As coordinates are upside down in the Cocoa world, this is the bottom edge of a window.

Chapter 7

User Notifications

7.1 class `NSUserNotificationActionMBS`

7.1.1 class `NSUserNotificationActionMBS`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

7.1.2 Methods

7.1.3 Available as boolean

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this class is available.

Notes: Returns true on Mac OS X 10.10 or newer. False in all other cases.

7.1.4 Constructor(`identifier as string, title as string`)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

7.1.5 copy as `NSUserNotificationActionMBS`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of this object.

7.1.6 Properties

7.1.7 Handle as Integer

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

7.1.8 Identifier as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal identifier for this action.

Notes: (Read only property)

7.1.9 Title as String

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The localized title of the action.

Notes: (Read only property)

7.2 class NSUserNotificationCenterDelegateMBS

7.2.1 class NSUserNotificationCenterDelegateMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 Real Studio application runs on. Not for remote notifications or notifications to iOS devices.

7.2.2 Methods

7.2.3 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

Notes: Must be called to have the class register itself.

7.2.4 Destructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

7.2.5 Properties

7.2.6 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

7.2.7 Events

7.2.8 didActivateNotification(center as NSUserNotificationCenterMBS, notification as NSUserNotificationMBS)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

7.2.9 `didDeliverNotification(center as NSUserNotificationCenterMBS, notification as NSUserNotificationMBS)`

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

7.2.10 shouldPresentNotification(center as NSUserNotificationCenterMBS, notification as NSUserNotificationMBS) as boolean

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

7.3 class NSUserNotificationCenterMBS

7.3.1 class NSUserNotificationCenterMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The NSUserNotificationCenterMBS class delivers user notifications to the user from applications or helper applications.

Example:

```
dim u as new NSUserNotificationCenterMBS

u.Title = "Hello World"
u.subtitle = "from Real Studio."
u.informativeText = "Our first Notification from Real Studio."

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.

NSUserNotificationCenterMBS 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: If 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 Real Studio application runs on. Not for remote notifications or notifications to iOS devices.

The `NSUserNotificationCenterMBS` class and the `NSUserNotificationMBS` class are both thread safe.

7.3.2 Methods

7.3.3 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether user notification framework is available.

Notes: Returns true on Mac OS X 10.8 and false otherwise.

7.3.4 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

Notes:

Initializes this object to point to the default user notification center.

Available in OS X v10.8 and later.

7.3.5 defaultUserNotificationCenter as NSUserNotificationCenterMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the default user notification center.

Notes: Available in OS X v10.8 and later.

7.3.6 deliveredNotifications as NSUserNotificationMBS()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

7.3.7 `deliverNotification(notification as NSUserNotificationMBS)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

7.3.8 `removeAllDeliveredNotifications`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Remove all delivered user notifications from the user notification center.

Notes: Available in OS X v10.8 and later.

7.3.9 removeDeliveredNotification(notification as NSUserNotificationMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

7.3.10 removeScheduledNotification(notification as NSUserNotificationMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

7.3.11 scheduledNotifications as NSUserNotificationMBS()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

7.3.12 `scheduleNotification(notification as NSUserNotificationMBS)`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

7.3.13 Properties

7.3.14 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

7.4 class NSUserNotificationMBS

7.4.1 class NSUserNotificationMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 Real Studio."
u.informativeText = "Our first Notification from Real Studio."

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 Real Studio application runs on. Not for remote notifications or notifications to iOS devices.

7.4.2 Methods

7.4.3 `additionalActions` as `NSMutableArray`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 `NSMutableArray` objects that describe the different actions that can be taken on a notification in addition to the default action described by `actionButtonTitle`.

7.4.4 Available as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

7.4.5 Constructor

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor to create a new notification.

7.4.6 `copy` as `NSMutableArray`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a clone of the notification object.

7.4.7 `NSUserDefaultsDefaultSoundName` as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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.

7.4.8 Print

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Prints description of notification object to console for debugging.

7.4.9 setAdditionalActions(additionalActions() as NSUserNotificationActionMBS)

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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`.

7.4.10 Properties

7.4.11 `actionButtonTitle` as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Specifies the title of the action button displayed in the notification.

Notes:

This value should be 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)

7.4.12 `activationType` as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.13 `actualDeliveryDate` as `date`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.14 `additionalActivationAction` as `NSUserNotificationActionMBS`

Plugin Version: 14.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 `additionalActivationAction` property when passed into the delegate event `didActivateNotification`.

(Read only property)

7.4.15 `contentImage` as `NSImageMBS`

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Image shown in the content of the notification.

Notes: (Read and Write property)

7.4.16 `deliveryDate` as `date`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.17 `deliveryRepeatInterval` as `NSDateComponentsMBS`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.18 `deliveryTimeZone` as `NSTimeZoneMBS`

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.19 description as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Description of notification object for debugging.

Notes: (Read only property)

7.4.20 Handle as Integer

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

7.4.21 hasActionButton as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.22 hasReplyButton as boolean

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.23 `identifier` as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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 than display a new one.

Available in OS X 10.9 and newer.
(Read and Write property)

7.4.24 `informativeText` as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The body text of the notification.

Notes:

This value should be 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)

7.4.25 `otherButtonTitle` as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Specifies a custom title for the close button in an alert-style notification.

Notes:

This value should be 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)

7.4.26 Presented as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.27 remote as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.28 response as NSAttributedStringMBS

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.29 responsePlaceholder as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Optional placeholder for inline reply field.

Notes: (Read and Write property)

7.4.30 soundName as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Specifies the name of the sound to play when the notification is delivered.

Notes:

Passing the `NSNotificationDefaultSoundName` 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)

7.4.31 subtitle as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Specifies the subtitle of the notification.

Notes:

This value should be 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)

7.4.32 title as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Specifies the title of the notification.

Notes:

This value should be 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)

7.4.33 userInfo as dictionary

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **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)

7.4.34 Constants

7.4.35 `NSNotificationActivationTypeActionButtonClicked = 2`

Plugin Version: 12.3. **Function:** One of the activation type constants.

Notes:

The user clicked on the action button of the notification alert.

Available in OS X v10.8 and later.

7.4.36 `NSNotificationActivationTypeAdditionalActionClicked = 4`

Plugin Version: 14.3. **Function:** One of the activation type constants.

Notes:

User did select an additional action.

Only for Mac OS X 10.10 and newer.

7.4.37 `NSNotificationActivationTypeContentsClicked = 1`

Plugin Version: 12.3. **Function:** One of the activation type constants.

Notes:

The user clicked on the contents of the notification alert.

Available in OS X v10.8 and later.

7.4.38 `NSNotificationActivationTypeNone = 0`

Plugin Version: 12.3. **Function:** One of the activation type constants.

Notes:

The user did not interact with the notification alert.
Available in OS X v10.8 and later.

7.4.39 NSUserNotificationActivationTypeReplied = 3

Plugin Version: 13.5. **Function:** The activation type for a notification which got a reply.

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Chapter 9

The FAQ

9.0.1 Can anyone help me convert seconds to time in this format hh:mm:ss?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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)

9.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.NSCalibratedRGBColorSpace)
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:

- 9.0.3 How to catch delete key? 263
- 9.0.4 How to convert cmyk to rgb? 263
- 9.0.5 How to delete a folder? 265
- 9.0.6 How to detect if CPU if 64bit processor? 266
- 9.0.7 How to refresh a htmlviewer on Windows? 266

9.0.3 How to catch delete key?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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:

- 9.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 262
- 9.0.4 How to convert cmyk to rgb? 263
- 9.0.5 How to delete a folder? 265
- 9.0.6 How to detect if CPU if 64bit processor? 266
- 9.0.7 How to refresh a htmlviewer on Windows? 266

9.0.4 How to convert cmyk to rgb?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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:

- 9.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 262
- 9.0.3 How to catch delete key? 263
- 9.0.5 How to delete a folder? 265
- 9.0.6 How to detect if CPU is 64bit processor? 266
- 9.0.7 How to refresh a htmlviewer on Windows? 266

9.0.5 How to delete a folder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
else ' file
fo.Delete
end if
next
```

```
f.Delete
End Sub
```

See also:

- 9.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 262
- 9.0.3 How to catch delete key? 263
- 9.0.4 How to convert cmyk to rgb? 263
- 9.0.6 How to detect if CPU is 64bit processor? 266
- 9.0.7 How to refresh a htmlviewer on Windows? 266

9.0.6 How to detect if CPU is 64bit processor?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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:

- 9.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 262
- 9.0.3 How to catch delete key? 263
- 9.0.4 How to convert cmyk to rgb? 263
- 9.0.5 How to delete a folder? 265
- 9.0.7 How to refresh a htmlviewer on Windows? 266

9.0.7 How to refresh a htmlviewer on Windows?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can ask the browser to reload the website with this code line:

Example:

```
call htmlViewer1.IERunJavaScriptMBS("javascript:document.location.reload()")
```

See also:

- 9.0.2 How do I get the proper highlight color on Mac OS X for active/inactive selection? 262
- 9.0.3 How to catch delete key? 263
- 9.0.4 How to convert cmyk to rgb? 263
- 9.0.5 How to delete a folder? 265
- 9.0.6 How to detect if CPU is 64bit processor? 266

9.0.8 Is there an example for vector graphics in REALbasic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

```

9.0.9 Picture functions do not preserve resolution values?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.10 A toolbox call needs a rect - how do I give it one?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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
```

9.0.11 API client not supported?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.12 Can I access Access Database with Java classes?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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 library as string = Join(libjs, "")
dim vm as new JavaVMMBS(library)

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>

9.0.13 Can I create PDF from Real Studio Report using DynaPDF?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

9.0.14 Can I use AppleScripts in a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.15 Can I use graphics class with DynaPDF?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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](https://feedback.adobe.com/showreport?report_id=11391)

9.0.16 Can I use OGG with REALbasic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** There is a QuickTime plugin for OGG which works with REALbasic.

Notes: That should be a solution for playback and recording on Mac and Windows.

9.0.17 Can I use sockets on a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Yes, but they run on the server, not on the client.

Notes:

You can use HTTPSocket, SMTPSocket, POP3Socket, SMTPSecureSocket, SecurePOP3Socket, EasyTCP-Socket, 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.

9.0.18 Can I use your ChartDirector plugin on a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Yes, our ChartDirector plugin works just fine on the Real Studio 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(& hFFFFFFF)

// 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. Transferring 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.

9.0.19 Can I use your DynaPDF plugin on a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Yes, our DynaPDF plugin works just fine on the Real Studio 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 Real Studio Web Edition.
<http://www.monkeybreadsoftware.de/realbasic/webapps.shtml>

9.0.20 Can I use your plugin controls on a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** No.

9.0.21 Can you get an unique machine ID?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.22 ChartDirector: Alignment Specification

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

9.0.23 ChartDirector: Color Specification

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** ChartDirector: Color Specification

Notes:

Many functions in the ChartDirector API accept colors as parameters. ChartDirector supports colors 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 AAR-

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 <code>Axis.setTitlePos</code> for axis title positioning only. For a vertical axis, <code>TopLeft2</code> refers to the left of the top side, while <code>TopLeft</code> refers to the top of the left side. The reverse applies for a horizontal axis.
TopRight2	11	An alternative top-right position used in <code>Axis.setTitlePos</code> for axis title positioning only. For a vertical axis, <code>TopRight2</code> refers to the right of the top side, while <code>TopRight</code> refers to the top of the right side. The reverse applies for a horizontal axis.
BottomLeft2	12	An alternative bottom-left position used in <code>Axis.setTitlePos</code> for axis title positioning only. For a vertical axis, <code>BottomLeft2</code> refers to the left of the bottom side, while <code>BottomLeft</code> refers to the bottom of the left side. The reverse applies for a horizontal axis.
BottomRight2	13	An alternative bottom-right position used in <code>Axis.setTitlePos</code> for axis title positioning only. For a vertical axis, <code>BottomRight2</code> refers to the right of the bottom side, while <code>BottomRight</code> refers to the bottom of the right side. The reverse applies for a horizontal axis.

RGGBB, 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 at all. This is equivalent to traditional RGB colors. A non-zero alpha transparency means 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 look 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

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.

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.

ConstantDescription

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.

9.0.24 ChartDirector: Font Specification

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 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.

9.0.25 ChartDirector: Mark Up Language

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

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.

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".)

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.

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 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

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.

The value baseline means the baseline of sub-blocks should align with the baseline of the block. The baseline

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.

9.0.26 ChartDirector: Parameter Substitution and Formatting

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

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

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 <code>BaseChart.addExtraField</code> or <code>BaseChart.addExtraField2</code> .

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 "& amps;# nn;" (eg. ">" will become "& amps;# 62;"). 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.

9.0.27 ChartDirector: Shape Specification

Plugin Version: 8.2, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

9.0.28 Copy styled text?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.29 Do you have code to validate a credit card number?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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)

9.0.30 Do you have plugins for X-Rite EyeOne, eXact or i1Pro?

Plugin Version: all, Console & Web: No. **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. Then we can talk about the plugin.

9.0.31 Does SQL Plugin handle stored procedures with multiple result sets?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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. Then 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.

9.0.32 Does the plugin home home?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.33 folderitem.absolutePath is limited to 255 chars. How can I get longer ones?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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](#)

9.0.34 Future of editablemovie class?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** In short, it will go away, so switch to plugin functions soon.

Notes:

The editableMovie class has been deprecated.

Deprecated means that Real Software will remove it someday, but as of today (and probably a few more years) the class will be available and running. Just not forever. The reason is that Apple deprecated the old QuickTime APIs and they are not available for 64 bit.

For 64 bit, you can move to our QTKit plugin.

We expect the old QuickTime classes in Real Studio and our plugins will continue to work in 32 bit applications. Even if editableMovie class is removed next year from Real Studio, our plugin still provides movie class extensions to do similar functions.

9.0.35 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?

Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.36 How about Plugin support for older OS X?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.37 How can I detect whether an Intel CPU is a 64bit CPU?

Plugin Version: all, Console & Web: No. **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.

9.0.38 How can I disable the close box of a window on Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.39 How can I get all the environment variables from Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.40 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, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.41 How can I get text from a PDF?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.42 How can I get text from a Word Document?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.43 How can I get the item string for a given file creator?

Plugin Version: all, Console & Web: No. **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.

9.0.44 How can I launch an app using it's creator code?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

9.0.45 How can I learn what shared libraries are required by a plugin on Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.46 How can I validate an email address?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can try this code:

Example:

```

Dim re As RegEx
re = New RegEx

```

```
Dim rm As RegExMatch
```

```
re.SearchPattern = "[a-z0-9!#$%&'*/=?^_`{|}+](?:\.[a-z0-9!#$%&'*/=?^_`{|}+)*@(?:[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>

9.0.47 How do I check if the QuickTime component for the JPEG exporting is available?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** If you want to know if the PictureToString functions will work, you may try this function:

Example:

```
Function IsQTJPEGExporerAvailable() As boolean
```

```
dim q as QTComponentInformationMBS
```

```
// search for QuickTime JPEG exporter codec
q=new QTComponentInformationMBS
```

```
while q.NextComponent
if q.Type="imco" and q.SubType="jpeg" then
Return true
end if
wend
```

```
Return false // not found
End Function
```

Notes:

It should work like this for other types like:

```

"tiff" ->TIFF
"PNTG" ->Mac Paint
"gif " ->GIF
"WRLE" ->Windows BMP
"tga " ->Targa
"png " ->PNG
etc.

```

9.0.48 How do I check if the QuickTime component for the JPEG importing is available?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** If you want to know if the StringToPicture functions will work, you may try this function:

Example:

```

Function IsQTJPEGImporterAvailable() As boolean
dim q as QTComponentInformationMBS

```

```

// search for QuickTime JPEG importer codec
q=new QTComponentInformationMBS

```

```

while q.NextComponent
if q.Type="imdc" and q.SubType="jpeg" then
Return true
end if
wend

```

```

Return false // not found
End Function

```

Notes:

It should work like this for other types like:

```

"tiff" ->TIFF
"PNTG" ->Mac Paint
"gif " ->GIF
"WRLE" ->Windows BMP
"tga " ->Targa
"png " ->PNG
etc.

```

9.0.49 How do I check if the QuickTime component for the Sequence grabber is available?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** If you want to know if the QTGrabberClass will work, you can use this code:

Example:

```
Function IsQTGrabberAvailable() As boolean
dim q as QTComponentInformationMBS

q=new QTComponentInformationMBS

while q.NextComponent
if q.Type="barg" then
Return true
end if
wend

Return false // not found
End Function
```

Notes: Don't forget that you need to check for each other component you use like the compression functions.

9.0.50 How do I decode correctly an email subject?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.51 How do I enable/disable a single tab in a tabpanel?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.52 How do I find the root volume for a file?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

9.0.53 How do I get the current languages list?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.54 How do I get the Mac OS Version?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.55 How do I get the printer name?

Plugin Version: all, Console & Web: No. **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.

9.0.56 How do I make a metal window if RB does not allow me this?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.57 How do I make a smooth color transition?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.58 How do I read the applications in the dock app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.59 How do I truncate a file?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** In a `binarystream` you can set the `length` property to truncate.

9.0.60 How do update a Finder's windows after changing some files?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.61 How to access a USB device directly?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.62 How to add icon to file on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.63 How to ask the Mac for the Name of the Machine?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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).

9.0.64 How to automatically enable retina in my apps?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.65 How to avoid leaks with Cocoa functions?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 REALbasic 2009r4 the code above should not be needed as REALbasic runtime does automatically handle the NSAutoreleasePools for you. For older REALbasic versions you need to use code with a timer with the action event above to avoid memory leaks.

Please do not use REALbasic 2009r4 and newer with plugins before version 9.5. You can get crashes there which typically show a line with a objc_msgSend call.

9.0.66 How to avoid trouble connecting to oracle database with SQL Plugin?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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>
```

9.0.67 How to avoid __NSAutoreleaseNoPool console messages in threads?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

9.0.68 How to bring app to front?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.69 How to bring my application to front?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** This makes SimpleText (Code txt) 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)

9.0.70 How to catch Control-C on Mac or Linux in a console app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 caught, a flag is set and you can ask later in your normal application flow for the result.

9.0.71 How to change name of application menu?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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.

9.0.72 How to change the name in the menubar of my app on Mac OS X?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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/> .

9.0.73 How to check if a folder/directory has subfolders?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.74 How to check if Macbook runs on battery or AC power?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.75 How to check if Microsoft Outlook is installed?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

```

9.0.76 How to check on Mac OS which country or language is currently selected?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.77 How to code sign my app with plugins?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 Mac and Windows to make sure they have not been modified.

In terminal, you do like this:

```
cd <Path to folder of 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.

9.0.78 How to collapse a window?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.79 How to compare two pictures?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.80 How to compile PHP library?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.81 How to convert a `BrowserType` to a String with `WebSession.Browser`?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

9.0.82 How to convert a `EngineType` to a String with `WebSession.Engine`?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

```

9.0.83 How to convert a PlatformType to a String with WebSession.Platform?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

```

9.0.84 How to convert a text to iso-8859-1 using the TextEncoder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

This code can help you although 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("Bjrn, this text should be converted")
Mac2PC.clear
```

Notes: You have to call Mac2PC.clear after every conversion to reset the encoding engine.

9.0.85 How to convert ChartTime back to Xojo date?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.86 How to convert line endings in text files?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.87 How to convert picture to string and back?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

9.0.88 How to copy an array?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.89 How to copy an dictionary?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.90 How to copy parts of a movie to another one?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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.

9.0.91 How to create a birthday like calendar event?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.92 How to create a GUID?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Use the UUIDMBS class for this.

9.0.93 How to create a Mac picture clip file?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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("AQAAAAAAAAAAAAAAAAACAFRDRVIAAABAAAAAAAAAABUQ0IQAAAAA")
r.AddResource(data,"drag",128,"") 'ditto
r.Close
```

Notes: In general Apple has deprecated this, but a few application still support clippings.

9.0.94 How to create a PDF file in REALbasic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.95 How to create EmailAttachment for PDF Data in memory?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.96 How to create PDF for image files?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.97 How to CURL Options translate to Plugin Calls?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 interpreted 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/f2f4e540bf8bb60f61cfd4328001c59 -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)

9.0.98 How to delete file with ftp and curl plugin?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.99 How to detect display resolution changed?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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".

9.0.100 How to detect retina?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Please use Window.BackingScaleFactorMBS to query the factor.

Example:

```
msgbox str(window1.BackingScaleFactorMBS)
```

9.0.101 How to disable force quit?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.102 How to disable the error dialogs from Internet Explorer on javascript errors?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.103 How to display a PDF file in REALbasic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.104 How to do a lottery in RB?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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(5))+chr(13)+str(za(6))+chr(13)+str(za(7))+chr(13)+str(za(8))+chr(13)+str(za(9))+chr(13)+str(za(10))+chr(13)+str(za(11))+chr(13)+str(za(12))+chr(13)+str(za(13))+chr(13)+str(za(14))+chr(13)+str(za(15))+chr(13)+str(za(16))+chr(13)+str(za(17))+chr(13)+str(za(18))+chr(13)+str(za(19))+chr(13)+str(za(20))+chr(13)+str(za(21))+chr(13)+str(za(22))+chr(13)+str(za(23))+chr(13)+str(za(24))+chr(13)+str(za(25))+chr(13)+str(za(26))+chr(13)+str(za(27))+chr(13)+str(za(28))+chr(13)+str(za(29))+chr(13)+str(za(30))+chr(13)+str(za(31))+chr(13)+str(za(32))+chr(13)+str(za(33))+chr(13)+str(za(34))+chr(13)+str(za(35))+chr(13)+str(za(36))+chr(13)+str(za(37))+chr(13)+str(za(38))+chr(13)+str(za(39))+chr(13)+str(za(40))+chr(13)+str(za(41))+chr(13)+str(za(42))+chr(13)+str(za(43))+chr(13)+str(za(44))+chr(13)+str(za(45))+chr(13)+str(za(46))+chr(13)+str(za(47))+chr(13)+str(za(48))+chr(13)+str(za(49))+chr(13)+str(za(50))+chr(13)+str(za(51))+chr(13)+str(za(52))+chr(13)+str(za(53))+chr(13)+str(za(54))+chr(13)+str(za(55))+chr(13)+str(za(56))+chr(13)+str(za(57))+chr(13)+str(za(58))+chr(13)+str(za(59))+chr(13)+str(za(60))+chr(13)+str(za(61))+chr(13)+str(za(62))+chr(13)+str(za(63))+chr(13)+str(za(64))+chr(13)+str(za(65))+chr(13)+str(za(66))+chr(13)+str(za(67))+chr(13)+str(za(68))+chr(13)+str(za(69))+chr(13)+str(za(70))+chr(13)+str(za(71))+chr(13)+str(za(72))+chr(13)+str(za(73))+chr(13)+str(za(74))+chr(13)+str(za(75))+chr(13)+str(za(76))+chr(13)+str(za(77))+chr(13)+str(za(78))+chr(13)+str(za(79))+chr(13)+str(za(80))+chr(13)+str(za(81))+chr(13)+str(za(82))+chr(13)+str(za(83))+chr(13)+str(za(84))+chr(13)+str(za(85))+chr(13)+str(za(86))+chr(13)+str(za(87))+chr(13)+str(za(88))+chr(13)+str(za(89))+chr(13)+str(za(90))+chr(13)+str(za(91))+chr(13)+str(za(92))+chr(13)+str(za(93))+chr(13)+str(za(94))+chr(13)+str(za(95))+chr(13)+str(za(96))+chr(13)+str(za(97))+chr(13)+str(za(98))+chr(13)+str(za(99))
End Sub

```

9.0.105 How to do an asycron DNS lookup?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** use CFHostMBS class (Mac OS X only).

Notes:

REALbasic internal functions and plugin DNS functions are sycronized.

You can use `DNSLookupThreadMBS` class for doing them asynchron.

9.0.106 How to draw a dashed pattern line?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can try this code:

Example:

// call like this: DrawDashedPatternLine g,0,0,width,height,10

```
Sub DrawDashedPatternLine(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 Realbasic code, so it even works on Windows.

9.0.107 How to draw a nice antialiased line?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

This code can help you although 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.

9.0.108 How to draw with CGContextMBS using my own handle?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can try this code:

Example:

```
Soft Declare Function QDBeginCGContext Lib "Carbon" (port as Integer, ByRef contextHandle as Integer)
as Integer
dim contextRef as Integer
call QDBeginCGContext(g.handle(graphics.HandleTypeCGrafPtr), contextRef)
dim c as new CGContextMBS(contextRef)
```

```
c.BeginPath
c.SetLineWidth(3)
c.SetRGBFillColor(1,0,0,0.5)
c.FillRect(CGMakeRectMBS(0,0,100,100))
c.DrawPath(c.kCGPathFillStroke)
c.Flush // and so on
```

```
Soft Declare Function QDEndCGContext Lib "Carbon" (port as Integer, ByRef contextHandle as Integer)
as Integer
dim h as Integer = c.Handle
call QDEndCGContext(g.handle(graphics.HandleTypeCGrafPtr), h)
c.Handle=0
```

Notes: Basicly you can provide your own handle to CGContextMBS. But if you do not set it back to 0 the CGContextMBS destructor will release the handle which can result into a crash. (if the reference count is wrong)

9.0.109 How to dump java class interface?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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

9.0.110 How to duplicate a picture with mask or alpha channel?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 Real Studio versions because of the `#` if even if your RS version does not support alpha channel pictures. This way it's future proof.

9.0.111 How to enable assistive devices?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.112 How to encrypt a file with Blowfish?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.113 How to extract text from HTML?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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: Gre

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 .

9.0.114 How to find empty folders in a folder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

9.0.115 How to find iTunes on a Mac OS X machine fast?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** You can try Launch Services.

Example:

```
dim f as FolderItem
```

```
f=LaunchServicesFindApplicationForInfoMBS("hook","com.apple.iTunes","iTunes.app")
```

```
MsgBox f.AbsolutePath
```

9.0.116 How to find network interface for a socket by it's name?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.117 How to find version of Microsoft Word?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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".

9.0.118 How to fix CURL error 60/53 on connecting to server?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.UnixpathMBS
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/>

9.0.119 How to format double with n digits?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.120 How to get a time converted to user time zone in a web app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

9.0.121 How to get an handle to the frontmost window on Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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
```

9.0.122 How to get CFAbsoluteTime from date?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** Use code like this:

Example:

```
dim d as new date
dim t as CFTimeZoneMBS = SystemCFTimeZoneMBS
dim g as new CFGregorianCalendarMBS
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.

9.0.123 How to get client IP address on web app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Use the `WebSession.RemoteAddress` property.

Example:

```
Sub Open()
Title = Session.RemoteAddress
End Sub
```

9.0.124 How to get fonts to load in charts on Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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"
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.

9.0.125 How to get fonts to load in DynaPDF on Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.126 How to get GMT time and back?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.127 How to get good crash reports?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Check this website from the webkit website:

Notes: <http://webkit.org/quality/crashlogs.html>

9.0.128 How to get list of all threads?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.129 How to get parameters from webpage URL in Real Studio Web Edition?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 Real Studio 2010r5. Please use DefineEncoding.

9.0.130 How to get Real Studio apps running Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You need to install some require 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.

9.0.131 How to get the color for disabled textcolor?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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" ...

9.0.132 How to get the current free stack space?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 ThreadCurrentStackSize lib "Carbon" (threadid as Integer, byref size as Integer) as short

if GetCurrentThread(threadid)=0 then
if 0=ThreadCurrentStackSize(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 you like for that.

9.0.133 How to get the current timezone?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:**

You can use the TimeZoneMBS class or the CTimeZoneMBS 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

```

9.0.134 How to get the current window title?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** The code below returns the current window title for the frontmost window on Mac OS X if Accessibility services are

Example:

```

Function CurrentWindowTitle() As string
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

```

9.0.135 How to get the cursor blink interval time?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.136 How to get the list of the current selected files in the Finder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 Realbasic 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.folderItem(i)

dateiname=f.name
// editfield1 with property "multiline=true"!
```

```
editfield1.text=editfield1.text + dateiname + chr(13)
next
end if
```

9.0.137 How to get the Mac OS system version?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

9.0.138 How to get the Mac OS Version using System.Gestalt?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.139 How to get the screensize excluding the task bar?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** Try this code:

Notes: Use the Screen class with the available* properties.

9.0.140 How to get the size of the frontmost window on Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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!

9.0.141 How to get the source code of a HTMLViewer?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Try this code:

Example:

// for Windows:

```
msgbox HTMLViewer1.IEHTMLTextMBS
```

// for Mac OS X:

```
msgbox HTMLViewer1.mainFrameMBS.dataSource.data
```

9.0.142 How to handle really huge images with GraphicsMagick or ImageMagick?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Sometimes it may be better to use an extra application to process images.

Notes:

A typical 32 bit app made with Xojo (Real Studio) 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.

9.0.143 How to handle tab key for editable cells in listbox?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.144 How to hard link MapKit framework?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.145 How to have a PDF downloaded to the user in a web application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 Real Studio Web Edition.

9.0.146 How to hide all applications except mine?

Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

9.0.147 How to hide script errors in HTMLViewer on Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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).

9.0.148 How to hide the grid/background/border in ChartDirector?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** If you want to hide something in a chart, simply assign the kTransparent constant as color.

9.0.149 How to hide the mouse cursor on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.150 How to insert image to NSTextView or TextArea?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.attributedStringWithAttachment(fileAttachment)
```

```
// add to a NSTextViewMBS
```

```
textview.insertText attributedString
```

```
End Sub
```

Notes: For TextArea you can query the underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

9.0.151 How to jump to an anchor in a htmlviewer?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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""
elseif TargetMacOS then
call HTMLViewer1.EvaluateJavaScriptMBS "window.location = ""# 16""
else
// not supported
end if
```

9.0.152 How to keep a movieplayer unclickable?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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
```

9.0.153 How to keep my web app from using 100% CPU time?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** On Linux and Mac OS X 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.

9.0.154 How to kill a process by name?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.155 How to know how many CPUs are present?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Try this function:

Example:

```
Function GetCPUCount() as Integer
Declare Function MPProcessors Lib "Carbon" () as Integer

Return MPProcessors()
End Function
```

Notes: Your app will then 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.

9.0.156 How to know if a movie is finished?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** This code can help you although it's not perfect:

Example:

```
Declare Function IsMovieDone Lib "QuickTime" (theMovie as Integer) as Integer
```

```
if IsMovieDone(moviePlayer1.movie.handle) <>0 then
//movie is finished
end if
```

Notes: But be carefull! It crashes sometimes for an unknown reason!?

9.0.157 How to know if QuickTime is installed on any target and can play MPEG 4 movies?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** Try this code:

Example:

```
dim q as QTComponentInformationMBS

q=new QTComponentInformationMBS

// "eat " = Movie importers
while q.NextComponentOfType("eat ")
if q.SubType="MP4 " then
MsgBox "found: "+q.Name+ " codec"
end if
wend
```

Notes: If you find a MP4 movie importing codec you can be sure that a MP4 movie can be opened.

9.0.158 How to know if QuickTime is installed on any target?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** Try this function:

Example:

```
Dim theEffect as QTEffect

theEffect=GetQTCrossFadeEffect

if theEffect = nil then
msgBox "QuickTime is not installed."
else
msgBox "Quicktime is installed."
end if
```

Notes: The problem with this code is that it checks only if the QuickTime part of the cross fade effect is available. Use the QTComponentInformationMBS to check for the features you really need.

9.0.159 How to know the calling function?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.160 How to launch an app using it's creator code?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

9.0.161 How to launch disc utility?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.162 How to make a lot of changes to a REAL SQL Database faster?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.163 How to make a NSImage object for my retina enabled app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.164 How to make a window borderless on Windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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

```

9.0.165 How to make an alias using AppleEvents?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

9.0.166 How to make an application smaller?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

If you use an older copy of REALbasic, you should try to compile for 68k only instead of PPC. It's a little bit slower, but code is much smaller.

On any Mac OS target you can save your images as JPEG and drop the into your application. REALbasic will include them as JPEGs into the Mac applications (convert to BMP for Windows). This will make the resources of your application smaller, but requires that the user has QuickTime 2.5 or newer installed.

9.0.167 How to make AppleScripts much faster?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

9.0.168 How to make double clicks on a canvas?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 GetDbfTime Lib "Carbon" () as Integer
doubleClickTime = GetDbfTime()
# 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 occurred close enough together in space
if abs(X - lastClickX) <= 5 and abs(Y - LastClickY) <= 5 then
DoubleClick //a double click has occurred 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
```

9.0.169 How to make my Mac not sleeping?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.170 How to make my own registration code scheme?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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 Real Studio as a starting point?

9.0.171 How to make small controls on Mac OS X?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 OS-
Type, 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))

```

9.0.172 How to mark my Mac app as background only?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.173 How to move a file or folder to trash?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.kFSFile-
OperationDefaultOptions)

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.

9.0.174 How to move an application to the front using the creator code?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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)

9.0.175 How to move file with ftp and curl plugin?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 RNTD with the new file name. To delete use DELE and the file path.

9.0.176 How to normalize string on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.177 How to obscure the mouse cursor on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.178 How to open icon file on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

9.0.179 How to open PDF in acrobat reader?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.180 How to open printer preferences on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

9.0.181 How to open special characters panel on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.182 How to optimize picture loading in Web Edition?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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:

<http://www.monkeybreadsoftware.de/realbasic/webapps.shtml>

9.0.183 How to parse XML?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.184 How to play audio in a web app?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can use the HTML5 audio tag and control it with javascript.

Notes:

See our web apps here:

<http://www.monkeybreadsoftware.de/realbasic/webapps.shtml>

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 Real Studio 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. Then 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 ele-
ment.</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)+"");")
```

9.0.185 How to pretty print xml?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Use the XML Transform method with the right XLS.

Notes:

Learn more here:

<http://docs.xojo.com/index.php/XMLDocument.Transform>

9.0.186 How to print to PDF?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.187 How to query Spotlight's Last Open Date for a file?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.188 How to quit windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.189 How to read a CSV file correctly?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.190 How to read the command line on windows?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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 Realbasic versions have a system.commandline property.

9.0.191 How to render PDF pages with PDF Kit?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.192 How to restart a Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

9.0.193 How to resume ftp upload with curl plugin?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.194 How to rotate a PDF page with CoreGraphics?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.195 How to rotate image with CoreImage?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 Real Studio picture object for display
dim pic as Picture = outputImage.CopyPictureWithMask
```

```
Backdrop = pic
```

9.0.196 How to run a 32 bit application on a 64 bit Linux?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.197 How to save a quicktime movie as a reference movie?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** Example code is below:

Example:

```
// save as reference movie
dim f as FolderItem
dim m as movie

f=SpecialFolder.Desktop.Child("test.mov")
m=f.OpenAsMovie

f=SpecialFolder.Desktop.Child("new movie.mov")

msgbox str(m.SaveMBS(f,false,false))
```

9.0.198 How to save HTMLViewer to PDF with landscape orientation?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** You can use `NSPrint-InfoMBS` 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.

9.0.199 How to save RTFD?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.ApplicationRtf, "test.rtf")

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 underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

9.0.200 How to scale a picture proportionally with mask?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** For a proportional scaling, we calculate the new picture size relative to the target maximum size.

Example:

```

Function ProportionalScaledWithMask(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)

// 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.

9.0.201 How to scale a picture proportionally?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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)

9.0.202 How to scale/resize a picture?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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:

- The GWorld class which uses QuickTime. Includes nice Bicubic scaling with QuickTime 6.
- QTGraphicsImporterMBS and QTGraphicsExporterMBS 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.ScopingMBS does crossplatform scaling with several modes.

with pure REALbasic:

- make a new picture and draw the old one with new size inside.

9.0.203 How to search with regex and use unicode codepoints?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 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

```

9.0.204 How to see if a file is invisible for Mac OS X?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

```

9.0.205 How to set cache size for SQLite or REALSQLDatabase?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.206 How to set the modified dot in the window?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Try this declares:

Example:

```
window1.ModifiedMBS=true
```

9.0.207 How to show a PDF file to the user in a Web Application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 Real Studio Web Edition.
<http://www.monkeybreadsoftware.de/realbasic/webapps.shtml>

9.0.208 How to show Keyboard Viewer programmatically?

Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Use Realbasic 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/Key-
boardViewerServer.app"

```

```

set POSIXPath to ((POSIX file thePath) as string)
tell application "System Events" to set isRunning to 0 <(count (application processes whose name is theAp-
plication))
if isRunning then tell application POSIXPath to quit
delay 0.15

```

```

ignoring application responses
tell application POSIXPath to run
end ignoring

```

9.0.209 How to show the mouse cursor on Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Try this declare:

Example:

```
Declare Sub ShowCursor Lib "Carbon" ()
```

```
ShowCursor
```

Notes: The MBS Plugin has this function and supports it on Windows, too.

9.0.210 How to shutdown a Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 immediatly: No document asked to be saved, all applications quitting without knowing).

```
Declare Sub ShutDownPower Lib "Carbon" ()
ShutDownPower
```

9.0.211 How to sleep a Mac?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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
```

9.0.212 How to speed up rasterizer for displaying PDFs with DynaPDF?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.213 How to use PDFLib in my RB application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** The PDFlib plugin was discontinued in favor of our DynaPDF plugin.
Notes: If you need help to move, please contact us.

9.0.214 How to use quotes in a string?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Just double them.

Example:

```
msgbox "This String contains ""quotes""."
```

9.0.215 How to use Sybase in Web App?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Please use our MBS Real Studio 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
```

9.0.216 How to use the Application Support folder?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:**

I was saving a registration code for an app to the Preference folder. 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.UnixpathMBS
```

Notes: You may not be able to write there with a normal user account!

9.0.217 How to use the IOPMCopyScheduledPowerEvents function in Realbasic?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 CFDictionaryes
' * 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.

9.0.218 How to validate a GUID?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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".

9.0.219 How to walk a folder hierarchie non recursively?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.220 I got this error: PropVal, QDPictMBS.Name (property value), Type mismatch error. Expected CGDataProviderMBS, but got Variant, Name:QDPictMBS

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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 Real Studio IDE on Windows crashed on compilation.

9.0.221 I registered the MBS Plugins in my application, but later the registration dialog is shown.

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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 temporary 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.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

9.0.222 I want to accept Drag & Drop from iTunes

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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=NewCFURLMBS CFStringMBS(CFStringMBS(o),nil)

file=u.file
if file<>nil then
MsgBox file.UnixpathMBS
end if
end if
end if
next
end if
end if

```

```
end if
End Sub
```

Notes: The code above inside a window on Realbasic 5.5 with MBS Plugin 5.3 will do it nice and show the paths.

9.0.223 I'm drawing into a listbox but don't see something.

Plugin Version: all, Console & Web: No. **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 clipping and an offset which the plugin doesn't know about.

9.0.224 I'm searching for a method or so to move a window from position x.y to somewhere else on the screen.

Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.225 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?

Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Stand alone.

Notes:

REALbasic 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)

9.0.226 Is the fn key on a powerbook keyboard down?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.227 Is there a case sensitive Dictionary?

Plugin Version: all, Console & Web: No. **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

9.0.228 Is there a way to use the MBS plugin to get only the visible item and folder count on a volume?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.229 Is there an easy way I can launch the Displays preferences panel?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

```

9.0.230 Is there an easy way I can launch the Quicktime preferences panel?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Use the code below:
Example:

```

dim error as Integer

error=OpenMacOSXPreferencesPaneMBS("QuickTime")
if error<>0 then
MsgBox "Failed to launch QuickTime System Preferences panel."
end if

```

9.0.231 List of Windows Error codes?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** We have a list of windows error codes on our website.

Notes: <http://www.monkeybreadsoftware.de/xojo/winerror.shtml>

9.0.232 Midi latency on Windows problem?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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)

9.0.233 My Xojo Web App does not launch. Why?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Here is a list of checks to do for linux apache installations with Xojo or Real Studio 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?

9.0.234 Pictures are not shown in my application. Why?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:**

On Mac OS Classic, please check the memory partition size which may be too low.
Else (most times on Windows) you are simple missing the part of QuickTime to load images.

9.0.235 Realbasic doesn't work with your plugins on Windows 98.

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** Upgrade your Windows version or complain to Realsoftware.

9.0.236 REALbasic or my RB application itself crashes on launch on Mac OS Classic. Why?

Plugin Version: all, Console & Web: No. **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 preferred to use 50 MB and for an application a 10 MB partition is a good way to start.

9.0.237 SQLiteDatabase not initialized error?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Before you can use SQLiteDatabaseMBS, it must be initialized.

Example:

```
dim d as new SQLiteDatabaseMBS
```

Notes:

This happens normally when you use "new SQLiteDatabaseMBS".
But if you just have a SQLConnectionMBS and get a recordset there, the initialization may not have happened, yet.
So please simply add a line "dim d as new SQLiteDatabaseMBS" to your app.open code after registration, so the plugin part can initialize and late provide recordsets.

9.0.238 Textconverter returns only the first x characters. Why?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

Some older REALbasic versions limit the Textconverter to around 1024 characters in input and output. This should be fixed with RB5.

Notes: REALbasic seems not to support Textconverters at all on Windows.

9.0.239 The type translation between CoreFoundation/Foundation and Realbasic data types.

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** The plugin does conversion between Cocoa/Carbon data types and native REALbasic 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 ->NSData

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.

9.0.240 Uploaded my web app with FTP, but it does not run on the server!

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.241 What classes to use for hotkeys?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Please use CarbonHotKeyMBS class on Mac and WindowsKeyFilterMBS on Windows.

Notes: CarbonHotKeyMBS will also work fine in Cocoa apps.

9.0.242 What do I need for Linux to get picture functions working?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.243 What does the NAN code mean?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

9.0.244 What font is used as a 'small font' in typical Mac OS X apps?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:**

REALbasic 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
fontName 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
```

9.0.245 What is last plugin version to run on Mac OS X 10.4?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.246 What is last plugin version to run on PPC?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.247 What is the difference between Timer and WebTimer?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Time is server side and WebTimer client side.

Notes: Timer is the normal timer class in Real Studio. 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.

9.0.248 What is the list of Excel functions?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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, REFTTEXT, 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.

9.0.249 What is the replacement for PluginMBS?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** Use the SoftDeclareMBS class to load libraries dynamically.

9.0.250 What to do on Realbasic reporting a conflict?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

I get an error like "This item conflicts with another item of the same name" when using one of the plugin functions.

REALbasic 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.

9.0.251 What to do with a NSImageCacheException?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** You need to add exception handlers for NSExcptionMBS 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.

9.0.252 What to do with MySQL Error 2014?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can get this error on MySQL if you have a recordset open while you create another one.

9.0.253 What ways do I have to ping?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **Answer:** You have different ways

Notes:

1. Use the shell class and the ping utility.
2. Use the MBS Network Plugin and there the SuperSocket part:
 - a) On Windows the ICMPPingMBS works to ping.
 - b) On Mac OS X it uses OpenTransport and needs root rights. You need to use sudo to run this application. This does not work on Intel Macs, because the plugin is not endian safe.

3. The DarwinPingMBS.Ping method:

Compiled for Mac OS X Macho target it works as a synchronized ping method.
The Windows version had a bug and was fixed in plugin version 8.2pr4. So it works now.

4. The DarwinPingMBS.SimplePing method:

Works on Mac OS X Macho target.

But this method can be called from a thread to make it working in background.

9.0.254 Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetActiveDisplayList.

9.0.255 Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetDisplaysWithPoint.

9.0.256 Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetDisplaysWithRect.

9.0.257 Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetOnlineDisplayList.

9.0.258 Where is GetObjectClassNameMBS?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **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.

9.0.259 Where is NetworkAvailableMBS?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** We removed NetworkAvailableMBS some versions ago. It was not working right and basically it's not useful. If you want to check whether you have a network, then do a DNS resolve:

Example:

```
// two independent domain names
const domain1 = "www.google.com"
const domain2 = "www.macs.w.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.

9.0.260 Where is StringHeight function in DynaPDF?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.261 Where is XLSDocumentMBS class?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** This class has been removed in favor of XLBookMBS class.

Notes: These classes have been removed XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

9.0.262 Where to get information about file formats?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

Please visit this web page:

<http://www.wotsit.org>

9.0.263 Where to register creator code for my application?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:**

Register at Apple:

<http://developer.apple.com/dev/cftype/information.html>

9.0.264 Which Mac OS X frameworks are 64bit only?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.265 Which plugins are 64bit only?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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.

9.0.266 Why application doesn't launch because of a missing ddraw.dll!?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** Some RB versions require that you install DirectX from Microsoft on your Windows.

9.0.267 Why application doesn't launch because of a missing shlwapi.dll!?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.268 Why do I hear a beep on keydown?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.269 Why does folderitem.item return nil?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Because Realbasic 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.

9.0.270 Why doesn't showurl work?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:**

There are three main reasons:

1. showurl is not supported by REALbasic 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.

9.0.271 Why have I no values in my chart?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: No. **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.

9.0.272 Will application size increase with using plugins?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **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.

9.0.273 XLS: Custom format string guidelines

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **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

Parameter	Description
x	The x value of the data point. For an enumerated x-axis (see <code>Axis.setLabels</code> 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 <code>Layer.addExtraField</code> , <code>Layer.addExtraField2</code> , <code>BaseChart.addExtraField</code> or <code>BaseChart.addExtraField2</code> .

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 <code>LineStyle.setSymbolScale</code> .
zy	The symbol scale in the y dimension. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .
z	The symbol scale without distinguishing the dimension to use. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .

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 Polar-Layer.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,,