MBS SnowLeopard 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 SnowLeopard Plugin

0.2 Content

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Chapter 2

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Chapter 4

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Chapter 5

Cocoa

5.1 class NSEventMonitorMBS

5.1.1 class NSEventMonitorMBS

Plugin Version: 12.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for watching events in Cocoa.
Notes: For Mac OS X 10.5 compatibility, please use CarbonMonitorEventsMBS class.

5.1.2 Methods

5.1.3 addGlobalMonitorForEventsMatchingMask(mask as UInt64) as boolean

Plugin Version: 12.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Installs an event monitor that receives copies of events posted to other applications.
Notes:

mask: An event mask specifying which events you wish to monitor. See NSEventMBS constants for possible values.

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

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

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

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

NSLeftMouseDragged
NSRightMouseDragged
NSOtherMouseDragged
NSLeftMouseUp
NSRightMouseUp
NSOtherMouseUp
NSLeftMouseDown
NSRightMouseDown
NSOtherMouseDown
NSMouseMoved
NSFlagsChanged
NSScrollWheel
NSTabletPoint
NSTabletProximity
NSKeyDown (Key repeats are determined by sending the event an isARepeat message.)

Available in OS X v10.6 and later.

5.1.4   addLocalMonitorForEventsMatchingMask(mask as UInt64) as boolean

Plugin Version: 12.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Installs an event
monitor that receives copies of events posted to this application before they are dispatched.
Notes:

mask: An event mask specifying which events you wish to monitor. See NSEventMBS constants for possible
values.

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

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

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

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

NSFlagsChanged
NSLeftMouseDragged
NSRightMouseDragged
NSOtherMouseDragged
NSLeftMouseUp
NSRightMouseUp
NSOtherMouseUp
NSLeftMouseDown
NSRightMouseDown
NSOtherMouseDown
NSMouseMoved
NSFlagsChanged
NSScrollWheel
NSTabletPoint
NSTabletProximity
NSKeyDown (Key repeats are determined by sending the event an isARepeat message.)

Available in OS X v10.6 and later.

5.1.5   Available as boolean

Plugin Version: 12.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether event monitoring is available.
Notes: Returns true on Mac OS X 10.6 and newer.

5.1.6   Constructor

Plugin Version: 12.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.
Notes: Initializes the object.

5.1.7   Destructor

Plugin Version: 12.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.
Notes: Remove all event monitors you added.

5.1.8   Properties

5.1.9   Count as Integer

Plugin Version: 12.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns number of
event monitors you added.
Notes: (Read only property)

5.1.10   Events

5.1.11   GlobalEvent(e as NSEventMBS)

Plugin Version: 12.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is called
for global system events.
Notes:

It is passed the event to monitor. You are unable to change the event, merely observe it.

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

5.1.12   LocalEvent(e as NSEventMBS) as NSEventMBS

Plugin Version: 12.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is called
for local application events.
Notes: You can return the event unmodified, create and return a new NSEventMBS object, or return nil
to stop the dispatching of the event.

Chapter 6

CoreLocation

6.1   class CLGeocodeCompletionHandlerMBS

6.1.1   class CLGeocodeCompletionHandlerMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class to receive the Complete event from a geocoder.

6.1.2   Events

6.1.3   Completed(geocoder as CLGeocoderMBS, placemarks() as CLPlacemarkMBS, error as NSErrorMBS, tag as Variant)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event to be called when a geocoding request is complete.
Notes:

Upon completion of a geocoding request, a block of this form is called to give you a chance to process the results. The parameters of this block are as follows:

placemark: Contains an array of CLPlacemark objects. For most geocoding requests, this array should contain only one entry. However, forward-geocoding requests may return multiple placemark objects in situations where the specified address could not be resolved to a single location.
If the request was canceled or there was an error in obtaining the placemark information, this parameter is nil.
error: Contains an error object (if any) indicating why the placemark data was not returned. For a list of possible error codes, see CLLocationManager Class Reference.

Available in OS X v10.8 and later.
Tag parameter added in version 14.2.

6.2   class CLGeocoderMBS

6.2.1   class CLGeocoderMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The CLGeocoder class provides services for converting between a coordinate (specified as a latitude and longitude) and the user-friendly representation of that coordinate.
Notes:

A user-friendly representation of the coordinate typically consists of the street, city, state, and country information corresponding to the given location, but it may also contain a relevant point of interest, landmarks, or other identifying information. A geocoder object is a single-shot object that works with a network-based service to look up placemark information for its specified coordinate value.

To use a geocoder object, create it and call one of its forward- or reverse-geocoding methods to begin the request. Reverse-geocoding requests take a latitude and longitude value and find a user-readable address. Forward-geocoding requests take a user-readable address and find the corresponding latitude and longitude value. Forward-geocoding requests may also return additional information about the specified location, such as a point of interest or building at that location. For both types of request, the results are returned using a CLPlacemark object. In the case of forward-geocoding requests, multiple placemark objects may be returned if the provided information yielded multiple possible locations.

To make smart decisions about what types of information to return, the geocoder server uses all the information provided to it when processing the request. For example, if the user is moving quickly along a highway, it might return the name of the overall region, and not the name of a small park that the user is passing through.

Applications should be conscious of how they use geocoding. Here are some rules of thumb for using this class effectively:

Send at most one geocoding request for any one user action.
If the user performs multiple actions that involve geocoding the same location, reuse the results from the initial geocoding request instead of starting individual requests for each action.
When you want to update the user's current location automatically (such as when the user is moving), issue new geocoding requests only when the user has moved a significant distance and after a reasonable amount of time has passed. For example, in a typical situation, you should not send more than one geocoding request per minute.
Do not start a geocoding request at a time when the user will not see the results immediately. For example, do not start a request if your application is inactive or in the background.
The computer or device must have access to the network in order for the geocoder object to return detailed placemark information. Although, the geocoder stores enough information locally to report the localized country name and ISO country code for many locations. If country information is not available for a specific location, the geocoder may still report an error to your completion block.

see also

https://developer.apple.com/library/mac/#documentation/CoreLocation/Reference/CLGeocoder_class/Reference/Referenc

6.2.2   Methods

6.2.3   Available as boolean

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

6.2.4   cancelGeocode

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

You can use this method to cancel a pending request and free up the resources associated with that request. Canceling a pending request causes the completion handler event to be called.

If the request is not pending, because it has already returned or has not yet begun, this method does nothing. Available in OS X v10.8 and later.

6.2.5   Constructor

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

6.2.6   geocodeAddressDictionary(addressDictionary as Dictionary, completion-Handler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Submits a forward-geocoding request using the specified address dictionary.
Notes:

addressDictionary: An Address Book dictionary containing information about the address to look up.
completionHandler: A handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a forward-geocoding request, do not attempt to initiate another forward- or reverse-geocoding request.

Available in OS X v10.8 and later.

6.2.7 geocodeAddressString(addressString as string, completionHandler as CLGeocode-CompletionHandlerMBS, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Submits a forward-geocoding request using the specified string.
Notes:

addressString: A string describing the location you want to look up. For example, you could specify the string "1 Infinite Loop, Cupertino, CA" to locate Apple headquarters.
completionHandler: A handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a forward-geocoding request, do not attempt to initiate another forward- or reverse-geocoding request.
Available in OS X v10.8 and later.
See also:

- 6.2.8 geocodeAddressString(addressString as string, region as CLRegionMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil) 61

6.2.8 geocodeAddressString(addressString as string, region as CLRegionMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Submits a forward-geocoding request using the specified string and region information.
Notes:

addressString: A string describing the location you want to look up. For example, you could specify the string "1 Infinite Loop, Cupertino, CA" to locate Apple headquarters.
region: A geographical region to use as a hint when looking up the specified address. Specifying a region lets you prioritize the returned set of results to locations that are close to some specific geographical area, which is typically the user's current location. If nil and the application is authorized for location services, the set of results is prioritized based on the user's approximate location. Invoking this method does not trigger a location services authorization request.
completionHandler: A handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a forward-geocoding request, do not attempt to initiate another forward- or reverse-geocoding request.

Available in OS X v10.8 and later.
See also:

6.2.9   isGeocoding as boolean

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the receiver is in the middle of geocoding its value. (read-only)
Notes:

This property contains the value true if the process is ongoing or false if the process is done or has not yet been initiated.
Available in OS X v10.8 and later.

6.2.10   reverseGeocodeLocation(location as CLLocationMBS, completionHandler as CLGeocodeCompletionHandlerMBS, tag as Variant = nil)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Submits a reverse-geocoding request for the specified location.
Notes:

location: The location object containing the coordinate data to look up.
completionHandler: The handler object containing the code to execute at the end of the request. This code is called whether the request is successful or unsuccessful.

This method submits the specified location data to the geocoding server asynchronously and returns. Your completion handler block will be executed on the main thread. After initiating a reverse-geocoding request, do not attempt to initiate another reverse- or forward-geocoding request.

Available in OS X v10.8 and later.

6.2.11   Properties

6.2.12   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)

6.3 class CLHeadingMBS

6.3.1 class CLHeadingMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A CLHeading object contains heading data generated by a CLLocationManager object.
Notes:

The heading data consists of computed values for true and magnetic north. It also includes the raw data for the three-dimensional vector used to compute those values.

Typically, you do not create instances of this class yourself, nor do you subclass it. Instead, you receive instances of this class through the delegate assigned to the CLLocationManager object whose startUpdatingHeading method you called.

Note: If you want heading objects to contain valid data for the trueHeading property, your location manager object should also be configured to deliver location updates. You can start the delivery of these updates by calling the location manager object's startUpdatingLocation method.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

6.3.2 Methods

6.3.3 Available as boolean

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

6.3.4 Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

6.3.5 copy as CLHeadingMBS

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

6.3.6   description as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the heading data in a formatted text string.
Notes:

A string of the form "magneticHeading <magnetic>trueHeading <heading>accuracy <accuracy>x <x>y <y>z <z>@ <date-time>" where <magnetic>, <heading>, <accuracy>, <x>, <y>, and <z>are formatted floating-point numbers and <date-time>is a formatted date string that includes date, time, and time zone information.

Available in OS X v10.7 and later.

6.3.7   headingAccuracy as Double

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The maximum deviation (measured in degrees) between the reported heading and the true geomagnetic heading. (read-only)
Notes:

A positive value in this property represents the potential error between the value reported by the magneticHeading property and the actual direction of magnetic north. Thus, the lower the value of this property, the more accurate the heading. A negative value means that the reported heading is invalid, which can occur when the device is uncalibrated or there is strong interference from local magnetic fields.

Available in OS X v10.7 and later.

6.3.8   kCLHeadingFilterNone as Double

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Special value for heading filter to define that you don't want to filter.

6.3.9   magneticHeading as Double

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The heading (measured in degrees) relative to magnetic north. (read-only)
Notes:

The value in this property represents the heading relative to the magnetic North Pole, which is different from the geographic North Pole. The value 0 means the device is pointed toward magnetic north, 90 means it is pointed east, 180 means it is pointed south, and so on. The value in this property should always be valid.

If the headingAccuracy property contains a negative value, the value in this property should be considered unreliable.

Available in OS X v10.7 and later.

6.3.10   timestamp as date

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The time at which this heading was determined. (read-only)
Notes: Available in OS X v10.7 and later.

6.3.11   trueHeading as Double

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The heading (measured in degrees) relative to true north. (read-only)
Notes:

The value in this property represents the heading relative to the geographic North Pole. The value 0 means the device is pointed toward true north, 90 means it is pointed due east, 180 means it is pointed due south, and so on. A negative value indicates that the heading could not be determined.

Important This property contains a valid value only if location updates are also enabled for the corresponding location manager object. Because the position of true north is different from the position of magnetic north on the Earth's surface, Core Location needs the current location of the device to compute the value of this property.

Available in OS X v10.7 and later.

6.3.12   x as Double

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The geomagnetic data (measured in microteslas) for the x-axis. (read-only)
Notes:

This value represents the x-axis deviation from the magnetic field lines being tracked by the device.
Available in OS X v10.7 and later.

6.3.13   y as Double

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The geomagnetic data (measured in microteslas) for the y-axis. (read-only)
Notes:

This value represents the y-axis deviation from the magnetic field lines being tracked by the device. Available in OS X v10.7 and later.

6.3.14   z as Double

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The geomagnetic data (measured in microteslas) for the z-axis. (read-only)
Notes:

This value represents the z-axis deviation from the magnetic field lines being tracked by the device. Available in OS X v10.7 and later.

6.3.15   Properties

6.3.16   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 CLLocationCoordinate2DMBS

6.4.1 class CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a location coordinate.

6.4.2 Methods

6.4.3 Constructor(latitude as Double = 0.0, longitude as Double = 0.0)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes a coordinate with values.

6.4.4 Properties

6.4.5 latitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The latitude. **Notes:** (Read and Write property)

6.4.6 longitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The longitude. **Notes:** (Read and Write property)

6.5   class CLLocationManagerMBS

6.5.1   class CLLocationManagerMBS

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The CoreLocation base class.
Example:

dim c as new CLLocationManagerMBS

c.startUpdatingLocation

Notes:

The CLLocationManagerMBS class defines the interface for configuring the delivery of location- and heading-related events to your application. You use an instance of this class to establish the parameters that determine when location and heading events should be delivered. You can also a location manager object to retrieve the most recent location data.

To use a CLLocationManagerMBS object to deliver location events, create an instance, configure the desired accuracy and distance filter values, and call the startUpdatingLocation method. The location service returns an initial location as quickly as possible, returning cached information when available. After delivery of the initial event notification, the CLLocationManagerMBS object may deliver additional events if the minimum threshold distance (as specified by the distanceFilter property) is exceeded or a more accurate location value is determined.

Important: The user has the option of denying an application's access to the location service data. During its initial uses by an application, the Core Location framework prompts the user to confirm that using the location service is acceptable. If the user denies the request, the CLLocationManagerMBS object reports an appropriate error to its delegate during future requests.

See also documentation from Apple for the CLLocationManager class:
https://developer.apple.com/library/mac/# documentation/CoreLocation/Reference/CLLocationManager_Class/CLLocatio

6.5.2   Methods

6.5.3   authorizationStatus as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the application's authorization status for using location services.
Notes:

The authorization status of a given application is managed by the system and determined by several factors.

Applications must be explicitly authorized to use location services by the user and location services must themselves currently be enabled for the system. This authorization takes place automatically when your application first attempts to use location services.

Available on Mac OS X 10.7 or later.

6.5.4 CheckEvents

Plugin Version: 15.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Checks for new events.
Notes:

This is a helper app to make CoreLocation geocoder work in web projects.
Should not be called in desktop apps.
But for a web app, use a Timer (not WebTimer) to run it on main loop every few milliseconds (e.g. 500 ms).

6.5.5 Constructor

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.
Example:

dim c as new CLLocationManagerMBS

MsgBox str(c.Handle) // not zero on success

6.5.6 deferredLocationUpdatesAvailable as boolean

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns true if the device supports deferred location updates, otherwise false.
Notes: Requires Mac OS X 10.9.

6.5.7 Destructor

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

6.5.8   dismissHeadingCalibrationDisplay

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Dismisses the heading calibration view from the screen immediately.
Notes: Core Location uses the heading calibration alert to calibrate the available heading hardware as needed. The display of this view is automatic, assuming your delegate supports displaying the view at all. If the view is displayed, you can use this method to dismiss it after an appropriate amount of time to ensure that your application's user interface is not unduly disrupted.

6.5.9   headingAvailable as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean value indicating whether the location manager is able to generate heading-related events.
Example:

msgbox "headingAvailable available: "+str(CLLocationManagerMBS.headingAvailable)

Notes:

Returns true if heading data is available or false if it is not.

Heading data may not be available on all iOS-based devices. You should check the value returned by this method before asking the location manager to deliver heading-related events.

Available on Mac OS X 10.7 or later.

6.5.10   kCLErrorDomain as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The domain for Core Location errors. This value is used in the NSError class.

6.5.11   kCLErrorUserInfoAlternateRegionKey as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A key in the user information dictionary of an kCLErrorRegionMonitoringResponseDelayed error whose value is a CLRegion-MBS object that the location services can more effectively monitor.

6.5.12 locationServicesAvailable as boolean

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the CoreLocation framework is available.
Example:

if CLLocationManagerMBS.locationServicesAvailable then
if CLLocationManagerMBS.locationServicesEnabled then
MsgBox "available and enabled"
else
MsgBox "available and not enabled"
end if
else
MsgBox "Not available"
end if

Notes: Returns true on Mac OS X 10.6 and false on all other systems.

6.5.13 locationServicesEnabled as boolean

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether location services are enabled on the device.
Example:

if CLLocationManagerMBS.locationServicesAvailable then
if CLLocationManagerMBS.locationServicesEnabled then
MsgBox "available and enabled"
else
MsgBox "available and not enabled"
end if
else
MsgBox "Not available"
end if

6.5.14 monitoredRegions as CLRegionMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The array of shared regions monitored by all location manager objects.
Notes:

You cannot add regions to this property directly. Instead, you must register regions by calling the startMonitoringForRegion method. The regions in this property are shared by all instances of the CLLocationMan-

agerMBS class in your application.

The objects in this set may not necessarily be the same objects you specified at registration time. Only the region data itself is maintained by the system. Therefore, the only way to uniquely identify a registered region is using its identifier property.

The location manager persists region data between launches of your application. If your application is terminated and then relaunched, the contents of this property are repopulated with region objects that contain the previously registered data.

Available on Mac OS X 10.7 or later.

6.5.15   regionMonitoringAvailable as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean indicating whether region monitoring is supported on the current device.
Example:

msgbox "regionMonitoringAvailable available: "+str(CLLocationManagerMBS.regionMonitoringAvailable)

Notes:

Available on Mac OS X 10.7 or later.

Returns true if region monitoring is available or false if it is not.

Support for region monitoring may not be available on all devices and models. You should check the value of this property before attempting to set up any regions or initiate region monitoring.

Even if region monitoring support is present on a device, it may still be unavailable because the user disabled it for the current application or for all applications.

6.5.16   regionMonitoringEnabled as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean indicating whether region monitoring is currently enabled.
Notes:

Returns true if region monitoring is available and is currently enabled or false if it is unavailable or not enabled.

The user can enable or disable location services (including region monitoring) altogether from the System Preferences.

You should check the return value of this method before starting region monitoring updates to determine if the user currently allows location services to be used at all. If this method returns false and you start region monitoring updates anyway, the Core Location framework prompts the user with a confirmation panel asking whether location services should be reenabled.

This method does not check to see if region monitoring capabilities are actually supported by the device. Therefore, you should also check the return value of the regionMonitoringAvailable class method before attempting to start region monitoring services.

Available on Mac OS X 10.7 or later.

6.5.17 significantLocationChangeMonitoringAvailable as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns true if the device supports significant location change monitoring, otherwise false.
Example:

msgbox "significantLocationChangeMonitoringAvailable available: "+str(CLLocationManagerMBS.significantLocationChangeMonitoringAvailable)

Notes:

Available on Mac OS X 10.7 or later.

This method indicates whether the device is able to report updates based on significant location changes only. (This primarily involves detecting changes in the cell tower currently associated with the device.) This capability provides tremendous power savings for applications that want to track a user's approximate location and do not need highly accurate position information.

6.5.18 startMonitoringForRegion(region as CLRegionMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts monitoring the specified region.
Notes:

region: The region object that defines the boundary to monitor. This parameter must not be nil.

You must call this method separately for each region you want to monitor. If an existing region with the same identifier is already being monitored by the application, the old region is replaced by the new one. The regions you add using this method are shared by all location manager objects in your application and stored in the monitoredRegions property.

Region events are delivered to the didEnterRegion and didExitRegion events. If there is an error, the location manager calls the monitoringDidFailForRegion event instead.

6.5.19   startMonitoringSignificantLocationChanges

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts the generation of updates based on significant location changes.
Example:

dim c as new CLLocationManagerMBS

c.startMonitoringSignificantLocationChanges

Notes:

This method initiates the delivery of location events asynchronously, returning shortly after you call it. Location events are delivered to your delegate's didUpdateToLocation event. The first event to be delivered is usually the most recently cached location event (if any) but may be a newer event in some circumstances. Obtaining a current location fix may take several additional seconds, so be sure to check the timestamps on the location events in your event code.

After returning a current location fix, the receiver generates update events only when a significant change in the user's location is detected. For example, it might generate a new event when the device becomes associated with a different cell tower. It does not rely on the value in the distanceFilter property to generate events. Calling this method several times in succession does not automatically result in new events being generated. Calling stopMonitoringSignificantLocationChanges in between, however, does cause a new initial event to be sent the next time you call this method.

In addition to your subclass implementing the didUpdateToLocation event, it should also implement the didFailWithError event to respond to potential errors.

Available in Mac OS X 10.7 or later.

6.5.20   startUpdatingHeading

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts the generation of updates that report the user's current heading.
Notes:

This method returns immediately. Calling this method when the receiver is stopped causes it to obtain an initial heading and notify your delegate. After that, the receiver generates update events when the value in the headingFilter property is exceeded.

Before calling this method, you should always check the headingAvailable property to see whether heading information is supported on the current device. If heading information is not supported, calling this method has no effect and does not result in the delivery of events to your delegate.

Calling this method several times in succession does not automatically result in new events being generated. Calling stopUpdatingHeading in between, however, does cause a new initial event to be sent the next time you call this method.

If you start this service and your application is suspended, the system stops the delivery of events until your application starts running again (either in the foreground or background). If your application is terminated, the delivery of new heading events stops altogether and must be restarted by your code when the application is relaunched.

Heading events are delivered to the didUpdateHeading event. If there is an error, the location manager calls the
didFailWithError event instead.

6.5.21   startUpdatingLocation

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts the generation of updates that report the user's current location.
Example:

dim c as new CLLocationManagerMBS

c.startUpdatingLocation

Notes:

This method returns immediately. Calling this method when the receiver is stopped causes it to obtain an initial location fix (which may take several seconds) and notify your delegate. After that, the receiver generates update events primarily when the value in the distanceFilter property is exceeded. Updates may be delivered in other situations though. For example, the receiver may send another notification if the hardware

gathers a more accurate location reading.

Calling this method several times in succession does not automatically result in new events being generated. Calling stopUpdatingLocation in between, however, does cause a new initial event to be sent the next time you call this method.

6.5.22   stopMonitoringForRegion(region as CLRegionMBS)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Stops monitoring the specified region.
Notes:

region: The region object currently being monitored. This parameter must not be nil.

If the specified region object is not currently being monitored, this method has no effect.

Available on Mac OS X 10.7 or later.

6.5.23   stopMonitoringSignificantLocationChanges

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Stops the delivery of location events based on significant location changes.
Notes:

Use this method to stop the delivery of location events that was started using the startMonitoringSignificantLocationChanges method.
Available on Mac OS X 10.7 or later.

6.5.24   stopUpdatingHeading

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Stops the generation of heading updates.
Notes: Call this method whenever your code no longer needs to receive heading-related events. Disabling event delivery gives the receiver the option of disabling the appropriate hardware (and thereby saving power) when no clients need location data. You can always restart the generation of heading updates by calling the startUpdatingHeading method again.

6.5.25 stopUpdatingLocation

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Stops the generation of location updates.
Example:

dim c as new CLLocationManagerMBS

c.startUpdatingLocation
// later
c.stopUpdatingLocation

Notes: You should call this method whenever your code no longer needs to receive location-related events. Disabling event delivery gives the receiver the option of disabling the appropriate hardware (and thereby saving power) when no clients need location data. You can always restart the generation of location updates by calling the startUpdatingLocation method again.

6.5.26 Properties

6.5.27 desiredAccuracy as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The desired accuracy of the location data.
Example:

dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyBest

Notes:

The receiver does its best to achieve the requested accuracy; however, the actual accuracy is not guaranteed.

You should assign a value to this property that is appropriate for your usage scenario. In other words, if you need only the current location within a few kilometers, you should not specify kCLLocationAccuracyBest for the accuracy. Determining a location with greater accuracy requires more time and more power.

When requesting high accuracy location data, the initial event delivered by the location service may not have the accuracy you requested. The location service delivers the initial event as quickly as possible. It then continues to determine the location with the accuracy you requested and delivers additional events, as necessary, when that data is available.

The default value of this property is kCLLocationAccuracyBest.
(Read and Write property)

6.5.28   distanceFilter as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The minimum distance (measured in meters) a device must move laterally before an update event is generated.
Example:

dim c as new CLLocationManagerMBS
c.distanceFilter=CLLocationMBS.kCLDistanceFilterNone

Notes:

This distance is measured relative to the previously delivered location. Use the value kCLDistanceFilterNone to be notified of all movements.

The default value of this property is kCLDistanceFilterNone.
(Read and Write property)

6.5.29   Handle as Integer

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal reference to the CLLocationManager object.
Example:

dim c as new CLLocationManagerMBS

MsgBox str(c.Handle) // not zero on success

Notes: (Read and Write property)

6.5.30   location as CLLocationMBS

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The most recently retrieved user location.
Example:

dim c as new CLLocationMBS(1,2,3,4,5,nil)

MsgBox c.description

Notes:

The value of this property is nil if no location data has ever been retrieved.

It is a good idea to check the timestamp of the location that is returned. If the receiver is currently gathering location data, but the minimum distance filter is large, the returned location might be relatively old. If it is, you can stop the receiver and start it again to force an update.
(Read only property)

6.5.31 maximumRegionMonitoringDistance as Double

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The largest boundary distance that can be assigned to a region.
Notes:

This property defines the largest boundary distance allowed from a region's center point. Attempting to monitor a region with a distance larger than this value causes the location manager to send a kCLErrorRegionMonitoringFailure error to the delegate.

If region monitoring is unavailable or not supported, the value in this property is -1.

Available on Mac OS X 10.7 or later.
(Read only property)

6.5.32 purpose as string

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An application-provided string that describes the reason for using location services.
Notes:

If this property is not "" and the system needs to ask for the user's consent to use location services, it displays the provided string. You can use this string to explain why your application is using location services.

You must set the value of this property prior to starting any location services. Because the string is ultimately displayed to the user, you should always load it from a localized strings file.

Available on Mac OS X 10.7 or later.
(Read and Write property)

6.5.33   Events

6.5.34   didChangeAuthorizationStatus(status as Integer)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the delegate that the authorization status for the application changed.
Notes:

status: The new authorization status for the application.

This method is called whenever the application's ability to use location services changes. Changes can occur because the user allowed or denied the use of location services for your application or for the system as a whole.

6.5.35   didEnterRegion(region as CLRegionMBS)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the delegate that the user entered the specified region.
Notes:

region: An object containing information about the region that was entered.

The region object provided may not be the same one that was registered. As a result, you should never perform pointer-level comparisons to determine equality. Instead, use the region's identifier string to determine if your delegate should respond.

6.5.36   didExitRegion(region as CLRegionMBS)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the delegate that the user left the specified region.
Notes:

manager: The location manager object reporting the event.
region: An object containing information about the region that was exited.

The region object provided may not be the same one that was registered. As a result, you should never perform pointer-level comparisons to determine equality. Instead, use the region's identifier string to determine if your delegate should respond.

6.5.37   didFailWithError(error as NSErrorMBS)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells you that the location manager was unable to retrieve a location value.
Notes:

error: The error object containing the reason why the location could not be retrieved.

If the location service is unable to retrieve a location fix right away, it reports a kCLErrorLocationUnknown error and keeps trying. In such a situation, you can simply ignore the error and wait for a new event.

If the user denies your application's use of the location service, this method reports a kCLErrorDenied error. Upon receiving such an error, you should stop the location service.

6.5.38   didFinishDeferredUpdatesWithError(error as NSErrorMBS)

Plugin Version: 13.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when deferred updates will no longer be delivered.
Notes:

Stopping location, disallowing deferred updates, and meeting a specified criterion are all possible reasons for finishing deferred updates.

An error will be returned if deferred updates end before the specified criteria are met (see CLError).
Requires Mac OS X 10.9.

6.5.39   didStartMonitoringForRegion(region as CLRegionMBS)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells you that a new region is being monitored.
Notes: region: The region that is being monitored.

6.5.40   didUpdate(newLocation as CLLocationMBS, oldLocation as CLLocationMBS)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells you that a new location value is available.
Notes:

newLocation: The new location data.
oldLocation: The location data from the previous update. If this is the first update event delivered by this

location manager, this parameter is nil.

By the time this event is called, the new location data is also available directly from the CLLocationManagerMBS object. The newLocation parameter may contain the data that was cached from a previous usage of the location service. You can use the timestamp property of the location object to determine how recent the location data is.

6.5.41   didUpdateHeading(newHeading as CLHeadingMBS)

Plugin Version: 12.3, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells you that the location manager received updated heading information.
Notes:

Implementation of this method is optional but expected if you start heading updates using the startUpdatingHeading method.

The location manager object calls this method after you initially start the heading service. Subsequent events are delivered when the previously reported value changes by more than the value specified in the headingFilter property of the location manager object.

6.5.42   didUpdateLocations(locations() as CLLocationMBS)

Plugin Version: 13.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when new locations are available.
Notes:

Required for delivery of deferred locations.
If implemented, updates will not be delivered to didUpdate.
Requires Mac OS X 10.9.

6.5.43   monitoringDidFailForRegion(region as CLRegionMBS, error as NSErrorMBS)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the delegate that a region monitoring error occurred.
Notes:

region: The region for which the error occurred.
error: An error object containing the error code that indicates why region monitoring failed.

If an error occurs while trying to monitor a given region, the location manager sends this message to its

delegate. Region monitoring might fail because the region itself cannot be monitored or because there was a more general failure in configuring the region monitoring service.

Although implementation of this event is optional, it is recommended that you implement it if you use region monitoring in your application.

6.5.44 Constants

6.5.45 kCLAuthorizationStatusAuthorized = 3

Plugin Version: 11.2. **Function:** One of the authorization status constants.
Notes: This application is authorized to use location services.

6.5.46 kCLAuthorizationStatusDenied = 2

Plugin Version: 11.2. **Function:** One of the authorization status constants.
Notes: The user explicitly denied the use of location services for this application or location services are currently disabled in Settings.

6.5.47 kCLAuthorizationStatusNotDetermined = 0

Plugin Version: 11.2. **Function:** One of the authorization status constants.
Notes: The user has not yet made a choice regarding whether this application can use location services.

6.5.48 kCLAuthorizationStatusRestricted = 1

Plugin Version: 11.2. **Function:** One of the authorization status constants.
Notes: This application is not authorized to use location services. The user cannot change this application's status, possibly due to active restrictions such as parental controls being in place.

6.5.49 kCLDeviceOrientationFaceDown = 6

Plugin Version: 12.3. **Function:** One of the orientation constants
Notes: The device is held parallel to the ground with the screen facing downwards.

6.5.50   kCLDeviceOrientationFaceUp = 5

Plugin Version: 12.3. **Function:** One of the orientation constants
Notes: The device is held parallel to the ground with the screen facing upwards.

6.5.51   kCLDeviceOrientationLandscapeLeft = 3

Plugin Version: 12.3. **Function:** One of the orientation constants
Notes: The device is in landscape mode, with the device held upright and the home button on the right side.

6.5.52   kCLDeviceOrientationLandscapeRight = 4

Plugin Version: 12.3. **Function:** One of the orientation constants
Notes: The device is in landscape mode, with the device held upright and the home button on the left side.

6.5.53   kCLDeviceOrientationPortrait = 1

Plugin Version: 12.3. **Function:** One of the orientation constants
Notes: The device is in portrait mode, with the device held upright and the home button at the bottom.

6.5.54   kCLDeviceOrientationPortraitUpsideDown = 2

Plugin Version: 12.3. **Function:** One of the orientation constants
Notes: The device is in portrait mode but upside down, with the device held upright and the home button at the top.

6.5.55   kCLDeviceOrientationUnknown = 0

Plugin Version: 12.3. **Function:** One of the orientation constants
Notes: The orientation is currently not known.

6.5.56   kCLErrorDenied = 1

Plugin Version: 9.6. **Function:** One of the error codes reported by the location manager error event.
Notes: Access to the location service was denied by the user.

6.5.57 kCLErrorGeocodeCanceled = 10

Plugin Version: 12.3. **Function:** One of the CoreLocation error constants.
Notes: The geocode request was canceled.

6.5.58 kCLErrorGeocodeFoundNoResult = 8

Plugin Version: 12.3. **Function:** One of the CoreLocation error constants.
Notes: The geocode request yielded no result.

6.5.59 kCLErrorGeocodeFoundPartialResult = 9

Plugin Version: 12.3. **Function:** One of the CoreLocation error constants.
Notes: The geocode request yielded a partial result.

6.5.60 kCLErrorHeadingFailure = 3

Plugin Version: 12.3. **Function:** One of the CoreLocation error constants.
Notes: The heading could not be determined.

6.5.61 kCLErrorLocationUnknown = 0

Plugin Version: 9.6. **Function:** One of the error codes reported by the location manager error event.
Notes: The location manager was unable to obtain a location value right now.

6.5.62 kCLErrorNetwork = 2

Plugin Version: 12.3. **Function:** One of the CoreLocation error constants.
Notes: The network was unavailable or a network error occurred.

6.5.63 kCLErrorRegionMonitoringDenied = 4

Plugin Version: 12.3. **Function:** One of the CoreLocation error constants.
Notes: Access to the region monitoring service was denied by the user.

6.5.64   kCLErrorRegionMonitoringFailure = 5

Plugin Version: 12.3. **Function:** One of the CoreLocation error constants.
Notes: A registered region cannot be monitored.

6.5.65   kCLErrorRegionMonitoringResponseDelayed = 7

Plugin Version: 12.3. **Function:** One of the CoreLocation error constants.
Notes: Core Location will deliver events but they may be delayed.

6.5.66   kCLErrorRegionMonitoringSetupDelayed = 6

Plugin Version: 12.3. **Function:** One of the CoreLocation error constants.
Notes: Core Location could not initialize the region monitoring feature immediately.

6.6   class CLLocationMBS

6.6.1   class CLLocationMBS

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A CLLocationMBS object represents the location data generated by a CLLocationManagerMBS object.
Example:

dim c as new CLLocationMBS(50,7)

MsgBox c.description

// example output: <+50.00000000, +7.00000000>+/- 0.00m (speed -1.00 mps / course -1.00) @ 2009-08-28 23:59:58 +0200

Notes:

This object incorporates the geographical coordinates and altitude of the device's location along with values indicating the accuracy of the measurements and when those measurements were made. On some devices, this class also reports information about the speed and heading in which the device is moving.

Typically, you use a CLLocationManagerMBS object to create instances of this class based on the last known location of the user's device. You can create instances yourself, however, if you want to cache custom location data or get the distance between two different coordinate points.

This class is designed to be used as is and should not be subclassed.

Requires Mac OS X 10.6

6.6.2   Methods

6.6.3   Available as boolean

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

6.6.4   Constructor(latitude as Double, longitude as Double)

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and returns a location object with the specified latitude and longitude.

Example:

dim c as new CLLocationMBS(50,7)

MsgBox c.description

// example output: <+50.00000000, +7.00000000>+/- 0.00m (speed -1.00 mps / course -1.00) @ 2009-08-28 23:59:58 +0200

Notes:

latitude: The latitude of the coordinate point.
longitude: The longitude of the coordinate point.

Typically, you acquire location objects from the location service, but you can use this method to create new location objects for other uses in your application. When using this method, the other properties of the object are initialized to appropriate values. In particular, the altitude and horizontalAccuracy properties are set to 0, the verticalAccuracy property is set to -1 to indicate that the altitude value is invalid, and the timestamp property is set to the time at which the instance was initialized.

Requires Mac OS X 10.6
See also:

6.6.5   Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, course as Double, speed as Double, timestamp as date)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes a location object with the specified coordinate and course information.
Notes:

latitude and longitude: A coordinate structure containing the latitude and longitude values.
altitude: The altitude value for the location.
horizontalAccuracy: The accuracy of the coordinate value. Specifying a negative number indicates that the coordinate value is invalid.
verticalAccuracy: The accuracy of the altitude value. Specifying a negative number indicates that the altitude value is invalid.
course: The direction of travel for the location.
speed: The current speed associated with this location.

timestamp: The time to associate with the location object. Typically, you would set this to the current time.

Typically, you acquire location objects from the location service, but you can use this method to create new location objects for other uses in your application.

Available on Mac OS X 10.7 or newer.
See also:

6.6.6 Constructor(latitude as Double, longitude as Double, altitude as Double, horizontalAccuracy as Double, verticalAccuracy as Double, timestamp as date)

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and returns a location object with the specified coordinate information.
Example:

dim c as new CLLocationMBS(1,2,3,4,5,nil)

MsgBox c.description

Notes:

coordinate: A coordinate structure containing the latitude and longitude values.
altitude: The altitude value for the location.
horizontalAccuracy: The accuracy of the coordinate value. Specifying a negative number indicates that the coordinate value is invalid.
verticalAccuracy: The accuracy of the altitude value. Specifying a negative number indicates that the altitude value is invalid.
timestamp: The time to associate with the location object. Typically, you would set this to the current time.

Typically, you acquire location objects from the location service, but you can use this method to create new location objects for other uses in your application.
See also:

6.6.7   copy as CLLocationMBS

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of the object.
Example:

dim c as new CLLocationMBS(5,6)

dim n as CLLocationMBS = c.copy

MsgBox n.description

Notes: Internally a new CLLocation object is created with a copy of the data.

6.6.8   distanceFromLocation(location as CLLocationMBS) as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the distance (in meters) between the two locations.
Example:

// Nickenich 50 24' 48" N, 7 19' 47" E
// Andernach 50 26' 23" N, 7 24' 6" E

dim c1 as new CLLocationMBS(50.439722, 7.40167) // Andernach
dim c2 as new CLLocationMBS(50.413333, 7.32972) // Nickenich

MsgBox str(c1.distanceFromLocation(c2))+" meter"

Notes: This method measures the distance between the two locations by tracing a line between them that follows the curvature of the Earth. The resulting arc is a smooth curve and does not take into account specific altitude changes between the two locations.

6.6.9   kCLDistanceFilterNone as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This constant indicates the minimum distance required before an event is generated.
Notes: All movements are reported.

6.6.10 kCLLocationAccuracyBest as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A constant value you can use to specify the accuracy of a location.
Example:

dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyBest

Notes: Use the best possible accuracy.

6.6.11 kCLLocationAccuracyBestForNavigation as Double

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A constant value you can use to specify the accuracy of a location.
Notes: Available on Mac OS X 10.7 or later.

6.6.12 kCLLocationAccuracyHundredMeters as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A constant value you can use to specify the accuracy of a location.
Example:

dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyHundredMeters

Notes: Accurate to within one hundred meters.

6.6.13 kCLLocationAccuracyKilometer as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A constant value you can use to specify the accuracy of a location.
Example:

dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyKilometer

Notes: Accurate to the nearest kilometer.

6.6.14   kCLLocationAccuracyNearestTenMeters as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A constant value you
can use to specify the accuracy of a location.
Example:

dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyNearestTenMeters

Notes: Accurate to within ten meters of the desired target.

6.6.15   kCLLocationAccuracyThreeKilometers as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A constant value you
can use to specify the accuracy of a location.
Example:

dim c as new CLLocationManagerMBS

c.desiredAccuracy=CLLocationMBS.kCLLocationAccuracyThreeKilometers

Notes: Accurate to the nearest three kilometers.

6.6.16   Properties

6.6.17   altitude as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The altitude in
meters.
Example:

dim c as new CLLocationMBS(1,2,3,4,5,nil)

MsgBox str(c.altitude)

Notes:

Positive values indicate altitudes above sea level. Negative values indicate altitudes below sea level.
(Read only property)

6.6.18   course as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The direction in
which the device is travelling.
Example:

dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox str(l.course)
end if

Notes:

Course values are measured in degrees starting at due north and continuing clockwise around the compass.
Thus, north is 0 degrees, east is 90 degrees, south is 180 degrees, and so on. Course values may not be
available on all devices. A negative value indicates that the direction is invalid.
(Read only property)

6.6.19   description as string

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the location
data in a formatted text string.
Example:

dim c as new CLLocationMBS(50.439722, 7.40167)

MsgBox C.description
// shows for example:
// <+50.43972200, +7.40167000>+/- 0.00m (speed -1.00 mps / course -1.00) @ 2009-08-29 14:22:39 +0200

Notes:

A string of the form "<<latitude>, <longitude>>+/- <accuracy>m (speed <speed>kph / heading <heading>) @ <date-time>", where <latitude>, <longitude>, <accuracy>, <speed>, and <heading>are formatted floating point numbers and <date-time>is a formatted date string that includes date, time, and time zone information.

The returned string is intended for display purposes only.
(Read only property)

6.6.20   Handle as Integer

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal reference to the CLLocation object.
Example:

dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox str(l.handle)
end if

Notes: (Read and Write property)

6.6.21   horizontalAccuracy as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The radius of uncertainty for the location, measured in meters.
Example:

dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox str(l.horizontalAccuracy)
end if

Notes:

The coordinate's latitude and longitude identify the center of the circle and this value indicates the radius of that circle. A negative value indicates that the coordinate's latitude and longitude are invalid. (Read only property)

6.6.22 latitude as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The geographical coordinate information.
Example:

dim c as new CLLocationMBS(50.413333, 7.32972)

MsgBox str(C.latitude) // shows 50.413333

Notes: (Read only property)

6.6.23 longitude as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The geographical coordinate information.
Example:

dim c as new CLLocationMBS(50.413333, 7.32972)

MsgBox str(C.longitude) // shows 7.32972

Notes: (Read only property)

6.6.24 speed as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The instantaneous speed of the device in meters per second.
Example:

dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox str(l.speed)

end if

Notes:

This value reflects the instantaneous speed of the device in the direction of its current heading. A negative value indicates an invalid speed. Because the actual speed can change many times between the delivery of subsequent location events, you should use this property for informational purposes only.
(Read only property)

6.6.25   timestamp as date

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The time at which this location was determined.
Example:

dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox l.timestamp.SQLDateTime
end if

Notes: (Read only property)

6.6.26   verticalAccuracy as Double

Plugin Version: 9.6, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The accuracy of the altitude value in meters.
Example:

dim c as CLLocationManagerMBS // your global instance

dim l as CLLocationMBS = c.location

if l<>Nil then
MsgBox str(l.verticalAccuracy)
end if

Notes:

The value in the altitude property could be plus or minus the value indicated by this property. A negative value indicates that the altitude value is invalid.
(Read only property)

6.7   class CLPlacemarkMBS

6.7.1   class CLPlacemarkMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A CLPlacemark object stores placemark data for a given latitude and longitude.
Notes: Placemark data includes information such as the country, state, city, and street address associated with the specified coordinate. It can also include points of interest and geographically related data. Placemark objects are typically generated by a CLGeocoder object, although you can also create them explicitly yourself.

6.7.2   Methods

6.7.3   addressDictionary as Dictionary

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A dictionary containing the Address Book keys and values for the placemark. (read-only)
Notes:

The keys in this dictionary are those defined by the Address Book framework and used to access address information for a person. For a list of the strings that can be in this dictionary, see the Address Property constants in ABPerson Reference.

You can format the contents of this dictionary to get a full address string as opposed to building the address yourself.

Available in OS X v10.8 and later.

6.7.4   administrativeArea as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The state or province associated with the placemark. (read-only)
Notes:

If the placemark location is Apple's headquarters, for example, the value for this property would be the string "CA" or "California".
Available in OS X v10.8 and later.

6.7.5   areasOfInterest as string()

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The relevant areas of interest associated with the placemark. (read-only)
Notes:

Examples of an area of interest are the name of a military base or large national park or an attraction such as Eiffel Tower, Disneyland, or Golden Gate Park.
Available in OS X v10.8 and later.

6.7.6   Available as boolean

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

6.7.7   Constructor(placement as CLPlacemarkMBS)

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and returns a placemark object from another placemark object.
Notes:

You can use this method to transfer information from one placemark object to another placemark object.
Available in OS X v10.8 and later.

6.7.8   copy as CLPlacemarkMBS

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

6.7.9   country as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of the country associated with the placemark. (read-only)
Notes:

If the placemark location is Apple's headquarters, for example, the value for this property would be the string "United States".
Available in OS X v10.8 and later.

6.7.10   description as string

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

6.7.11   inlandWater as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of the inland water body associated with the placemark. (read-only)
Notes:

For coordinates that lie over an inland body of water, this property contains the name of that water bodythe name of a lake, stream, river, or other waterway.
Available in OS X v10.8 and later.

6.7.12   ISOcountryCode as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The abbreviated country name. (read-only)
Notes:

This string is the standard abbreviation used to refer to the country. For example, if the placemark location is Apple's headquarters, the value for this property would be the string "US".
Available in OS X v10.8 and later.

6.7.13   locality as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The city associated with the placemark. (read-only)
Notes:

If the placemark location is Apple's headquarters, for example, the value for this property would be the string "Cupertino".
Available in OS X v10.8 and later.

6.7.14   location as CLLocationMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The location object containing latitude and longitude information. (read-only)
Notes:

This object is used to initialize the placemark object.
Available in OS X v10.8 and later.

6.7.15 name as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of the placemark. (read-only)
Notes: Available in OS X v10.8 and later.

6.7.16 ocean as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of the ocean associated with the placemark. (read-only)
Notes:

For coordinates that lie over an ocean, this property contains the name of the ocean.
Available in OS X v10.8 and later.

6.7.17 postalCode as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The postal code associated with the placemark. (read-only)
Notes:

If the placemark location is Apple's headquarters, for example, the value for this property would be the string "95014".
Available in OS X v10.8 and later.

6.7.18 region as CLRegionMBS

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The geographic region associated with the placemark. (read-only)
Notes: Available in OS X v10.8 and later.

6.7.19 subAdministrativeArea as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Additional administrative area information for the placemark. (read-only)
Notes:

Subadministrative areas typically correspond to counties or other regions that are then organized into a larger administrative area or state. For example, if the placemark location is Apple's headquarters, the value for this property would be the string "Santa Clara", which is the county in California that contains the city of Cupertino.

Available in OS X v10.8 and later.

6.7.20   subLocality as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Additional city-level information for the placemark. (read-only)
Notes:

This property contains additional information, such as the name of the neighborhood or landmark associated with the placemark. It might also refer to a common name that is associated with the location.
Available in OS X v10.8 and later.

6.7.21   subThoroughfare as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Additional street-level information for the placemark. (read-only)
Notes:

Subthroughfares provide information such as the street number for the location. For example, if the place-mark location is Apple's headquarters (1 Infinite Loop), the value for this property would be the string "1".

Available in OS X v10.8 and later.

6.7.22   thoroughfare as string

Plugin Version: 12.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The street address associated with the placemark. (read-only)
Notes:

The street address contains the street name. For example, if the placemark location is Apple's headquarters, the value for this property would be the string "Infinite Loop".

Available in OS X v10.8 and later.

6.7.23 Properties

6.7.24 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)

6.8   class CLRegionMBS

6.8.1   class CLRegionMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The CLRegion class defines a geographical area that can be tracked.
Example:

dim c as new CLRegionMBS(50.413333, 7.329722, 3000, "Nickenich")

msgbox c.identifier+" "+str(c.latitude)+"/"+str(c.longitude)+", "+str(c.radius)+"m"

Notes:

When an instance of this class is registered with a CLLocationManagerMBS object, the location manager generates an appropriate event whenever the user crosses the boundaries of the defined area.

To use this class, create an instance of it and use the startMonitoringForRegion method of a CLLocationManager object to begin monitoring it.

Please also check the documentation from Apple for the CLRegion class.
Available on Mac OS X 10.7 or later.

6.8.2   Methods

6.8.3   Available as boolean

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

6.8.4   Constructor(latitude as Double, longitude as Double, radius as Double, identifier as string)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes a region object defining a circular area.
Notes:

latitude and longitude: The center point of the region.
radius: The distance (measured in meters) from the center point that marks the boundary of the region.
identifier: A unique identifier to associate with the region object. You use this identifier to differentiate regions within your application. This value must not be "".

identifier is a description for the region that could be displayed to the user, and ideally should be chosen by the user.

On success the handle property is not zero.

6.8.5   containsCoordinate(latitude as Double, longitude as Double) as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a Boolean value indicating whether the region contains the specified coordinate.
Notes:

latitude and longitude: The coordinate to test against the region.

Returns true if the coordinate lies within the region's boundaries or false if it does not.

6.8.6   copy as CLRegionMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of the region object.

6.8.7   identifier as string

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The identifier for the region object.
Example:

dim c as new CLRegionMBS(50.413333, 7.329722, 3000, "Nickenich")
msgbox c.identifier

6.8.8   latitude as Double

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The position of the center of the region.

6.8.9   longitude as Double

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The position of the center of the region.

6.8.10   radius as Double

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The radius (measured in meters) that defines the region's outer boundary.

6.8.11   Properties

6.8.12   Handle as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal CLRegion object reference.
Notes: (Read and Write property)

Chapter 7

Declare

7.1 class BlockMBS

7.1.1 class BlockMBS

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A class to use blocks on Mac OS X with declares.

7.1.2 Methods

7.1.3 Close

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Releases all blocks.

7.1.4 GetBlockB(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address of a block to pass to a declare.
Notes:

Tag is passed to the event.
Later when the block is invoked, the BlockB event is called. If the block is invoked on the main thread, we call the event directly. Else we schedule to call the event as soon as possible on the main thread. With running the event later, we can of course not return the event result to the block caller, but only the value in the AsyncBoolResult property.

7.1.5   GetBlockBI(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address
of a block to pass to a declare.
Notes:

Tag is passed to the event.
Later when the block is invoked, the BlockBI event is called. If the block is invoked on the main thread,
we call the event directly. Else we schedule to call the event as soon as possible on the main thread. With
running the event later, we can of course not return the event result to the block caller, but only the value
in the AsyncBoolResult property.

7.1.6   GetBlockBII(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address
of a block to pass to a declare.
Notes:

Tag is passed to the event.
Later when the block is invoked, the BlockBII event is called. If the block is invoked on the main thread,
we call the event directly. Else we schedule to call the event as soon as possible on the main thread. With
running the event later, we can of course not return the event result to the block caller, but only the value
in the AsyncBoolResult property.

7.1.7   GetBlockBIII(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address
of a block to pass to a declare.
Notes:

Tag is passed to the event.
Later when the block is invoked, the BlockBIII event is called. If the block is invoked on the main thread,
we call the event directly. Else we schedule to call the event as soon as possible on the main thread. With
running the event later, we can of course not return the event result to the block caller, but only the value
in the AsyncBoolResult property.

7.1.8   GetBlockBIIII(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address
of a block to pass to a declare.
Notes:

Tag is passed to the event.

Later when the block is invoked, the BlockBIIII event is called. If the block is invoked on the main thread, we call the event directly. Else we schedule to call the event as soon as possible on the main thread. With running the event later, we can of course not return the event result to the block caller, but only the value in the AsyncBoolResult property.

7.1.9   GetBlockV(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address of a block to pass to a declare.
Notes:

Tag is passed to the event.
Later when the block is invoked, the BlockV event is called. If the block is invoked on the main thread, we call the event directly. Else we schedule to call the event as soon as possible on the main thread.

7.1.10   GetBlockVI(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address of a block to pass to a declare.
Notes:

Tag is passed to the event.
Later when the block is invoked, the BlockVI event is called. If the block is invoked on the main thread, we call the event directly. Else we schedule to call the event as soon as possible on the main thread.

7.1.11   GetBlockVII(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address of a block to pass to a declare.
Notes:

Tag is passed to the event.
Later when the block is invoked, the BlockVII event is called. If the block is invoked on the main thread, we call the event directly. Else we schedule to call the event as soon as possible on the main thread.

7.1.12   GetBlockVIII(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address of a block to pass to a declare.
Notes:

Tag is passed to the event.
Later when the block is invoked, the BlockVIII event is called. If the block is invoked on the main thread,
we call the event directly. Else we schedule to call the event as soon as possible on the main thread.

7.1.13   GetBlockVIIII(tag as Variant = nil) as Integer

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address
of a block to pass to a declare.
Notes:

Tag is passed to the event.
Later when the block is invoked, the BlockVIIII event is called. If the block is invoked on the main thread,
we call the event directly. Else we schedule to call the event as soon as possible on the main thread.

7.1.14   Properties

7.1.15   AsyncBoolResult as Boolean

Plugin Version: 13.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The result for a
boolean block called on a non main thread.
Notes:

If you use one of the BlockB methods to get a block and it's called on another thread but the main thread,
we return the value of this property instead of the actual event result.
(Read only property)

7.1.16   Synchronous as Boolean

Plugin Version: 16.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether to call
events synchronously.
Notes:

If the block is called on another thread, the plugin calls the event on the main thread.
If Synchronous is true, we call the main thread synchronously, else asynchronously.
Default is asynchronously to avoid dead locks.
(Read and Write property)

7.1.17 Events

7.1.18 BlockB(Async‿ as boolean, tag as Variant) as boolean

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.
If you return a boolean, we pass it to the caller if async=false. For Async = true, the plugin already passed back AsyncBoolResult for you before this event is called.

7.1.19 BlockBI(Async‿ as boolean, tag as Variant, value as Integer) as boolean

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.
Value properties give the actual values. You may need to cast to Ptr, Boolean or whatever data type you expect.
If you return a boolean, we pass it to the caller if async=false. For Async = true, the plugin already passed back AsyncBoolResult for you before this event is called.

7.1.20 BlockBII(Async‿ as boolean, tag as Variant, value1 as Integer, value2 as Integer) as boolean

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.
Value properties give the actual values. You may need to cast to Ptr, Boolean or whatever data type you expect.
If you return a boolean, we pass it to the caller if async=false. For Async = true, the plugin already passed back AsyncBoolResult for you before this event is called.

7.1.21 BlockBIII(Async_ as boolean, tag as Variant, value1 as Integer, value2 as Integer, value3 as Integer) as boolean

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.
Value properties give the actual values. You may need to cast to Ptr, Boolean or whatever data type you expect.
If you return a boolean, we pass it to the caller if async=false. For Async = true, the plugin already passed back AsyncBoolResult for you before this event is called.

7.1.22 BlockBIIII(Async_ as boolean, tag as Variant, value1 as Integer, value2 as Integer, value3 as Integer, value4 as Integer) as boolean

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.
Value properties give the actual values. You may need to cast to Ptr, Boolean or whatever data type you expect.
If you return a boolean, we pass it to the caller if async=false. For Async = true, the plugin already passed back AsyncBoolResult for you before this event is called.

7.1.23 BlockV(Async_ as boolean, tag as Variant)

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.

7.1.24 BlockVI(Async_ as boolean, tag as Variant, value as Integer)

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.
Value properties give the actual values. You may need to cast to Ptr, Boolean or whatever data type you expect.

7.1.25 BlockVII(Async_ as boolean, tag as Variant, value1 as Integer, value2 as Integer)

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.
Value properties give the actual values. You may need to cast to Ptr, Boolean or whatever data type you expect.

7.1.26 BlockVIII(Async_ as boolean, tag as Variant, value1 as Integer, value2 as Integer, value3 as Integer)

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.
Value properties give the actual values. You may need to cast to Ptr, Boolean or whatever data type you expect.

7.1.27 BlockVIIII(Async_ as boolean, tag as Variant, value1 as Integer, value2 as Integer, value3 as Integer, value4 as Integer)

Plugin Version: 13.4, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when block is invoked.
Notes:

Async: False if block is invoked directly on main thread. Else true so invoked later on main thread.
Tag: The tag value passed on block creation.
Value properties give the actual values. You may need to cast to Ptr, Boolean or whatever data type you expect.

Chapter 8

MapKit

8.1 control MapKitViewControlMBS

8.1.1 control MapKitViewControlMBS

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control for showing a map in Xojo.
Notes:

This control is designed for Xojo, but may work also in Cocoa target in Real Studio.

As Xojo provides some events for us automatically like for context menu or mouse wheel, it does not mean that those events do work. The webview used in the map view seems to consume them before the plugin gets them.

8.1.2 Methods

8.1.3 showAddress(address as string)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method to run an address geocoding and shows position on map.

8.1.4   Properties

8.1.5   View as MKMapViewMBS

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The map view used
for this control.
Notes:

The plugin creates it automatically when the constructor runs.
(Read only property)

8.1.6   Events

8.1.7   annotationViewDidChangeDragState(mapView as MKMapViewMBS, annotationView as MKAnnotationViewMBS, newState as Integer, oldState as Integer)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control
that the drag state of one of its annotation views changed.
Notes:

mapView: The map view containing the annotation view.
annotationView: The annotation view whose drag state changed.
newState: The new drag state of the annotation view.
oldState: The previous drag state of the annotation view.

The drag state typically changes in response to user interactions with the annotation view. However, the
annotation view itself is responsible for changing that state as well.

8.1.8   beginGestureWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Informs the receiver
that the user has begun a touch gesture.
Notes:

e: An event object representing the gesture beginning.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

8.1.9 BoundsChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the bounds, but not the frame, changed.

8.1.10 contextMenuItemsForAnnotationView(mapView as MKMapViewMBS, view as MKAnnotationViewMBS) as NSMenuItemMBS()

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Your control can provide menuitems to show a contextual menu on an annotation view.

8.1.11 didAddAnnotationViews(mapView as MKMapViewMBS, Annotation-Views() as MKAnnotationViewMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that one or more annotation views were added to the map.
Notes:

mapView: The map view that added the annotation views.
views: An array of MKAnnotationView objects representing the views that were added.

By the time this method is called, the specified views are already added to the map.

8.1.12 didAddOverlayViews(mapView as MKMapViewMBS, overlayViews() as MKOverlayViewMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that one or more overlay views were added to the map.
Notes:

mapView: The map view that added the overlay views.
overlayViews: An array of MKOverlayView objects representing the views that were added.

By the time this method is called, the specified views are already added to the map.

8.1.13 didDeselectAnnotationView(mapView as MKMapViewMBS, view as MKAnnotationViewMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that one of its annotation views was deselected.
Notes:

mapView: The map view containing the annotation view.
view: The annotation view that was deselected.

You can use this method to track changes in the selection state of annotation views.

8.1.14 didFailLoadingMap(mapView as MKMapViewMBS, error as NSErrorMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that the specified view was unable to load the map data.
Notes:

mapView: The map view that started the load operation.
error: The reason that the map data could not be loaded.

This method might be called in situations where the device does not have access to the network or is unable to load the map data for some reason. It may also be called if a request for additional map tiles comes in while a previous request for tiles is still pending. You can use this message to notify the user that the map data is unavailable.

8.1.15 didFailToLocateUserWithError(mapView as MKMapViewMBS, error as NSErrorMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that an attempt to locate the user's position failed.
Notes:

mapView: The map view that is tracking the user's location.
error: An error object containing the reason why location tracking failed.

8.1.16 didFinishLoadingMap(mapView as MKMapViewMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that the specified map view successfully loaded the needed map data.
Notes:

mapView: The map view that started the load operation.

This method is called when the map tiles associated with the current request have been loaded. Map tiles are requested when a new visible area is scrolled into view and tiles are not already available. Map tiles may also be requested for portions of the map that are not currently visible. For example, the map view may load tiles immediately surrounding the currently visible area as needed to handle small pans by the user.

8.1.17 didSelectAnnotationView(mapView as MKMapViewMBS, view as MKAnnotationViewMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that one of its annotation views was selected.
Notes:

mapView: The map view containing the annotation view.
view: The annotation view that was selected.

You can use this method to track changes in the selection state of annotation views.

8.1.18 didStopLocatingUser(mapView as MKMapViewMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that the map view stopped tracking the user's location.
Notes:

mapView: The map view that stopped tracking the user's location.

This method is called when the value of the showsUserLocation property changes to false.

8.1.19 didUpdateUserLocation(mapView as MKMapViewMBS, userLocation as MKUserLocationMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that the location of the user was updated.
Notes:

mapView: The map view that is tracking the user's location.
userLocation: The location object representing the user's latest location. This property may be nil.

While the showsUserLocation property is set to true, this method is called whenever a new location update

is received by the map view. This method is also called if the map view's user tracking mode is set to MKUserTrackingModeFollowWithHeading and the heading changes.

This method is not called if the application is currently running in the background. If you want to receive location updates while running in the background, you must use the Core Location framework.

8.1.20   EnableMenuItems

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Function:** The event where you can enable menu items.

8.1.21   endGestureWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Informs the receiver that the user has ended a touch gesture.
Notes:

e: An event object representing the gesture end.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

8.1.22   FrameChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the frame changed.

8.1.23   geocoderDidFailWithError(geocoder as MKGeocoderMBS, error as NSErrorMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The geocoder failed to map address to coordinate.

8.1.24 geocoderDidFindCoordinate(geocoder as MKGeocoderMBS, coordinate as CLLocationCoordinate2DMBS, Latitude as Double, Longitude as Double)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The geocoder did find a coordinate.

8.1.25 GotFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control itself got focus.
Notes: This only fires if the control itself got focus and not a sub control.

8.1.26 LostFocus

Plugin Version: 16.5, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control lost focus.
Notes: This only fires if the control itself lost focus and not a sub control.

8.1.27 magnifyWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Informs the receiver that the user has begun a pinch gesture.
Notes:

e: An event object representing the magnify gesture.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

8.1.28 MenuAction(HitItem as MenuItem) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when a menuitem is choosen.
Notes: This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

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

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was pressed inside the controls region at the location passed in to x, y.
Notes:

The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner or the Control.
Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.

- You will receive the MouseDrag and MouseUp events.

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

8.1.30   MouseDrag(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event fires continuously after the mouse button was pressed inside the Control.
Notes:

Mouse location is local to the control passed in to x, y.
As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the mouse has really moved.

8.1.31   MouseUp(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was released.
Notes: Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

8.1.32   pressureChange(e as NSEventMBS) as boolean

Plugin Version: 15.1, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Function:** Informs the current object that a pressure change occurred on a system that supports pressure sensitivity.
Notes:

This method is invoked automatically in response to user actions. event is the event that initiated the change in pressure.
Available in OS X v10.10.3 and later.

8.1.33 regionDidChangeAnimated(mapView as MKMapViewMBS, animated as boolean)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that the region displayed by the map view just changed.
Notes:

mapView: The map view whose visible region changed.
animated: If true, the change to the new region was animated.

This method is called whenever the currently displayed map region changes. During scrolling, this method may be called many times to report updates to the map position. Therefore, your implementation of this method should be as lightweight as possible to avoid affecting scrolling performance.

8.1.34 regionWillChangeAnimated(mapView as MKMapViewMBS, animated as boolean)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that the region displayed by the map view is about to change.
Notes:

mapView: The map view whose visible region is about to change.
animated: If true, the change to the new region will be animated. If NO, the change will be made immediately.

This method is called whenever the currently displayed map region changes. During scrolling, this method may be called many times to report updates to the map position. Therefore, your implementation of this method should be as lightweight as possible to avoid affecting scrolling performance.

8.1.35 reverseGeocoderDidFailWithError(geocoder as MKReverseGeocoderMBS, error as NSErrorMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The reverse geocoder failed with an error.

8.1.36 reverseGeocoderDidFindPlacemark(geocoder as MKReverseGeocoderMBS, placemark as MKPlacemarkMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The reverse geocoder did find a placemark.

8.1.37   rotateWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Informs the receiver that the user has begun a rotation gesture.
Notes:

e: An event object representing the rotate gesture.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

8.1.38   ScaleFactorChanged(NewFactor as Double)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The backing store scale factor has changed.
Notes: Please invalidate any cached bitmaps or other relevant state.

8.1.39   swipeWithEvent(e as NSEventMBS) as boolean

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Informs the receiver that the user has begun a swipe gesture.
Notes:

e: An event object representing the swipe gesture.
The event will be sent to the view under the touch in the key window.
Available in Mac OS X v10.6 and later.
Return true if you handled this event.

8.1.40   userDidClickAndHoldAtCoordinate(mapView as MKMapViewMBS, coordinate as CLLocationCoordinate2DMBS, Latitude as Double, Longitude as Double)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The user did click and hold the mouse button down.
Notes: Provides coordinate and you can do something there, like adding a pin.

8.1.41 viewForAnnotation(mapView as MKMapViewMBS, annotation as Variant) as MKAnnotationViewMBS

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns the view associated with the specified annotation object.
Notes:

mapView: The map view that requested the annotation view.
annotation: The object representing the annotation that is about to be displayed. In addition to your custom annotations, this object could be an MKUserLocation object representing the user's current location.

Returns the annotation view to display for the specified annotation or nil if you want to display a standard annotation view.

Rather than create a new view each time this method is called, you should use the dequeueReusableAnnotationViewWithIdentifier method of the MKMapView class to see if an existing annotation view of the desired type already exists. If one does exist, you should update the view to reflect the attributes of the specified annotation and return it. If a view of the appropriate type does not exist, you should create one, configure it with the needed annotation data, and return it.

If the object in the annotation parameter is an instance of the MKUserLocation class, you can provide a custom view to denote the user's location. To display the user's location using the default system view, return nil.

If you do not implement this method, or if you return nil from your implementation for annotations other than the user location annotation, the map view uses a standard pin annotation view.

8.1.42 viewForOverlay(mapView as MKMapViewMBS, overlay as Variant) as MKOverlayViewMBS

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Asks the control for the overlay view to use when displaying the specified overlay object.
Notes:

mapView: The map view that requested the overlay view.
overlay: The object representing the overlay that is about to be displayed.

Returns the view to use when presenting the specified overlay on the map. If you return nil, no view is displayed for the specified overlay object.

8.1.43   willStartLoadingMap(mapView as MKMapViewMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that the specified map view is about to retrieve some map data.
Notes:

mapView: The map view that began loading the data.

This method is called whenever a new group of map tiles need to be downloaded from the server. This typically occurs whenever you expose portions of the map by panning or zooming the content. You can use this method to mark the time that it takes for the map view to load the data.

8.1.44   willStartLocatingUser(mapView as MKMapViewMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Tells the control that the map view will start tracking the user's position.
Notes:

mapView: The map view that is tracking the user's location.

This method is called when the value of the showsUserLocation property changes to true.

8.2 class MKAnnotationMBS

8.2.1 class MKAnnotationMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for annotation protocol in the MapKit framework.
Notes: This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.2.2 Methods

8.2.3 Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

8.2.4 Properties

8.2.5 className as string

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of this MKAnnotation class.
Notes: (Read only property)

8.2.6 classPath as string

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The path of this annotation class.
Notes:

Useful for debugging to know what super classes the annotation has.
(Read only property)

8.2.7 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The center point (specified as a map coordinate) of the annotation.
Notes: (Read only property)

8.2.8   Handle as Integer

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.
Notes: (Read and Write property)

8.2.9   latitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The center point (specified as a map coordinate) of the annotation.
Notes: (Read only property)

8.2.10   longitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The center point (specified as a map coordinate) of the annotation.
Notes: (Read only property)

8.2.11   subtitle as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The string containing the annotation's subtitle.
Notes:

This string is displayed in the callout for the associated annotation view.
(Read and Write property)

8.2.12   title as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The string containing the annotation's title.
Notes:

Although this property is optional, if you support the selection of annotations in your map view, you are expected to provide this property. This string is displayed in the callout for the associated annotation view.
(Read and Write property)

8.3 class MKAnnotationViewMBS

8.3.1 class MKAnnotationViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKAnnotationView class is responsible for presenting annotations visually in a map view.
Notes:

Annotation views are loosely coupled to a corresponding annotation object, which is an object that corresponds to the MKAnnotation protocol. When an annotation's coordinate point is in the visible region, the map view asks its delegate to provide a corresponding annotation view. Annotation views may be recycled later and put into a reuse queue that is maintained by the map view.

see also
https://developer.apple.com/library/ios/documentation/MapKit/Reference/MKAnnotationView_Class/Reference/Reference
Subclass of the MKViewMBS class.

8.3.2 Methods

8.3.3 Constructor(annotation as Variant, reuseIdentifier as string = "")

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and returns a new annotation view.
Notes:

annotation: The annotation object to associate with the new view.
reuseIdentifier: If you plan to reuse the annotation view for similar types of annotations, pass a string to identify it. Although you can pass nil if you do not intend to reuse the view, reusing annotation views is generally recommended.

Returns the initialized annotation view or nil if there was a problem initializing the object.

The reuse identifier provides a way for you to improve performance by recycling annotation views as they are scrolled on and off of the map. As views are no longer needed, they are moved to a reuse queue by the map view. When a new annotation becomes visible, your application can request a view for that annotation by passing the appropriate reuse identifier string to the dequeueReusableAnnotationViewWithIdentifier method of MKMapView.

8.3.4 setCalloutOffset(x as Double, y as Double)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The offset (in pixels) at which to place the callout bubble.

Notes: This property determines the additional distance by which to move the callout bubble. When this property is set to (0, 0), the anchor point of the callout bubble is placed on the top-center point of the annotation view's frame. Specifying positive offset values moves the callout bubble down and to the right, while specifying negative values moves it up and to the left.

8.3.5 setCenterOffset(x as Double, y as Double)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The offset (in pixels) at which to display the view.
Notes: By default, the center point of an annotation view is placed at the coordinate point of the associated annotation. You can use this property to reposition the annotation view as needed. This x and y offset values are measured in pixels. Positive offset values move the annotation view down and to the right, while negative values move it up and to the left.

8.3.6 setSelected(selected as boolean, animated as boolean)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the selection state of the annotation view.
Notes:

selected: Contains the value true if the view should display itself as selected.
animated: Set to true if the change in selection state is animated.

You should not call this method directly. An MKMapView object calls this method in response to user interactions with the annotation.

8.3.7 Properties

8.3.8 annotation as Variant

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The annotation object currently associated with the view.
Notes:

You should not change the value of this property directly. This property contains a non-nil value only while the annotation view is visible on the map. If the view is queued and waiting to be reused, the value is nil (Read and Write property)

8.3.9   calloutOffsetX as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The offset (in pixels) at which to place the callout bubble.
Notes:

This property determines the additional distance by which to move the callout bubble. When this property is set to (0, 0), the anchor point of the callout bubble is placed on the top-center point of the annotation view's frame. Specifying positive offset values moves the callout bubble down and to the right, while specifying negative values moves it up and to the left.
(Read and Write property)

8.3.10   calloutOffsetY as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The offset (in pixels) at which to place the callout bubble.
Notes:

This property determines the additional distance by which to move the callout bubble. When this property is set to (0, 0), the anchor point of the callout bubble is placed on the top-center point of the annotation view's frame. Specifying positive offset values moves the callout bubble down and to the right, while specifying negative values moves it up and to the left.
(Read and Write property)

8.3.11   canShowCallout as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the annotation view is able to display extra information in a callout bubble.
Notes:

If the value of this property is true, a standard callout bubble is shown when the user taps a selected annotation view. The callout uses the title and subtitle text from the associated annotation object. If there is no title text, though, the annotation view is treated as if its enabled property is set to false. The callout also displays any custom callout views stored in the leftCalloutAccessoryView and rightCalloutAccessoryView properties.

If the value of this property is NO, the value of the title and subtitle strings are ignored and the annotation view remains enabled by default. You can still disable the view explicitly using the enabled property.
(Read and Write property)

8.3.12 centerOffsetX as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The offset (in pixels) at which to display the view.
Notes:

By default, the center point of an annotation view is placed at the coordinate point of the associated annotation. You can use this property to reposition the annotation view as needed. This x and y offset values are measured in pixels. Positive offset values move the annotation view down and to the right, while negative values move it up and to the left.
(Read and Write property)

8.3.13 centerOffsetY as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The offset (in pixels) at which to display the view.
Notes:

By default, the center point of an annotation view is placed at the coordinate point of the associated annotation. You can use this property to reposition the annotation view as needed. This x and y offset values are measured in pixels. Positive offset values move the annotation view down and to the right, while negative values move it up and to the left.
(Read and Write property)

8.3.14 draggable as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean indicating whether the annotation view is draggable.
Notes:

Setting this property to true makes an annotation draggable by the user. If true, the associated annotation object must also implement the setCoordinate method. The default value of this property is false.

Setting this property to true, lets the map view know that the annotation is always draggable. In other words, you cannot conditionalize drag operations by attempting to stop an operation that has already been initiated; doing so can lead to undefined behavior. Once begun, the drag operation should always continue to completion.
(Read and Write property)

8.3.15 dragState as Integer

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current drag state of the annotation view.
Notes: (Read and Write property)

8.3.16 enabled as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the annotation is enabled.
Notes:

The default value of this property is true. If the value of this property is false, the annotation view ignores touch events and cannot be selected. Subclasses may also display the annotation contents differently depending on the value of this property.
(Read and Write property)

8.3.17 highlighted as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the annotation view is highlighted.
Notes:

You should not set the value of this property directly. The map view sets it in response to touch events entering or exiting the annotation view's bounds.
(Read and Write property)

8.3.18 imageURL as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The URL for the image to be displayed by the annotation view.
Notes: (Read and Write property)

8.3.19 reuseIdentifier as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The string that identifies that this annotation view is reusable.
Notes:

You specify the reuse identifier when you create the view. You use this type later to retrieve an annotation view that was created previously but which is currently unused because its annotation is not on screen.

If you define distinctly different types of annotations (with distinctly different annotation views to go with them), you can differentiate between the annotation types by specifying different reuse identifiers for each one.
(Read only property)

8.3.20   selected as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the annotation view is currently selected.
Notes:

You should not set the value of this property directly. If the property contains YES, the annotation view is displaying a callout bubble.
(Read and Write property)

8.3.21   Constants

8.3.22   DragStateCanceling = 3

Plugin Version: 14.1. **Function:** One of the constants indicating the current drag state of an annotation view
Notes: An action occurred that indicated the view should cancel the drag operation. You can put an annotation view into this state to abort the operation.

8.3.23   DragStateDragging = 2

Plugin Version: 14.1. **Function:** One of the constants indicating the current drag state of an annotation view
Notes: The view is in the middle of a drag operation and is tracking progress.

8.3.24   DragStateEnding = 4

Plugin Version: 14.1. **Function:** One of the constants indicating the current drag state of an annotation view
Notes: An action occurred that indicated the view was dropped by the user. The map view automatically moves annotation views to this state in response to appropriate user actions.

8.3.25 DragStateNone = 0

Plugin Version: 14.1. **Function:** One of the constants indicating the current drag state of an annotation view
Notes: The view is not involved in a drag operation. The annotation view is responsible for returning itself to this state when a drag ends or is canceled.

8.3.26 DragStateStarting = 1

Plugin Version: 14.1. **Function:** One of the constants indicating the current drag state of an annotation view
Notes: An action occurred that indicated the view should begin dragging. The map view automatically moves annotation views to this state in response to appropriate user actions.

8.4   class MKCircleMBS

8.4.1   class MKCircleMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKCircle class is a concrete overlay object representing a circular area on a map.
Notes:

This class manages the data that defines the area and is typically used in conjunction with an MKCircleView object, which handles the drawing of the circular area on a map.
Subclass of the MKShapeMBS class.

8.4.2   Methods

8.4.3   circleWithCenterCoordinate(coord as CLLocationCoordinate2DMBS, radius as Double) as MKCircleMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates and returns an MKCircle object using the specified coordinate and radius.
Example:

dim mapview as MKMapViewMBS // your map view
dim centerCoordinate as CLLocationCoordinate2DMBS = mapview.centerCoordinate
dim radius as Integer = 300 // 300 meter

dim circle as MKCircleMBS = MKCircleMBS.circleWithCenterCoordinate(centerCoordinate, radius)
mapview.addOverlay circle

Notes:

coord: The center point of the circle, specified as a latitude and longitude value.
radius: The radius of the circle, measured in meters from the center point.
See also:

- 8.4.4 circleWithCenterCoordinate(Latitude as Double, Longitude as Double, radius as Double) as MK-
  CircleMBS   136

8.4.4   circleWithCenterCoordinate(Latitude as Double, Longitude as Double, radius as Double) as MKCircleMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates and returns an MKCircle object using the specified coordinate and radius.
Notes:

Latitude and Longitude: The center point of the circle, specified as a latitude and longitude value.
radius: The radius of the circle, measured in meters from the center point.
See also:

8.4.5   Constructor(coord as CLLocationCoordinate2DMBS, radius as Double)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates and returns
an MKCircle object using the specified coordinate and radius.
Notes:

coord: The center point of the circle, specified as a latitude and longitude value.
radius: The radius of the circle, measured in meters from the center point.
See also:

8.4.6   Constructor(Latitude as Double, Longitude as Double, radius as Double)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates and returns
an MKCircle object using the specified coordinate and radius.
Notes:

Latitude and Longitude: The center point of the circle, specified as a latitude and longitude value.
radius: The radius of the circle, measured in meters from the center point.
See also:

8.4.7   Operator_Convert as MKAnnotationMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an annota-
tion object referencing this circle.

8.4.8   Properties

8.4.9   coordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The center point of
the circular area, specified as a latitude and longitude.
Notes: (Read only property)

8.4.10 latitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The center point of the circular area, specified as a latitude.
Notes: (Read only property)

8.4.11 longitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The center point of the circular area, specified as a longitude.
Notes: (Read only property)

8.4.12 radius as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The radius of the circular area, measured in meters.
Notes: (Read only property)

8.4.13 region as MKCoordinateRegionMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The region linked to this circle.
Notes: (Read only property)

8.4.14 subtitle as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The subtitle of this circle.
Notes: (Read only property)

8.4.15 title as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The title of this circle.
Notes: (Read only property)

8.5 class MKCircleViewMBS

8.5.1 class MKCircleViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKCircleView class provides the visual representation for an MKCircle annotation object.
Notes:

This view fills and strokes the circle represented by the annotation. You can change the color and other drawing attributes of the circle by modifying the properties inherited from the MKOverlayPathView class. This class is typically used as is and not subclassed.
Subclass of the MKOverlayPathViewMBS class.

8.5.2 Methods

8.5.3 Constructor(circle as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and returns a new overlay view using the specified circle overlay object.
Notes: circle must be a MKCircleMBS object.

8.5.4 Properties

8.5.5 circle as MKCircleMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The circle overlay object that contains the information used to draw the overlay.
Notes: (Read only property)

8.6   class MKCoordinateRegionMBS

8.6.1   class MKCoordinateRegionMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A structure that defines which portion of the map to display.

8.6.2   Methods

8.6.3   Constructor(center as CLLocationCoordinate2DMBS, span as MKCoordinateSpanMBS)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor to initialize an object of this class.

8.6.4   Properties

8.6.5   center as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The center point of the region.
Notes: (Read and Write property)

8.6.6   span as MKCoordinateSpanMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The horizontal and vertical span representing the amount of map to display.
Notes:

The span also defines the current zoom level used by the map view object.
(Read and Write property)

8.7 class MKCoordinateSpanMBS

8.7.1 class MKCoordinateSpanMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A structure that defines the area spanned by a map region.
Notes: You use the delta values in this structure to indicate the desired zoom level of the map, with smaller delta values corresponding to a higher zoom level.

8.7.2 Methods

8.7.3 Constructor(latitudeDelta as Double, longitudeDelta as Double)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor to initialize this class.

8.7.4 Properties

8.7.5 latitudeDelta as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The amount of north-to-south distance (measured in degrees) to display on the map.
Notes:

Unlike longitudinal distances, which vary based on the latitude, one degree of latitude is always approximately 111 kilometers (69 miles).
(Read and Write property)

8.7.6 longitudeDelta as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The amount of east-to-west distance (measured in degrees) to display for the map region.
Notes:

The number of kilometers spanned by a longitude range varies based on the current latitude. For example, one degree of longitude spans a distance of approximately 111 kilometers (69 miles) at the equator but shrinks to 0 kilometers at the poles.
(Read and Write property)

8.8   class MKGeocoderMBS

8.8.1   class MKGeocoderMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class to lookup geo coordinates for an address.

8.8.2   Methods

8.8.3   cancel

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Cancels the query.

8.8.4   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.
See also:

8.8.5   Constructor(parent as MapKitViewControlMBS, anAddress as string)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Submits a forward-geocoding request using the specified address dictionary.
Notes:

address: The address to lookup.

This method submits the specified location data to the geocoding server asynchronously and returns.

Later the events geocoderDidFailWithError or geocoderDidFindCoordinate from MapKitViewControlMBS class are called.
See also:

8.8.6   Constructor(parent as MapKitViewControlMBS, anAddress as string, Coordinate as CLLocationCoordinate2DMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Submits a forward-geocoding request using the specified address dictionary.
Notes:

address: The address to lookup.
Coordinate: Specifies the region where to search nearby.

This method submits the specified location data to the geocoding server asynchronously and returns.

Later the events geocoderDidFailWithError or geocoderDidFindCoordinate from MapKitViewControlMBS class are called.
See also:

8.8.7   Constructor(parent as MapKitViewControlMBS, anAddress as string, NearLatitude as Double, NearLongitude as Double)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Submits a forward-geocoding request using the specified address dictionary.
Notes:

address: The address to lookup.
Coordinate: Specifies the region where to search nearby.

This method submits the specified location data to the geocoding server asynchronously and returns.

Later the events geocoderDidFailWithError or geocoderDidFindCoordinate from MapKitViewControlMBS class are called.
See also:

8.8.8   Destructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

8.8.9   start

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts the geocoder.

8.8.10   Properties

8.8.11   Address as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The address looking up.
Notes: (Read only property)

8.8.12   coordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate found.
Notes: (Read only property)

8.8.13   Handle as Integer

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.
Notes: (Read and Write property)

8.8.14   latitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The latitude of the coordinate.
Notes: (Read only property)

8.8.15   longitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The longitude of the coordinate.
Notes: (Read only property)

8.8.16   Querying as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether this geocoder is querying currently.
Notes: (Read only property)

8.9   class MKMapViewMBS

8.9.1   class MKMapViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An MKMapView object provides an embeddable map interface, similar to the one provided by the Maps application.
Notes:

You use this class as-is to display map information and to manipulate the map contents from your application. You can center the map on a given coordinate, specify the size of the area you want to display, and annotate the map with custom information.
Subclass of the NSViewMBS class.

8.9.2   Methods

8.9.3   addAnnotation(annotation as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds the specified annotation to the map view.
Example:

dim mapview as MKMapViewMBS // your map view

// new pin
dim pin as new MKPointAnnotationMBS

pin.coordinate = mapView.centerCoordinate
pin.title = "Hello"

// show on map
mapView.addAnnotation pin

8.9.4   addAnnotations(annotations() as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds an array of annotation objects to the map view.

8.9.5   addJavascriptTag(urlString as string)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds additional javascript.

8.9.6 addOverlay(overlay as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds a single overlay object to the map.
Example:

dim mapview as MKMapViewMBS // your map view
dim centerCoordinate as CLLocationCoordinate2DMBS = mapview.centerCoordinate
dim radius as Integer = 300 // 300 meter

dim circle as MKCircleMBS = MKCircleMBS.circleWithCenterCoordinate(centerCoordinate, radius)
mapview.addOverlay circle

Notes:

overlay: The overlay object to add. This object must conform to the MKOverlay protocol.

The specified object is added to the group of overlay objects in the MKOverlayLevelAboveLabels level. Adding an overlay causes the map view to begin monitoring the area represented by that overlay. As soon as the bounding rectangle of an overlay intersects the visible portion of the map, the map view adds a corresponding overlay view to the map. The overlay view is provided by the mapViewViewForOverlay event.

To remove an overlay from a map, use the removeOverlay method.

8.9.7 addOverlays(overlays() as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds an array of overlay objects to the map.
Notes:

overlays: An array of objects, each of which must conform to the MKOverlay protocol.

The specified objects are added to the group of overlay objects in the MKOverlayLevelAboveLabels level. Adding an overlay causes the map view to begin monitoring the area represented by that overlay. As soon as the bounding rectangle of the overlay intersects the visible portion of the map, the map view tries to draw the overlay. As soon as the bounding rectangle of an overlay intersects the visible portion of the map, the map view adds a corresponding overlay view to the map. The overlay view is provided by the mapViewViewForOverlay method of the map view's delegate object.

To remove multiple overlays from a map, use the removeOverlays method.

8.9.8   addStylesheetTag(urlString as string)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Adds additional
style sheet.

8.9.9   annotations as Variant()

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The complete list
of annotations associated with the receiver.
Notes: If no annotations are associated with the map view, the value of this property is empty.

8.9.10   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new box
view with size 100/100 and position 0/0
Example:

dim x as new MKMapViewMBS

Notes: On success the handle property is not zero.
See also:

8.9.11   Constructor(Handle as Integer)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an object
based on the given NSView handle.
Example:

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

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

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

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

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new control with the given size and position.
Example:

dim left,top,width,height as Integer
// define rectangle
dim x as new MKMapViewMBS(left, top, width, height)

Notes: On success the handle property is not zero.
See also:

8.9.13 convertCoordinateToPointToView(coordinate as CLLocationCoordinate2DMBS, view as NSViewMBS) as NSPointMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a map coordinate to a point in the specified view.
Notes:

coordinate: The map coordinate for which you want to find the corresponding point.
view: The view in whose coordinate system you want to locate the specified map coordinate. If this parameter is nil, the returned point is specified in the window's coordinate system. If view is not nil, it must belong to the same window as the map view.

Returns the point (in the appropriate view or window coordinate system) corresponding to the specified latitude and longitude value.

8.9.14   convertPointToCoordinateFromView(point as NSPointMBS, view as NSViewMBS) as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a point in the specified view's coordinate system to a map coordinate.
Notes:

point: The point you want to convert.
view: The view that serves as the reference coordinate system for the point parameter.

Returns the map coordinate at the specified point.

8.9.15   convertRectToRegionFromView(rect as NSRectMBS, view as NSViewMBS) as MKCoordinateRegionMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a rectangle in the specified view's coordinate system to a map region.
Notes:

rect: The rectangle you want to convert.
view: The view that serves as the reference coordinate system for the rect parameter.

Returns the map region corresponding to the specified view rectangle.

8.9.16   convertRegionToRectToView(region as MKCoordinateRegionMBS, view as NSViewMBS) as NSRectMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Converts a map region to a rectangle in the specified view.
Notes:

region: The map region for which you want to find the corresponding view rectangle.
view: The view in whose coordinate system you want to locate the specified map region. If this parameter is nil, the returned rectangle is specified in the window's coordinate system. If view is not nil, it must belong to the same window as the map view.

Returns the rectangle corresponding to the specified map region.

8.9.17 dequeueReusableAnnotationViewWithIdentifier(identifier as string) as MKAnnotationViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a reusable annotation view located by its identifier.
Notes:

identifier: A string identifying the annotation view to be reused. This string is the same one you specify when initializing the annotation view using the Constructor method.

Returns an annotation view with the specified identifier, or nil if no such object exists in the reuse queue.

For performance reasons, you should generally reuse MKAnnotationView objects in your map views. As annotation views move offscreen, the map view moves them to an internally managed reuse queue. As new annotations move onscreen, and your code is prompted to provide a corresponding annotation view, you should always attempt to dequeue an existing view before creating a new one. Dequeueing saves time and memory during performance-critical operations such as scrolling.

8.9.18 deselectAnnotation(annotation as Variant, animated as boolean)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Deselects the specified annotation and hides its callout view.
Notes:

annotation: The annotation object to deselect.
animated: If true, the callout view is animated offscreen.

8.9.19 Destructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The destructor.

8.9.20 exchangeOverlay(index1 as Integer, index2 as Integer)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Exchanges the positions of the two overlay objects.
Notes:

index1: The index of an overlay in the MKOverlayLevelAboveLabels map level.
index2: The index of another overlay in the MKOverlayLevelAboveLabels map level.

If you need to exchange overlays in other map levels, use the exchangeOverlay method.

8.9.21   InitMapKit as boolean

Plugin Version: 15.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Loads the MapKit framework from Apple.
Notes:

64-bit only. And you need to sign app with entitlement for MapKit usage.
As the plugin can use both frameworks (opensource and Apple), some methods may only be available in one framework.
You need to load the framework once before you want to use the Map Kit classes.

8.9.22   insertOverlayAboveOverlay(overlay as Variant, aboveOverlay as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Inserts one overlay object on top of another.
Notes:

overlay: The overlay object to insert.
sibling: An existing object in the overlays array. This object must exist in the array and must not be nil.

This method inserts the overlay into the MKOverlayLevelAboveLabels level and positions it relative to the specified sibling. When displayed, this leads to the overlay's contents being displayed above that of its sibling. If sibling is not in the same map level, this method appends the overlay to the end of the list of overlays at the indicated level.

8.9.23   insertOverlayAtIndex(overlay as Variant, index as Integer)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Inserts an overlay object into the list associated with the map.
Notes:

overlay: The overlay object to insert.
index: The index at which to insert the overlay object. If this value is greater than the number of objects in the overlays property, this method appends the object to the end of the array.

This method inserts the overlay into the MKOverlayLevelAboveLabels level.

8.9.24 insertOverlayBelowOverlay(overlay as Variant, belowOverlay as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Inserts one overlay object below another.
Notes:

overlay: The overlay object to insert.
sibling: An existing object in the overlays array. This object must exist in the array and must not be nil.

This method inserts the overlay into the MKOverlayLevelAboveLabels level and positions it relative to the specified sibling. When displayed, this leads to the overlay's contents being displayed beneath that of its sibling. If sibling is not in the same map level, this method appends the overlay to the end of the list of overlays at the indicated level.

8.9.25 IsFrameworkLoaded as boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether the MapKit framework was loaded successfully.

8.9.26 LoadFramework(path as folderitem) as boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Loads the Open-Source MapKit framework.
Example:

```
dim f as FolderItem = getfolderitem("MapKit.framework")

if MKMapViewMBS.LoadFramework(f) then
// ok
else
MsgBox "Failed to load framework."
quit
end if
```

Notes: You need to load the framework once before you want to use the Map Kit classes.

8.9.27   overlays as Variant()

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The overlay objects currently associated with the map view.
Notes:

This property contains the union of all overlays at the different levels of the map. The objects in this array must adopt the MKOverlay protocol. If no overlays are associated with the map view, the value of this property is an empty array.

The order of the objects in this array does not necessary reflect their visual order on the map.

8.9.28   removeAnnotation(annotation as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes the specified annotation object from the map view.
Notes:

annotation: The annotation object to remove. This object must conform to the MKAnnotation protocol.

If the annotation is currently associated with an annotation view, and that view has a reuse identifier, this method removes the annotation view and queues it internally for later reuse. You can retrieve queued annotation views (and associate them with new annotations) using the dequeueReusableAnnotationViewWithIdentifier method.

Removing an annotation object disassociates it from the map view entirely, preventing it from being displayed on the map. Thus, you would typically call this method only when you want to hide or delete a given annotation.

8.9.29   removeAnnotations(annotations() as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes an array of annotation objects from the map view.
Notes:

annotations: The array of annotations to remove. Objects in the array must conform to the MKAnnotation protocol.

If any annotation object in the array has an associated annotation view, and if that view has a reuse identifier, this method removes the annotation view and queues it internally for later reuse. You can retrieve queued annotation views (and associate them with new annotations) using the dequeueReusableAnnotationViewWithIdentifier method.

Removing annotation objects disassociates them from the map view entirely, preventing them from being displayed on the map. Thus, you would typically call this method only when you want to hide or delete the specified annotations.

8.9.30   removeOverlay(overlay as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes a single overlay object from the map.
Notes:

overlay: The overlay object to remove.

This method removes the overlay regardless of the level that it is in. Removing an overlay also removes its corresponding renderer, if one is in use. If the specified overlay is not currently associated with the map view, this method does nothing.

8.9.31   removeOverlays(overlays() as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Removes one or more overlay objects from the map.
Notes:

overlays: An array of objects, each of which conforms to the MKOverlay protocol.

This method removes the specified overlays regardless of which level each one is in. Removing an overlay also removes its corresponding renderer, if one is in use. If a given overlay object is not associated with the map view, it is ignored.

8.9.32   selectAnnotation(annotation as Variant, animated as boolean)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Selects the specified annotation and displays a callout view for it.
Notes:

annotation: The annotation object to select.
animated: If true, the callout view is animated into position.

If the specified annotation is not onscreen, and therefore does not have an associated annotation view, this method has no effect.

8.9.33   selectedAnnotations as Variant()

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The annotations that are currently selected.
Notes: Assigning a new array to this property selects only the first annotation in the array.

8.9.34   setCenterCoordinate(Latitude as Double, Longitude as Double, Animated as boolean = true)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Changes the center coordinate of the map and optionally animates the change.
Notes:

Latitude and Longitude: The new center coordinate for the map.
animated: Specify true if you want the map view to scroll to the new location or false if you want the map to display the new location immediately.

Changing the center coordinate centers the map on the new coordinate without changing the current zoom level. It also updates the value in the region property to reflect the new center coordinate and the new span values needed to maintain the current zoom level.

8.9.35   setRegion(c as CLLocationCoordinate2DMBS, animated as boolean = false)

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Changes the currently visible region and optionally animates the change.
Notes: Same as SetRegion with MKCoordinateRegionMBS but reuses current coordinate span.
See also:

8.9.36   setRegion(region as MKCoordinateRegionMBS, animated as boolean = false)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Changes the currently visible region and optionally animates the change.
Example:

```
dim mapview as MKMapViewMBS // your mapview

// get current region
dim r as MKCoordinateRegionMBS = mapview.region
```

```
// make new span with double deltas
dim s as new MKCoordinateSpanMBS(r.span.latitudeDelta*2, r.span.longitudeDelta*2)

// make new region
dim n as new MKCoordinateRegionMBS(r.center, s)

// and zoom there
mapview.setRegion n, true
```

Notes:

region: The new region to display in the map view.
animated: Specify true if you want the map view to animate the transition to the new region or false if you want the map to center on the specified region immediately.

Changing just the center coordinate of the region can still cause the span values to change implicitly. The span values might change because that the distances represented by a span change at different latitudes and longitudes and the map view may need to adjust the span to account for the new location. If you want to change the center coordinate without changing the zoom level, use the setCenterCoordinate instead.

When setting a new region, the map may adjust the value in the region parameter so that it fits the visible area of the map precisely. This adjustment is normal and is done to ensure that the value in the region property always reflects the visible portion of the map. However, it does mean that if you get the value of that property right after calling this method, the returned value may not match the value you set. (You can use the regionThatFits method to determine the region that will actually be set by the map.)
See also:

- 8.9.35 setRegion(c as CLLocationCoordinate2DMBS, animated as boolean = false)   156

8.9.37   showAddress(address as string)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method to run an address geocoding and shows position on map.
Example:

```
dim mapview as MKMapViewMBS // your map view
mapView.showAddress "Markt 15, Andernach, Deutschland"
```

8.9.38   viewForAnnotation(annotation as Variant) as MKAnnotationViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the annotation view associated with the specified annotation object, if any.
Example:

Function viewForAnnotation(mapView as MKMapViewMBS, annotation as Variant) As MKAnnotation-
ViewMBS
// make a new view for this annotation
dim view as new MKPinAnnotationViewMBS(annotation, "id")

// allow user to drag
view.draggable = true

// maybe save it somewhere for later?
views.Append view

// and return
Return view
End Function

Notes:

annotation: The annotation object whose view you want.

Returns the annotation view or nil if the view has not yet been created. This method may also return nil if the annotation is not in the visible map region and therefore does not have an associated annotation view.

8.9.39   viewForOverlay(overlay as MKPolylineMBS) as MKOverlayViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the view associated with the overlay object if any.
Notes:

overlay: The overlay object whose view you want.
Returns the view associated with the overlay object or nil if the overlay is not onscreen.

8.9.40 Properties

8.9.41 centerCoordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The map coordinate at the center of the map view.
Example:

dim mapview as MKMapViewMBS // your map view
dim centerCoordinate as CLLocationCoordinate2DMBS = mapview.centerCoordinate

// show center
MsgBox str(centerCoordinate.latitude)+" "+str(centerCoordinate.longitude)

Notes:

Changing the value in this property centers the map on the new coordinate without changing the current zoom level. It also updates the values in the region property to reflect the new center coordinate and the new span values needed to maintain the current zoom level.

Changing the value of this property updates the map view immediately. If you want to animate the change, use the setCenterCoordinate method instead.
(Read only property)

8.9.42 centerCoordinateLatitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The map coordinate at the center of the map view.
Notes:

Changing the value in this property centers the map on the new coordinate without changing the current zoom level. It also updates the values in the region property to reflect the new center coordinate and the new span values needed to maintain the current zoom level.

Changing the value of this property updates the map view immediately. If you want to animate the change, use the setCenterCoordinate method instead.
(Read only property)

8.9.43 centerCoordinateLongitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The map coordinate at the center of the map view.

Notes:

Changing the value in this property centers the map on the new coordinate without changing the current zoom level. It also updates the values in the region property to reflect the new center coordinate and the new span values needed to maintain the current zoom level.

Changing the value of this property updates the map view immediately. If you want to animate the change, use the setCenterCoordinate method instead.
(Read only property)

8.9.44   mapType as Integer

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The type of data displayed by the map view.
Example:

dim mapview as MKMapViewMBS // your map view
mapView.mapType = mapView.MKMapTypeHybrid

Notes:

Changing the value in this property may cause the receiver to begin loading new map content. For example, changing from MKMapTypeStandard to MKMapTypeSatellite might cause it to begin loading the satellite imagery needed for the map. If new data is needed, however, it is loaded asynchronously and appropriate messages are sent to the receiver's delegate indicating the status of the operation.
(Read and Write property)

8.9.45   region as MKCoordinateRegionMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The area currently displayed by the map view.
Notes:

The region encompasses both the latitude and longitude point on which the map is centered and the span of coordinates to display. The span values provide an implicit zoom value for the map. The larger the displayed area, the lower the amount of zoom. Similarly, the smaller the displayed area, the greater the amount of zoom.

Changing only the center coordinate of the region can still cause the span to change implicitly. The span might change because the distances represented by a span change at different latitudes and longitudes and the map view may need to adjust the span to account for the new location. If you want to change the center coordinate without changing the zoom level, use the centerCoordinate instead.

Changing the value of this property updates the map view immediately. When setting this property, the map may adjust the new region value so that it fits the visible area of the map precisely. This is normal and is done to ensure that the value in this property always reflects the visible portion of the map. However, it does mean that if you get the value of this property right after setting it, the returned value may not match the value you set. (You can use the regionThatFits method to determine the region that will actually be set by the map.)

If you want to animate the change in region, use the setRegion method instead.
(Read and Write property)

8.9.46   scrollEnabled as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value that determines whether the user may scroll around the map.
Notes:

This property controls only user interactions with the map. If you set the value of this property to NO, you may still change the map location programmatically by changing the value in the region property.

The default value of this property is true.
(Read and Write property)

8.9.47   showsUserLocation as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the map should try to display the user's location.
Notes:

This property does not indicate whether the user's position is actually visible on the map, only whether the map view should try to display it. Setting this property to true causes the map view to use the Core Location framework to find the current location and try to display it on the map. As long as this property is true, the map view continues to track the user's location and update it periodically. The default value of this property is false.

Showing the user's location does not guarantee that the location is visible on the map. The user might have scrolled the map to a different point, causing the current location to be offscreen. To determine whether the user's current location is currently displayed on the map, use the userLocationVisible property.
(Read and Write property)

8.9.48   userLocation as MKUserLocationMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The annotation object representing the user's current location.
Notes: (Read only property)

8.9.49   userLocationVisible as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the device's current location is visible in the map view.
Notes:

This property tells you whether the icon used to represent the user's current location is visible in the map view. When determining whether the current location is visible, this property factors in the horizontal accuracy of the location data. Specifically, if the rectangle represented by the user's current location plus or minus minus the horizontal accuracy of that location intersects the map's visible rectangle, this property contains the value true. If that location rectangle does not intersect the map's visible rectangle, this property contains the value false.

If the user's location cannot be determined, this property contains the value false.
(Read only property)

8.9.50   webview as Variant

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The webview used for the map.
Notes:

Value is a WebViewMBS object.
(Read only property)

8.9.51   zoomEnabled as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value that determines whether the user may use pinch gestures to zoom in and out of the map.
Notes:

This property controls only user interactions with the map. If you set the value of this property to NO, you may still change the zoom level programmatically by changing the value in the region property.

The default value of this property is true.
(Read and Write property)

8.9.52 Constants

8.9.53 MKMapTypeHybrid = 2

Plugin Version: 14.1. **Function:** One of the map types.
Notes: Displays a satellite image of the area with road and road name information layered on top.

8.9.54 MKMapTypeSatellite = 1

Plugin Version: 14.1. **Function:** One of the map types.
Notes: Displays satellite imagery of the area.

8.9.55 MKMapTypeStandard = 0

Plugin Version: 14.1. **Function:** One of the map types.
Notes: Displays a street map that shows the position of all roads and some road names.

8.10   class MKMultiPointMBS

8.10.1   class MKMultiPointMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKMultiPoint class is an abstract superclass used to define shapes composed of multiple points.
Notes:

You should not create instances of this class directly. Instead, you should create instances of the MKPolyline or MKPolygon classes. However, you can use the method and properties of this class to access information about the specific points associated with the line or polygon.
Subclass of the MKShapeMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.10.2   Methods

8.10.3   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

8.10.4   coordinates as CLLocationCoordinate2DMBS()

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Retrieves points associated with the shape and converts them to coordinate values.
Notes: This method converts the map points into coordinates before returning them to you.

8.10.5   Properties

8.10.6   coordinateCount as Integer

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The number of points associated with the shape.
Notes: (Read only property)

8.11   class MKOverlayPathViewMBS

8.11.1   class MKOverlayPathViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKOverlay-PathView class represents a generic overlay that draws its contents using a CGPath data type.
Notes:

You can use this class to implement simple path-based overlay views or subclass it to define additional drawing behaviors. The default drawing behavior of this class is to apply the object's current fill attributes, fill the path, apply the current stroke attributes, and then stroke the path.

If you subclass, you should override the createPath method and use that method to build the appropriate path for the overlay. You can invalidate this path as needed and force the path to be recreated using whatever new data your subclass has obtained.
Subclass of the MKOverlayViewMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.11.2   Methods

8.11.3   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

8.11.4   Properties

8.11.5   fillColor as NSColorMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The fill color to use for the path.
Notes: (Read and Write property)

8.11.6   lineWidth as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The stroke width to use for the path.
Notes:

The default value of this property is 0.
(Read and Write property)

8.11.7   strokeColor as NSColorMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The stroke color to use for the path.
Notes: (Read and Write property)

8.12 class MKOverlayViewMBS

8.12.1 class MKOverlayViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKOverlayView class defines the basic behavior associated with all overlay views.
Notes:

An overlay view provides the visual representation of an overlay objectthat is, an object that conforms to the MKOverlay protocol. This class defines the drawing infrastructure used by the map view but does not do any actual drawing.

The Map Kit framework provides several concrete instances of overlay views. Specifically, it provides overlay views for each of the concrete overlay objects. You can use one of these existing overlay views or define your own subclass if you want to draw the overlay contents differently.
Subclass of the MKViewMBS class.

8.12.2 Methods

8.12.3 Constructor(Overlay as Variant)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and returns the overlay view and associates it with the specified overlay object.
Notes:

overlay: The overlay object to use when drawing the overlay on the map. This object provides the data needed to draw the overlay's shape. This object is retained by the overlay view.

Returns an initialized overlay object.

Upon initialization, the frame of the overlay view is set to CGRectZero. The map view sets the size and position of the view at display time, and you should not change those values yourself.

8.12.4 Properties

8.12.5 Overlay as Variant

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The overlay object containing the data for drawing.
Notes: (Read only property)

8.13   class MKPinAnnotationViewMBS

8.13.1   class MKPinAnnotationViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKPinAnnotationView class provides a concrete annotation view that displays a pin icon like the ones found in the Maps application.
Notes:

Using this class, you can configure the type of pin to drop and whether you want the pin to be animated into place.
Subclass of the MKAnnotationViewMBS class.

8.13.2   Methods

8.13.3   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.
See also:

8.13.4   Constructor(annotation as Variant, reuseIdentifier as string = "")

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.
See also:

8.13.5   Properties

8.13.6   animatesDrop as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether to animate the dropping of the pin.
Notes: (Read and Write property)

8.13.7 pinColor as Integer

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The color of the pin head.
Notes:

The Maps application uses different pin colors for different types of map annotations. Your own map annotation should use the available pin colors in the same way.
(Read and Write property)

8.13.8 Constants

8.13.9 ColorBlue = 2

Plugin Version: 14.1. **Function:** One of the color constants.
Notes: The head of the pin is blue. Purple pins indicate user-specified points on the map.

8.13.10 ColorGreen = 1

Plugin Version: 14.1. **Function:** One of the color constants.
Notes: The head of the pin is green. Green pins indicate starting points on the map.

8.13.11 ColorRed = 0

Plugin Version: 14.1. **Function:** One of the color constants.
Notes: The head of the pin is red. Red pins indicate destination points on the map.

8.14   class MKPlacemarkMBS

8.14.1   class MKPlacemarkMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A MKPlacemark object stores placemark data for a given latitude and longitude.
Notes:

Placemark data includes information such as the country, state, city, and street address associated with the specified coordinate. Placemark objects are typically generated by a MKReverseGeocoder object, although you can also create them explicitly yourself.

A placemark is also an annotation and conforms to the MKAnnotation protocol, whose properties and methods include the placemark coordinate and other information. Because they are annotations, you can add them directly to the map view.
Subclass of the MKAnnotationMBS class.

8.14.2   Methods

8.14.3   Constructor(coordinate as CLLocationCoordinate2DMBS, addressDictionary as dictionary)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and returns a placemark object using the specified coordinate and Address Book dictionary.
Notes: You can create placemark objects manually for entities for which you already have address information, such as contacts in the Address Book. Creating a placemark object explicitly avoids the need to query the reverse geocoder object for the same information.
See also:

- 8.14.4 Constructor(Latitude as Double, Longitude as Double, addressDictionary as dictionary)   170

8.14.4   Constructor(Latitude as Double, Longitude as Double, addressDictionary as dictionary)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and returns a placemark object using the specified coordinate and Address Book dictionary.
Notes: You can create placemark objects manually for entities for which you already have address information, such as contacts in the Address Book. Creating a placemark object explicitly avoids the need to query the reverse geocoder object for the same information.
See also:

- 8.14.3 Constructor(coordinate as CLLocationCoordinate2DMBS, addressDictionary as dictionary) 170

8.14.5 Properties

8.14.6 addressDictionary as Dictionary

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A dictionary containing the Address Book keys and values for the placemark.
Notes:

The keys in this dictionary are those defined by the Address Book framework and used to access address information for a person. For a list of the strings that might be in this dictionary, see the Address Property constants in ABPerson Reference.
(Read only property)

8.14.7 administrativeArea as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The state associated with the placemark.
Notes:

If the placemark location was Apple's headquarters, the value for this property would be the string "CA" or "California".
(Read only property)

8.14.8 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate of the placemark.
Notes: (Read only property)

8.14.9 CoordinateLatitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate of the placemark.
Notes: (Read only property)

8.14.10 CoordinateLongitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate of the placemark.

Notes: (Read only property)

8.14.11   country as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of the country associated with the placemark.
Notes:

If the placemark location was Apple's headquarters, the value for this property would be the string "United States".
(Read only property)

8.14.12   countryCode as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The abbreviated country name.
Notes:

This string is the standard abbreviation used to refer to the country. For example, if the placemark location was Apple's headquarters, the value for this property would be the string "US".
(Read only property)

8.14.13   locality as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The city associated with the placemark
Notes:

If the placemark location was Apple's headquarters, the value for this property would be the string "Cupertino".
(Read only property)

8.14.14   postalCode as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The postal code associated with the placemark.
Notes:

If the placemark location was Apple's headquarters, the value for this property would be the string "95014".
(Read only property)

8.14.15   subAdministrativeArea as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Additional administrative area information for the placemark.
Notes:

Subadministrative areas typically correspond to counties or other regions that are then organized into a larger administrative area or state. For example, if the placemark location was Apple's headquarters, the value for this property would be the string "Santa Clara", which is the county in California that contains the city of Cupertino.
(Read only property)

8.14.16   subLocality as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Additional city-level information for the placemark.
Notes:

This property contains additional information, such as the name of the neighborhood or landmark associated with the placemark. It might also refer to a common name that is associated with the location.
(Read only property)

8.14.17   subThoroughfare as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Additional street-level information for the placemark.
Notes:

Subthroughfares provide information such as the street number for the location. For example, if the placemark location was Apple's headquarters (1 Infinite Loop), the value for this property would be the string "1".
(Read only property)

8.14.18   thoroughfare as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The street address associated with the placemark.
Notes:

The street address contains the street name. For example, if the placemark location was Apple's headquarters, the value for this property would be the string "Infinite Loop".
(Read only property)

8.15   class MKPointAnnotationMBS

8.15.1   class MKPointAnnotationMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKPointAnnotation class defines a concrete annotation object located at a specified point.
Example:

dim mapview as MKMapViewMBS // your map view

// new pin
dim pin as new MKPointAnnotationMBS

pin.coordinate = mapView.centerCoordinate
pin.title = "Hello"

// show on map
mapView.addAnnotation pin

Notes:

You can use this class, rather than define your own, in situations where all you want to do is associate a point on the map with a title.
Subclass of the MKShapeMBS class.

8.15.2   Methods

8.15.3   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.
Example:

dim mapview as MKMapViewMBS // your map view

// new pin
dim pin as new MKPointAnnotationMBS

pin.coordinate = mapView.centerCoordinate
pin.title = "Hello"

// show on map
mapView.addAnnotation pin

8.15.4 Properties

8.15.5 coordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate point of the annotation, specified as a latitude and longitude.
Notes: (Read and Write property)

8.15.6 CoordinateLatitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate point of the annotation, specified as a latitude and longitude.
Notes: (Read and Write property)

8.15.7 CoordinateLongitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate point of the annotation, specified as a latitude and longitude.
Notes: (Read and Write property)

8.16   class MKPolygonMBS

8.16.1   class MKPolygonMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKPolygon class represents a shape consisting of one or more points that define a closed polygon.
Notes:

The points are connected end-to-end in the order they are provided. The first and last points are connected to each other to create the closed shape.

When creating a polygon, you can mask out portions of the polygon by specifying one or more interior polygons. For the polygons you specify, this class uses the even-odd fill rule to determine the final occupied area. When applied to overlapping polygons, this rule can cause specific regions to be masked out (and thereby removed) from the total occupied area. For more information about how fill rules are applied to paths, see "Paths" in Quartz 2D Programming Guide.
Subclass of the MKMultiPointMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.16.2   Methods

8.16.3   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

8.16.4   interiorPolygons as MKPolygonMBS()

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The array of polygons nested inside the receiver.
Notes: When a polygon is rendered on screen, the area occupied by any interior polygons is masked out and not considered part of the polygon.

8.16.5   Operator_Convert as MKAnnotationMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an annotation object for this polygon.

8.16.6 polygonWithCoordinates(coords() as CLLocationCoordinate2DMBS) as MKPolygonMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates and returns an MKPolygon object from the specified set of coordinates.
Notes:

coords: The array of coordinates defining the shape.
Returns a new polygon object.
See also:

- 8.16.7 polygonWithCoordinates(coords() as CLLocationCoordinate2DMBS, InteriorPolygons() as MKPolygonMBS) as MKPolygonMBS 177

8.16.7 polygonWithCoordinates(coords() as CLLocationCoordinate2DMBS, InteriorPolygons() as MKPolygonMBS) as MKPolygonMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates and returns an MKPolygon object from the specified set of coordinates and interior polygons.
Notes:

coords: The array of coordinates defining the shape.
interiorPolygons: An array of MKPolygon objects that define one or more cutout regions for the receiver's polygon.

Returns a new polygon object.
See also:

- 8.16.6 polygonWithCoordinates(coords() as CLLocationCoordinate2DMBS) as MKPolygonMBS 177

8.17   class MKPolygonViewMBS

8.17.1   class MKPolygonViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKPolygonView
class provides the visual representation for an MKPolygon annotation object.
Notes:

This view fills and strokes the area represented by the annotation. You can change the color and other draw-
ing attributes of the polygon by modifying the properties inherited from the MKOverlayPathView class.
This class is typically used as is and not subclassed.
Subclass of the MKOverlayPathViewMBS class.

8.17.2   Methods

8.17.3   Constructor(polygon as MKPolygonMBS)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and
returns a new overlay view using the specified polygon overlay object.
Notes: polygon: The polygon overlay containing the information about the area to be drawn. This ob-
ject must have at least three points defining the polygon in order for this view to draw the corresponding path.

8.17.4   Properties

8.17.5   Polygon as MKPolygonMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The polygon overlay
object that contains the information used to draw the overlay.
Notes: (Read only property)

8.18   class MKPolylineMBS

8.18.1   class MKPolylineMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKPolyline class represents a shape consisting of one or more points that define connecting line segments.
Notes:

The points are connected end-to-end in the order they are provided. The first and last points are not connected to each other.
Subclass of the MKMultiPointMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.18.2   Methods

8.18.3   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

8.18.4   Operator_Convert as MKAnnotationMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an annotation object for the polyline.

8.18.5   polylineWithCoordinates(coords() as CLLocationCoordinate2DMBS) as MKPolylineMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates and returns an MKPolyline object from the specified set of coordinates.
Notes:

coords: The array of coordinates defining the shape. The data in this array is copied to the new object.
Returns a new polyline object.

8.19   class MKPolylineViewMBS

8.19.1   class MKPolylineViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKPolylineView class provides the visual representation for an MKPolyline annotation object.
Notes:

This view strokes the path represented by the annotation. (This class does not fill the area enclosed by the path.) You can change the color and other drawing attributes of the path by modifying the properties inherited from the MKOverlayPathView class. This class is typically used as is and not subclassed.
Subclass of the MKOverlayPathViewMBS class.

8.19.2   Methods

8.19.3   Constructor(polyline as MKPolylineMBS)

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Initializes and returns a new overlay view using the specified polyline overlay object.
Notes: polyline: The polyline overlay object containing the information about the path to be stroked. This object must have at least two points defined in order for this view to draw the corresponding path.

8.19.4   Properties

8.19.5   Polyline as MKPolylineMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The polyline overlay object that contains the information used to draw the overlay.
Notes: (Read only property)

8.20 class MKReverseGeocoderMBS

8.20.1 class MKReverseGeocoderMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKReverseGeocoder class provides services for converting a map coordinate (specified as a latitude/longitude pair) into information about that coordinate, such as the country, city, or street.
Notes: A reverse geocoder object is a single-shot object that works with a network-based map service to look up placemark information for its specified coordinate value.

8.20.2 Methods

8.20.3 cancel

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Cancels a pending reverse-geocoding request.
Notes: You can use this method to cancel a pending request and free up the resources associated with that request. If the request has already returned or has not yet begun, calling this method has no effect.

8.20.4 Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.
See also:

- 8.20.5 Constructor(control as MapKitViewControlMBS, coordinate as CLLocationCoordinate2DMBS) 181

- 8.20.6 Constructor(control as MapKitViewControlMBS, latitude as Double, longitude as Double) 182

8.20.5 Constructor(control as MapKitViewControlMBS, coordinate as CLLocationCoordinate2DMBS)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Initializes the reverse geocoder with the specified coordinate value.
Notes: coordinate: The map coordinate whose placemark information you want to retrieve.
See also:

- 8.20.4 Constructor 181

- 8.20.6 Constructor(control as MapKitViewControlMBS, latitude as Double, longitude as Double) 182

8.20.6   Constructor(control as MapKitViewControlMBS, latitude as Double, longitude as Double)

Plugin Version: 14.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Initializes the reverse geocoder with the specified coordinate value.
Notes: coordinate: The map coordinate whose placemark information you want to retrieve.
See also:

8.20.7   start

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Starts the reverse-geocoding process asynchronously.
Notes: You should call this method only once to begin the reverse-geocoding process. This method submits the coordinate value to the map server asynchronously and returns. Once the process is complete, the results are delivered to the associated delegate object.

8.20.8   Properties

8.20.9   coordinate as CLLocationCoordinate2DMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate whose placemark data you want to retrieve.
Notes: (Read only property)

8.20.10   Handle as Integer

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.
Notes: (Read and Write property)

8.20.11   latitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate whose placemark data you want to retrieve.
Notes: (Read only property)

8.20.12 longitude as Double

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The coordinate whose placemark data you want to retrieve.
Notes: (Read only property)

8.20.13 placemark as MKPlacemarkMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The result of the reverse-geocoding operation.
Notes:

The value of this property is nil by default. After a successful reverse-geocoding operation, it is set to the placemark object that was generated.
(Read only property)

8.20.14 Querying as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the receiver is in the middle of reverse-geocoding its coordinate.
Notes:

This property contains true if the process is ongoing or false if the process is done or has not yet been initiated.
(Read only property)

8.21   class MKShapeMBS

8.21.1   class MKShapeMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKShape class is an abstract class that defines the basic properties for all shape-based annotation objects.
Notes:

This class must be subclassed and cannot be used as is. Subclasses are responsible for defining the geometry of the shape and providing an appropriate value for the coordinate property inherited from the MKAnnotation protocol.
Subclass of the MKAnnotationMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.21.2   Methods

8.21.3   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

8.22 class MKUserLocationMBS

8.22.1 class MKUserLocationMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The MKUserLocation class defines a specific type of annotation that identifies the user's current location.
Notes:

You do not create instances of this class directly. Instead, you retrieve an existing MKUserLocation object from the userLocation property of the map view displayed in your application.
Subclass of the MKAnnotationMBS class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.22.2 Methods

8.22.3 Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

8.22.4 Properties

8.22.5 location as CLLocationMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current location of the device.
Notes:

This property contains nil if the map view is not currently showing the user location or if the user's location has not yet been determined.
(Read only property)

8.22.6 updating as Boolean

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A Boolean value indicating whether the user's location is currently being updated.
Notes: (Read only property)

8.23   class MKViewMBS

8.23.1   class MKViewMBS

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a view. **Notes:** This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

8.23.2   Methods

8.23.3   Constructor

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private construtor.

8.23.4   Properties

8.23.5   className as string

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The name of this MKView class.
Notes: (Read only property)

8.23.6   classPath as string

Plugin Version: 14.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The path of this view class.
Notes:

Useful for debugging to know what super classes the view has.
(Read only property)

8.23.7   Handle as Integer

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.
Notes: (Read and Write property)

8.23.8   options as Dictionary

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The options dictionary.
Notes: (Read only property)

8.23.9   viewPrototypeName as String

Plugin Version: 14.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The view prototype name.
Notes: (Read only property)

Chapter 9

Network

9.1 class CW8021XProfileMBS

9.1.1 class CW8021XProfileMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN 802.1X profile.
Notes:

Encapsulates an 802.1X profile providing accessors to various profile properties.

Requires Mac OS X 10.6 or newer.

9.1.2 Methods

9.1.3 allUser8021XProfiles as CW8021XProfileMBS()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Getting all stored 802.1X user profiles.
Notes:

An array object containing CW8021XProfile objects representing all stored 802.1X user profiles for the login user.

Retrieves the all the stored 802.1X profiles for the login user

If there are no 802.1X user profiles for the login user, then this method will return an empty array object.

9.1.4   Constructor

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an CW8021XProfile object with default parameters.
Notes: The default EAP profile supports (in preferred order) TLS, PEAP, TTLS, and EAP-FAST. The profile will conditionally support TLS only if their is a certificate available. TTLS uses MSCHAPv2 inner authentication and EAP-FAST uses automatic PAC provisioning. Support for more advanced EAP profile options may be added in a future implementation.

9.1.5   copy as CW8021XProfileMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of this object.

9.1.6   isEqualToProfile(profile as CW8021XProfileMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The CW8021XProfile object for which to test equality.
Notes:

Returns true if two profiles are equal.

Two CW8021XProfile objects are considered equal if all their corresponding properties are equal.

9.1.7   Operator_Compare(profile as CW8021XProfileMBS) as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Compares two profiles.

9.1.8   profile as CWWirelessProfileMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An CW8021XProfile object with default parameters for the given network.
Notes:

Convenience method for getting an CW8021XProfile object with default parameters.

The default EAP profile supports (in preferred order) TLS, PEAP, TTLS, and EAP-FAST. The profile will conditionally support TLS only if their is a certificate available. TTLS uses MSCHAPv2 inner authentication

and EAP-FAST uses automatic PAC provisioning. Support for more advanced EAP profile options may be added in a future implementation.

9.1.9 Properties

9.1.10 alwaysPromptForPassword as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** IEEE 802.1X client always prompts the user for the IEEE 802.1X password.
Notes: (Read and Write property)

9.1.11 description as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The object description
Notes: (Read only property)

9.1.12 Handle as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.
Notes: (Read and Write property)

9.1.13 password as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** IEEE 802.1X password.
Notes: (Read and Write property)

9.1.14 ssid as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Wireless network name.
Notes: (Read and Write property)

9.1.15   userDefinedName as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** User-defined name.
Notes: (Read and Write property)

9.1.16   username as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** IEEE 802.1X
username.
Notes: (Read and Write property)

9.2 class CWChannelMBS

9.2.1 class CWChannelMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The CoreWLAN class for a channel.
Notes:

Encapsulates an IEEE 802.11 channel.

Available on Mac OS X 10.7 or later.
Please also check the documentation from Apple for the CWChannel class.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

9.2.2 Methods

9.2.3 Constructor

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

9.2.4 copy as CWChannelMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of the object.

9.2.5 isEqualToChannel(channel as CWChannelMBS) as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Compares two channels.
Notes: Returns true if both are equal.

9.2.6 Operator_Compare(channel as CWChannelMBS) as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Compares two channels.

9.2.7   Properties

9.2.8   channelBand as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The channel band.
Notes: (Read only property)

9.2.9   channelNumber as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The channel number.
Notes: (Read only property)

9.2.10   channelWidth as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The channel width.
Notes: (Read only property)

9.2.11   Handle as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal reference for this object.
Notes: (Read and Write property)

9.3 class CWConfigurationMBS

9.3.1 class CWConfigurationMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN configuration.
Notes:

Encapsulates a static configuration for a given IEEE 802.11 wireless interface.

Requires Mac OS X 10.6 or newer.

9.3.2 Methods

9.3.3 configuration as CWConfigurationMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method for getting an CWConfiguration object.
Notes:

dim c as CWConfigurationMBS = CWConfigurationMBS.configuration
MsgBox hex(c.Handle)
See also:

9.3.4 configuration(config as CWConfigurationMBS) as CWConfigurationMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method for getting a CWConfiguration object initialized with the given CWConfiguration object.
Notes: Available on Mac OS X 10.7 or later.
See also:

9.3.5 Constructor

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an CWConfiguration.
See also:

9.3.6   Constructor(configuration as CWConfigurationMBS)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a CWConfigurationMBS object initialized with the given CWConfigurationMBS object.
Notes: Available on Mac OS X 10.7 or later.
See also:

9.3.7   copy as CWConfigurationMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of this object.

9.3.8   isEqualToConfiguration(configuration as CWConfigurationMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Test whether two configurations are equal.
Notes: Two CWConfiguration objects are considered equal if all their corresponding properties are equal.

9.3.9   mutableCopy as CWMutableConfigurationMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a mutable copy of this object.
Notes: Available on Mac OS X 10.7 or later.

9.3.10   networkProfiles as CWNetworkProfileMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of remembered CWNetworkProfileMBS objects.
Notes:

The order of this array corresponds to the order in which the the CWNetworkProfile objects participate in the auto-join process.

Available on Mac OS X 10.7 or later.

9.3.11 Operator_Compare(configuration as CWConfigurationMBS) as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Compares two profiles.

9.3.12 preferredNetworks as CWWirelessProfileMBS()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Ordered array of CWWirelessProfile objects.
Notes: The preferred networks list is a subset of the remembered networks set. It cannot contain duplicate entries and cannot contain any entries that are not present in the remembered networks set.

9.3.13 rememberedNetworks as CWWirelessProfileMBS()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Array of stored CWWirelessProfile objects for the given CWConfiguration.

9.3.14 setPreferredNetworks(profiles() as CWWirelessProfileMBS)

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the ordered array of CWWirelessProfile objects.
Notes: The preferred networks list is a subset of the remembered networks set. It cannot contain duplicate entries and cannot contain any entries that are not present in the remembered networks set.

9.3.15 setRememberedNetworks(profiles() as CWWirelessProfileMBS)

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the array of stored CWWirelessProfile objects for the given CWConfiguration.

9.3.16 Properties

9.3.17 alwaysRememberNetworks as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preference to always remember networks joined.
Notes: (Read and Write property)

9.3.18   disconnectOnLogout as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preference to disconnect from the current network upon user logout.
Notes: (Read and Write property)

9.3.19   Handle as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.
Notes: (Read and Write property)

9.3.20   rememberJoinedNetworks as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** AirPort client will remember all joined networks.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.3.21   requireAdminForIBSSCreation as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preference to require administrative privileges to create computer-to-computer networks.
Notes: (Read and Write property)

9.3.22   requireAdminForNetworkChange as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preference to require administrative privileges to change networks.
Notes: (Read and Write property)

9.3.23   requireAdminForPowerChange as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preference to require administrative privileges to change the CoreWLAN interface power state.

Notes: (Read and Write property)

9.3.24 requireAdministratorForAssociation as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Require an administrator password to change networks.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.3.25 requireAdministratorForIBSSMode as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Require an administrator password to create a computer-to-computer network.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.3.26 requireAdministratorForPower as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Require an administrator password to change the interface power state.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.4   module CWGlobalsMBS

9.4.1   module CWGlobalsMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The module for the global constants.
Notes: Please note that MBS Plugin implements all methods from 10.6 to 10.9 in CoreWLAN. But Apple changes things often, so some methods are only for older system, some only for newer. e.g. kCWErrorDomain is for 10.6 and CWErrorDomain for 10.7 and newer.

9.4.2   Methods

9.4.3   CWBSSIDDidChangeNotification as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Please use with NSNotificationObserverMBS class.
Posted when the BSSID of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

9.4.4   CWCountryCodeDidChangeNotification as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Please use with NSNotificationObserverMBS class.
Posted when the country code of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

9.4.5   CWErrorDomain as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN Error Domain.

9.4.6 CWLinkDidChangeNotification as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Please use with NSNotificationObserverMBS class.
Posted when the link state of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

9.4.7 CWLinkQualityDidChangeNotification as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Please use with NSNotificationObserverMBS class.
Posted when the link quality for any WLAN interface changes. The object for this notification is the corresponding BSD interface name. The userInfo dictionary for this notification contains the current RSSI and current transmit rate for the given CoreWLAN interface.

9.4.8 CWLinkQualityNotificationRSSIKey as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Dictionary key for link quality change details.
Notes: Number containing the current RSSI value for the WLAN interface. Found in the userInfo dictionary for the CWLinkQualityChangedNotification.

9.4.9 CWLinkQualityNotificationTransmitRateKey as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Dictionary key for link quality change details.
Notes: Number containing the current transmit rate value for the WLAN interface. Found in the userInfo dictionary for the CWLinkQualityChangedNotification.

9.4.10 CWModeDidChangeNotification as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Please use with NSNotificationObserverMBS class.

Posted when the mode of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

9.4.11   CWPowerDidChangeNotification as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Please use with NSNotificationObserverMBS class.
Posted when the power state of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

9.4.12   CWScanCacheDidUpdateNotification as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Please use with NSNotificationObserverMBS class.
Posted when new entries are added to the scan cache, or existing entries are updated with more current information. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

9.4.13   CWServiceDidChangeNotification as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Please use with NSNotificationObserverMBS class.
Posted when the network service availability for any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

9.4.14   CWSSIDDidChangeNotification as string

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.

Notes:

Please use with NSNotificationObserverMBS class.
Posted when the SSID of any WLAN interface changes. The object for this notification is the corresponding BSD interface name. This notification does not contain a userInfo dictionary.

9.4.15 kCWAssocKey8021XProfile as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the Association Parameter Keys.
Notes: CW8021XProfile object containing the network IEEE 802.1X profile. Required for association to IEEE 802.1X dynamic WEP and WPA/WPA2 Enterprise networks.

9.4.16 kCWAssocKeyPassphrase as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the Association Parameter Keys.
Notes: String containing network passphrase or key. Required for association to WEP and WPA/WPA2 Personal networks.

9.4.17 kCWBSSIDDidChangeNotification as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Posted when the BSSID of the wireless interface changes. This notification does not contain a userInfo dictionary.
As CoreWLAN has been deprecated, this events may not fire any more.

9.4.18 kCWCountryCodeDidChangeNotification as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Posted when the country code of the CoreWLAN interface changes. This notification does not contain a userInfo dictionary.
As CoreWLAN has been deprecated, this events may not fire any more.

9.4.19   kCWErrorDomain as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Error domain for NSErrors returned by calls to CWInterface.
Notes: NSErrorMBS class has a domain property and there is this domain value used for errors from the CoreWLAN framework.

9.4.20   kCWIBSSKeyChannel as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the IBSS Parameter Keys.
Notes: Number containing the channel number on which the network will be created. Defaults to channel 11.

9.4.21   kCWIBSSKeyPassphrase as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the IBSS Parameter Keys.
Notes: String containing network cipher key. 40-bit and 104-bit WEP modes are currently supported. Cipher mode is inferred from the key length. A cipher key that has 5 characters or has 10 hexidecimal characters corresponds to a 40-bit WEP key. A cipher key that has 13 characters or has 26 hexidecimal characters corresponds to a 104-bit WEP key. If this key is not present, then no cipher key will be used on the network.

9.4.22   kCWIBSSKeySSID as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the IBSS Parameter Keys.
Notes: String containing the SSID of the network to be created.

9.4.23   kCWLinkDidChangeNotification as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Posted when the link state of the CoreWLAN interface changes. This notification does not contain a userInfo dictionary.
As CoreWLAN has been deprecated, this events may not fire any more.

9.4.24 kCWModeDidChangeNotification as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Posted when the op mode of the CoreWLAN interface changes. This notification does not contain a userInfo dictionary.
As CoreWLAN has been deprecated, this events may not fire any more.

9.4.25 kCWPowerDidChangeNotification as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Posted when the power state of the CoreWLAN interface changes. This notification does not contain a userInfo dictionary.
As CoreWLAN has been deprecated, this events may not fire any more.

9.4.26 kCWScanKeyBSSID as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the Scan Parameter Keys.
Notes: String containing the target BSSID of a directed scan request.

9.4.27 kCWScanKeyDwellTime as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the Scan Parameter Keys.
Notes: Number specifying the time in milliseconds that the interface will spend on each channel listening for beacon frames and probe responses. Defaults to driver default.

9.4.28 kCWScanKeyMerge as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the Scan Parameter Keys.
Notes: Boolean value indicating whether or not duplicate SSID entries should be included in the scan results. A value evaluating to true will include the BSSID with the strongest signal strength and remove all

other duplicate SSID entries. Defaults to true.

9.4.29   kCWScanKeyRestTime as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the Scan Parameter Keys.
Notes: Number specifying the time in milliseconds that the interface will spend on its home channels between intervals of off-channel activity during the scan request. Defaults to driver default.

9.4.30   kCWScanKeyScanType as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the Scan Parameter Keys.
Notes: String indicating the type of scan to perform. Defaults to APScanTypeActive.

9.4.31   kCWScanKeySSID as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the Scan Parameter Keys.
Notes: String containing the target SSID of a directed scan request.

9.4.32   kCWSSIDDidChangeNotification as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** One of the notification names for CoreWLAN.
Notes:

Posted when the SSID of the CoreWLAN interface changes. This notification does not contain a userInfo dictionary.
As CoreWLAN has been deprecated, this events may not fire any more.

9.4.33   KeychainDeleteEAPUsernameAndPassword(ssidData as memoryblock) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Deletes the 802.1X username and password for the specified SSID.
Notes:

ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainDeleteWiFiEAPUsernameAndPassword instead.

9.4.34 KeychainDeletePassword(ssidData as memoryblock) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Deletes the password for the specified SSID and keychain domain.
Notes:

ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainDeleteWiFiPassword instead.

9.4.35 KeychainDeleteWiFiEAPUsernameAndPassword(KeychainDomain as Integer, ssidData as memoryblock) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Deletes the 802.1X username and password for the specified SSID and keychain domain.
Notes:

domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

9.4.36   KeychainDeleteWiFiPassword(KeychainDomain as Integer, ssidData as memoryblock) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Deletes the password for the specified SSID and keychain domain.
Notes:

domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

9.4.37   KeychainFindWiFiEAPUsernameAndPassword(KeychainDomain as Integer, ssidData as memoryblock, byref username as string, byref password as string) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Finds and returns the 802.1X username and password stored for the specified SSID and keychain domain.
Notes:

domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
username: a string passed by reference, which upon return will contain the 802.1X username for the specified SSID.
password: a string passed by reference, which upon return will contain the 802.1X password for the specified SSID.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

9.4.38   KeychainFindWiFiPassword(KeychainDomain as Integer, ssidData as memoryblock, byref password as string) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Finds and returns (by reference) the password for the specified SSID and keychain domain.
Notes:

domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
password: An string passed by reference, which upon return will contain the Wi-Fi keychain password for
the specified SSID. This parameter is optional.

Returns an error code indicating whether or not a failure occurred. errSecSuccess indicates no error occurred.
Available on Mac OS X 10.9 or newer.

9.4.39 KeychainGetEAPIdentity(ssidData as memoryblock, byref SecIdentityRef as Integer) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Finds and returns
the identity stored for the specified SSID and keychain domain.
Notes:

ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
identity: An Integer passed by reference, which upon return will contain the SecIdentityRef associated with
the specified SSID.
The returned value must be released by the caller.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainGetWiFiEAPIdentity instead.

9.4.40 KeychainGetEAPIdentityList(byref ListSecIdentityRef() as Integer) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Finds and returns
all available identities.
Notes:

ListSecIdentityRef: An array passed by reference, which upon return will be populated with a list of integers
(SecIdentityRef).

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

9.4.41   KeychainGetEAPUsernameAndPassword(ssidData as memoryblock, byref username as string, byref password as string) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Finds and returns the 802.1X username and password stored for the specified SSID.
Notes:

ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
username: A string passed by reference, which upon return will contain the 802.1X username for the specified SSID.
password: A string passed by reference, which upon return will contain the 802.1X password for the specified SSID.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain.

Available in Mac OS X 10.7, deprecated in 10.9. Please use FindWiFiEAPUsernameAndPassword instead.

9.4.42   KeychainGetPassword(ssidData as memoryblock, byref password as string) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Finds and returns (by reference) the password for the specified SSID.
Notes:

ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
password: A string passed by reference, which upon return will contain the Wi-Fi keychain password for the specified SSID.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainFindWiFiPassword instead.

9.4.43   KeychainGetWiFiEAPIdentity(KeychainDomain as Integer, ssidData as memoryblock, byref SecIdentityRef as Integer) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Finds and returns the identity stored for the specified SSID and keychain domain.
Notes:

domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
identity: An Integer passed by reference, which upon return will contain the SecIdentityRef associated with the specified SSID.
The returned value must be released by the caller.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

9.4.44   KeychainSetEAPIdentity(ssidData as memoryblock, SecIdentityRef as Integer) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Associates an identity to the specified SSID.
Notes:

ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
identity: The identity containing the certificate to use for 802.1X authentication.
Passing 0 clears any identity association for the specified SSID.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainSetWiFiEAPIdentity instead.

9.4.45   KeychainSetEAPUsernameAndPassword(ssidData as memoryblock, username as string, password as string) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the 802.1X username and password for the specified SSID.
Notes:

ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
username: The 802.1X username.
password: The 802.1X password. This parameter is optional.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use SetWiFiEAPUsernameAndPassword instead.

9.4.46   KeychainSetPassword(ssidData as memoryblock, password as string) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the Wi-Fi network keychain password for the specified SSID.
Notes:

ssidData: The service set identifier (SSID) which is used to uniquely identify the keychain item.
password: The Wi-Fi network password.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

The keychain used is determined by the SecPreferencesDomain of the caller as returned by KeychainManagerMBS.PreferenceDomain().
Available in Mac OS X 10.7, deprecated in 10.9. Please use KeychainSetWiFiPassword instead.

9.4.47   KeychainSetWiFiEAPIdentity(KeychainDomain as Integer, ssidData as memoryblock, SecIdentityRef as Integer) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Associates an identity to the specified SSID and keychain domain.
Notes:

domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
identity: The identity containing the certificate to use for 802.1X authentication. a SecIdentityRef passed as Integer.

Passing 0 clears any identity association for the specified SSID.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

9.4.48 KeychainSetWiFiEAPUsernameAndPassword(KeychainDomain as Integer, ssidData as memoryblock, Username as string, Password as string) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the 802.1X username and password for the specified SSID and keychain domain.
Notes:

domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
username: The 802.1X username.
password: The 802.1X password. This parameter is optional.

Returns an OSStatus error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.

Available on Mac OS X 10.9 or newer.

9.4.49 KeychainSetWiFiPassword(KeychainDomain as Integer, ssidData as memoryblock, password as string) as Integer

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the Wi-Fi network keychain password for the specified SSID and keychain domain.
Notes:

domain: The keychain domain, which determines which keychain will be used.
ssid: The service set identifier (SSID) which is used to uniquely identify the keychain item.
password: The Wi-Fi network password.

Returns an error code indicating whether or not a failure occurred.
errSecSuccess indicates no error occurred.
Available on Mac OS X 10.9 or newer.

9.4.50   MergeNetworks(networks() as CWNetworkMBS) as CWNetworkMBS()

Plugin Version: 14.4, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Merges the specified set of CWNetwork objects.
Notes:

networks: The set of networks to merge.

Duplicate networks are defined as networks with the same SSID, security type, and BSS type (IBSS or Infrastructure).
When duplicate networks exist, the network with the best RSSI value will be chosen.

9.4.51   Constants

9.4.52   kCWAPFullErr = -3913

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Access point is unable to handle another associated station.

9.4.53   kCWAssociationDeniedErr = -3909

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Association was denied for an unspecified reason.

9.4.54   kCWAuthAlgUnsupportedErr = -3910

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Specified authentication algorithm is not supported.

9.4.55   kCWAuthenticationAlgorithmUnsupportedErr = -3910

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Specified authentication algorithm is not supported.

9.4.56   kCWChallengeFailureErr = -3912

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Authentication was rejected because of a challenge failure.

9.4.57   kCWChannelBand2GHz = 1

Plugin Version: 13.5. **Function:** One of the CoreWLAN channel bands used for CWChannel.
Notes: 2 GHz channel band.

9.4.58   kCWChannelBand5GHz = 2

Plugin Version: 13.5. **Function:** One of the CoreWLAN channel bands used for CWChannel.
Notes: 5 GHz channel band.

9.4.59   kCWChannelBandUnknown = 0

Plugin Version: 13.5. **Function:** One of the CoreWLAN channel bands used for CWChannel.
Notes: Unknown channel band.

9.4.60   kCWChannelWidth160MHz = 4

Plugin Version: 13.5. **Function:** One of the CoreWLAN channel widths used for CWChannel.
Notes: 160MHz channel width.

9.4.61   kCWChannelWidth20MHz = 1

Plugin Version: 13.5. **Function:** One of the CoreWLAN channel widths used for CWChannel.
Notes: 20MHz channel width.

9.4.62   kCWChannelWidth40MHz = 2

Plugin Version: 13.5. **Function:** One of the CoreWLAN channel widths used for CWChannel.
Notes: 40MHz channel width.

9.4.63   kCWChannelWidth80MHz = 3

Plugin Version: 13.5. **Function:** One of the CoreWLAN channel widths used for CWChannel.
Notes: 80MHz channel width.

9.4.64   kCWChannelWidthUnknown = 0

Plugin Version: 13.5. **Function:** One of the CoreWLAN channel widths used for CWChannel.
Notes: Unknown channel width.

9.4.65   kCWCipherKeyFlagsMulticast = 4

Plugin Version: 13.5. **Function:** One of the CoreWLAN chipher key flags.
Notes: Cipher key will be used for multicast packets.

9.4.66   kCWCipherKeyFlagsNone = 0

Plugin Version: 13.5. **Function:** One of the CoreWLAN chipher key flags.
Notes: Open System authentication.

9.4.67   kCWCipherKeyFlagsRx = 16

Plugin Version: 13.5. **Function:** One of the CoreWLAN chipher key flags.
Notes: Cipher key will be used for packets received by the interface.

9.4.68   kCWCipherKeyFlagsTx = 8

Plugin Version: 13.5. **Function:** One of the CoreWLAN chipher key flags.
Notes: Cipher key will be used for packets sent from the interface.

9.4.69   kCWCipherKeyFlagsUnicast = 2

Plugin Version: 13.5. **Function:** One of the CoreWLAN chipher key flags.
Notes: Cipher key will be used for unicast packets.

9.4.70 kCWCipherSuiteRejectedErr = -3923

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Cipher suite rejected due to network security policy.

9.4.71 kCWDSSSOFDMUnsupportedErr = -3916

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Association denied because DSSS-OFDM is not supported by requesting station.

9.4.72 kCWEAPOLErr = 1

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: EAPOL-related error.

9.4.73 kCWErr = -3931

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Generic error, no specific error code exists to describe the error condition.

9.4.74 kCWError = -3931

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Generic error.

9.4.75 kCWFormatErr = -3904

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Invalid protocol element field detected.

9.4.76 kCWHTFeaturesNotSupported = -3926

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Association was denied because the requesting station does not support HT features.

9.4.77   kCWHTFeaturesNotSupportedErr = -3926

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Association was denied because the requesting station does not support HT features.

9.4.78   kCWIBSSModeSecurityNone = 0

Plugin Version: 13.5. **Function:** One of the IBSS mode security types.
Notes: Open System authentication.

9.4.79   kCWIBSSModeSecurityWEP104 = 2

Plugin Version: 13.5. **Function:** One of the IBSS mode security types.
Notes: WPA Personal authentication.

9.4.80   kCWIBSSModeSecurityWEP40 = 1

Plugin Version: 13.5. **Function:** One of the IBSS mode security types.
Notes: WEP security.

9.4.81   kCWInterfaceModeHostAP = 3

Plugin Version: 13.5. **Function:** One of the CoreWLAN interface operation modes.
Notes: Interface is participating in an infrastructure network as an access point.

9.4.82   kCWInterfaceModeIBSS = 2

Plugin Version: 13.5. **Function:** One of the CoreWLAN interface operation modes.
Notes: Interface is participating in an IBSS network.

9.4.83   kCWInterfaceModeNone = 0

Plugin Version: 13.5. **Function:** One of the CoreWLAN interface operation modes.
Notes: Interface is not in any mode.

9.4.84 kCWInterfaceModeStation = 1

Plugin Version: 13.5. **Function:** One of the CoreWLAN interface operation modes.
Notes: Interface is participating in an infrastructure network as a non-AP station.

9.4.85 kCWInterfaceStateAssociating = 3

Plugin Version: 11.0. **Function:** One of the interface state constants in CoreWLAN.
Notes: CoreWLAN interface is associating.

9.4.86 kCWInterfaceStateAuthenticating = 2

Plugin Version: 11.0. **Function:** One of the interface state constants in CoreWLAN.
Notes: CoreWLAN interface is authenticating.

9.4.87 kCWInterfaceStateInactive = 0

Plugin Version: 11.0. **Function:** One of the interface state constants in CoreWLAN.
Notes: CoreWLAN interface is in the initial, inactive state.

9.4.88 kCWInterfaceStateRunning = 4

Plugin Version: 11.0. **Function:** One of the interface state constants in CoreWLAN.
Notes: CoreWLAN interface is running.

9.4.89 kCWInterfaceStateScanning = 1

Plugin Version: 11.0. **Function:** One of the interface state constants in CoreWLAN.
Notes: CoreWLAN interface is scanning.

9.4.90 kCWInvalidAKMPErr = -3920

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Invalid authentication selector requested.

9.4.91   kCWInvalidAuthenticationSequenceNumberErr = -3911

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Authentication frame received with an authentication sequence number out of expected sequence.

9.4.92   kCWInvalidAuthSeqNumErr = -3911

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Authentication frame received with an authentication sequence number out of expected sequence.

9.4.93   kCWInvalidFormatErr = -3904

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Invalid protocol element field detected.

9.4.94   kCWInvalidGroupCipherErr = -3918

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Invalid group cipher requested.

9.4.95   kCWInvalidInfoElementErr = -3917

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Invalid information element included in association request.

9.4.96   kCWInvalidInformationElementErr = -3917

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Invalid information element included in association request.

9.4.97   kCWInvalidPairwiseCipherErr = -3919

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Invalid pairwise cipher requested.

9.4.98   kCWInvalidParameterErr = -3900

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Parameter error.

9.4.99   kCWInvalidPMKErr = -3924

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: PMK rejected by the access point.

9.4.100   kCWInvalidRSNCapabilitiesErr = -3922

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Invalid RSN capabilities specified in association request.

9.4.101   kCWIPCError = -3929

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Error communicating with a separate process.

9.4.102   kCWIPCFailureErr = -3929

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Error communicating with a separate process.

9.4.103   kCWKeychainDomainNone = 0

Plugin Version: 13.5. **Function:** One of the CoreWLAN keychain domains used in the CWKeychain API.
Notes: No keychain domain specified.

9.4.104   kCWKeychainDomainSystem = 2

Plugin Version: 13.5. **Function:** One of the CoreWLAN keychain domains used in the CWKeychain API.
Notes: The system keychain domain.

9.4.105   kCWKeychainDomainUser = 1

Plugin Version: 13.5. **Function:** One of the CoreWLAN keychain domains used in the CWKeychain API.
Notes: The login (user) keychain domain.

9.4.106   kCWNoErr = 0

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Success.

9.4.107   kCWNoMemErr = -3901

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Memory allocation failed.

9.4.108   kCWNoMemoryErr = -3901

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Memory allocation failed.

9.4.109   kCWNotSupportedErr = -3903

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Operation not supported.

9.4.110   kCWOperationNotPermittedErr = -3930

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Calling process does not have permission to perform this operation.

9.4.111   kCWOpModeHostAP = 3

Plugin Version: 11.0. **Function:** One of the interface operation mode constants in CoreWLAN.
Notes: Interface is participating in an infrastructure network as an access point.

9.4.112   kCWOpModeIBSS = 1

Plugin Version: 11.0. **Function:** One of the interface operation mode constants in CoreWLAN.
Notes: Interface is participating in an IBSS network.

9.4.113   kCWOpModeMonitorMode = 2

Plugin Version: 11.0. **Function:** One of the interface operation mode constants in CoreWLAN.
Notes: Interface is in 802.11 monitor mode.

9.4.114   kCWOpModeStation = 0

Plugin Version: 11.0. **Function:** One of the interface operation mode constants in CoreWLAN.
Notes: Interface is participating in an infrastructure network as a non-AP station.

9.4.115   kCWOpNotPermitted = -3930

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Calling process does not have permission to perform this operation.

9.4.116   kCWParamErr = -3900

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Parameter error.

9.4.117   kCWPCOTransitionTimeNotSupported = -3927

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Association was denied because the requesting station does not support the PCO transition time required by the AP.

9.4.118   kCWPCOTransitionTimeNotSupportedErr = -3927

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Association was denied because the requesting station does not support the PCO transition time required by the AP.

9.4.119   kCWPHYMode11a = 1

Plugin Version: 13.5. **Function:** One of the CoreWLAN physical layer modes.
Notes: IEEE 802.11a PHY.

9.4.120   kCWPHYMode11ac = 5

Plugin Version: 13.5. **Function:** One of the CoreWLAN physical layer modes.
Notes: IEEE 802.11ac PHY.

9.4.121   kCWPHYMode11b = 2

Plugin Version: 13.5. **Function:** One of the CoreWLAN physical layer modes.
Notes: IEEE 802.11b PHY.

9.4.122   kCWPHYMode11g = 3

Plugin Version: 13.5. **Function:** One of the CoreWLAN physical layer modes.
Notes: IEEE 802.11g PHY.

9.4.123   kCWPHYMode11n = 4

Plugin Version: 13.5. **Function:** One of the CoreWLAN physical layer modes.
Notes: IEEE 802.11n PHY.

9.4.124   kCWPHYModeNone = 0

Plugin Version: 13.5. **Function:** One of the CoreWLAN physical layer modes.
Notes: No PHY mode.

9.4.125 kCWReassociationDeniedErr = -3908

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Reassociation was denied because the access point was unable to determine that an association exists.

9.4.126 kCWReferenceNotBoundErr = -3928

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: No interface is bound to the CWInterface.

9.4.127 kCWRefNotBoundErr = -3928

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: No interface is bound to the CWInterface.

9.4.128 kCWScanTypeActive = 0

Plugin Version: 11.0. **Function:** One of the scan type constants in CoreWLAN.
Notes: In accordance with the supported channels for the active country code, the interface will transmit probe request frames and listen for probe responses.

9.4.129 kCWScanTypeFast = 2

Plugin Version: 11.0. **Function:** One of the scan type constants in CoreWLAN.
Notes: The scan will return cached scan results.

9.4.130 kCWScanTypePassive = 1

Plugin Version: 11.0. **Function:** One of the scan type constants in CoreWLAN.
Notes: The interface will listen for beacon frames on each channel irrespective of country code.

9.4.131 kCWSecurityDynamicWEP = 6

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: Dynamic WEP security.

9.4.132   kCWSecurityEnterprise = 10

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: Enterprise authentication.

9.4.133   kCWSecurityModeDynamicWEP = 7

Plugin Version: 11.0. **Function:** One of the security mode constants in CoreWLAN.
Notes: Dynamic WEP 802.1X authentication.

9.4.134   kCWSecurityModeOpen = 0

Plugin Version: 11.0. **Function:** One of the security mode constants in CoreWLAN.
Notes: Open System authentication.

9.4.135   kCWSecurityModeWEP = 1

Plugin Version: 11.0. **Function:** One of the security mode constants in CoreWLAN.
Notes: WEP authentication.

9.4.136   kCWSecurityModeWPA2_Enterprise = 5

Plugin Version: 11.0. **Function:** One of the security mode constants in CoreWLAN.
Notes: WPA2 Enterprise authentication.

9.4.137   kCWSecurityModeWPA2_PSK = 3

Plugin Version: 11.0. **Function:** One of the security mode constants in CoreWLAN.
Notes: WPA2 Personal authentication.

9.4.138   kCWSecurityModeWPA_Enterprise = 4

Plugin Version: 11.0. **Function:** One of the security mode constants in CoreWLAN.
Notes: WPA Enterprise authentication.

9.4.139 kCWSecurityModeWPA_PSK = 2

Plugin Version: 11.0. **Function:** One of the security mode constants in CoreWLAN.
Notes: WPA Personal authentication.

9.4.140 kCWSecurityModeWPS = 6

Plugin Version: 11.0. **Function:** One of the security mode constants in CoreWLAN.
Notes: WiFi Protected Setup authentication.

9.4.141 kCWSecurityNone = 0

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: Open System authentication.

9.4.142 kCWSecurityPersonal = 5

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: Personal authentication.

9.4.143 kCWSecurityUnknown = & h7FFFFFFF

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: Unknown security type.

9.4.144 kCWSecurityWEP = 1

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: WEP security.

9.4.145 kCWSecurityWPA2Enterprise = 9

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: WPA2 Enterprise authentication.

9.4.146   kCWSecurityWPA2Personal = 4

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: WPA2 Personal authentication.

9.4.147   kCWSecurityWPAEnterprise = 7

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: WPA Enterprise authentication.

9.4.148   kCWSecurityWPAEnterpriseMixed = 8

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: WPA/WPA2 Enterprise authentication.

9.4.149   kCWSecurityWPAPersonal = 2

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: WPA Personal authentication.

9.4.150   kCWSecurityWPAPersonalMixed = 3

Plugin Version: 13.5. **Function:** One of the CoreWLAN security types.
Notes: WPA/WPA2 Personal authentication.

9.4.151   kCWShortSlotUnsupportedErr = -3915

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Association denied because short slot time option is not supported by requesting station.

9.4.152   kCWSupplicantTimeoutErr = -3925

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: WPA/WPA2 handshake timed out.

9.4.153 kCWTimeoutErr = -3905

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Authentication/Association timed out.

9.4.154 kCWUknownErr = -3902

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Unexpected error condition encountered for which no error code exists.

9.4.155 kCWUnknownErr = -3902

Plugin Version: 13.5. **Function:** One of the CoreWLAN Errors.
Notes: Unexpected error condition encountered for which no error code exists.

9.4.156 kCWUnspecifiedFailureErr = -3906

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Access point did not specify a reason for authentication/association failure.

9.4.157 kCWUnsupportedCapabilitiesErr = -3907

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Access point cannot support all requested capabilities.

9.4.158 kCWUnsupportedRateSetErr = -3914

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Interface does not support all of the rates in the access point's basic rate set.

9.4.159 kCWUnsupportedRSNVersionErr = -3921

Plugin Version: 11.0. **Function:** One of the error constants in CoreWLAN.
Notes: Invalid WPA/WPA2 version specified.

9.4.160   kOldCWPHYMode11A = 0

Plugin Version: 11.0. **Function:** One of the physical layer mode constants in CoreWLAN.
Notes: IEEE 802.11a

9.4.161   kOldCWPHYMode11B = 1

Plugin Version: 11.0. **Function:** One of the physical layer mode constants in CoreWLAN.
Notes: IEEE 802.11b

9.4.162   kOldCWPHYMode11G = 2

Plugin Version: 11.0. **Function:** One of the physical layer mode constants in CoreWLAN.
Notes: IEEE 802.11g

9.4.163   kOldCWPHYMode11N = 3

Plugin Version: 11.0. **Function:** One of the physical layer mode constants in CoreWLAN.
Notes: IEEE 802.11n

9.5   class CWInterfaceMBS

9.5.1   class CWInterfaceMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN interface.
Notes:

Encapsulates an CoreWLAN interface providing controlled access to various interface operations such as scanning, assocation, and IBSS creation, and providing a means to query and manipulate interface parameters.

Requires Mac OS X 10.6 or newer.

Please note that MBS Plugin implements all methods from 10.6 to 10.9 in CoreWLAN. But Apple changes things often, so some methods are only for older system, some only for newer. e.g. kCWErrorDomain is for 10.6 and CWErrorDomain for 10.7 and newer.

9.5.2   Methods

9.5.3   associateToEnterpriseNetwork(network as CWNetworkMBS, SecIdentityRef as Integer, username as string, password as string, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Connects to the given enterprise network.
Notes:

network: The network to which the interface will associate.
username: The username to use for IEEE 802.1X authentication.
password: The password to use for IEEE 802.1X authentication.
identity: The identity to use for IEEE 802.1X authentication. Holds the corresponding client certificate.
error: An NSError object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method.

Returns a Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

This method will block for the duration of the association. This operation may require an administrator password.

9.5.4   associateToNetwork(network as CWNetworkMBS, parameters as dictionary, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Attempts to associate to the given CWNetworkMBS, with the given association parameters.
Notes:

parameters: A dicitonary object containing association parameters.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the association parameters defined in CWGlobalsMBS for more information. Certain networks will require specific authentication credentials for association (i.e. a network using WPA2 Personal authentication will require a passphrase). This method will block for the duration of the association. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration. See also:

- 9.5.5 associateToNetwork(network as CWNetworkMBS, password as string, byref error as NSErrorMBS) as boolean   232

9.5.5   associateToNetwork(network as CWNetworkMBS, password as string, byref error as NSErrorMBS) as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Associates to a given network using the given network passphrase.
Notes:

network: The network to which the interface will associate.
password: The network passphrase or key. Required for association to WEP, WPA Personal, and WPA2 Personal networks.
error: An NSErrorMBS object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method. This parameter is optional and can be passed as nil.

Returns a boolean value which will indicate whether or not a failure occurred during execution. true indicates no error occurred.

This method will block for the duration of the association. This operation may require an administrator password.

Available on Mac OS X 10.7 or later.
See also:

9.5.6 cachedScanResults as CWNetworkMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The networks currently in the scan cache for the WLAN interface.
Notes:

Returns empty array in the case of an error.
Available on Mac OS X 10.7 or later.

9.5.7 commitConfiguration(config as CWConfigurationMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Changing the interface configuration.
Notes:

config: An CWConfiguration object containing the desired changes to the current CW configuration preferences.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

This method uses the SFAuthorization property of the given CWInterface object to commit the given configuration. The SFAuthorization property must be authorized with administrative privileges.
See also:

- 9.5.8 commitConfiguration(config as CWConfigurationMBS, SFAuthorizationRef as Integer, byref error as NSErrorMBS) as boolean 233

9.5.8 commitConfiguration(config as CWConfigurationMBS, SFAuthorizationRef as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Commit a configuration for the given WLAN interface.
Notes:

configuration: The configuration to commit.
authorization: An SFAuthorization object to use for authorizing the commit. This parameter is optional and can be passed as 0.

error: An NSError object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method.

Returns a Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

This method requires the caller have root privileges or obtain administrator privileges with the authorization parameter.
See also:

- 9.5.7 commitConfiguration(config as CWConfigurationMBS, byref error as NSErrorMBS) as boolean 233

9.5.9   Constructor

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an CWInterface for the primary interface.
Example:

dim c as new CWInterfaceMBS

MsgBox c.description

See also:

- 9.5.10 Constructor(name as string)   234

9.5.10   Constructor(name as string)

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an interface object linked to the interface of the given name.
Example:

dim c as new CWInterfaceMBS("en0")

MsgBox c.description

See also:

- 9.5.9 Constructor   234

9.5.11   disassociate

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Disassociates the CoreWLAN interface from the currently associated network.
Notes: This method is a no-op if the given CoreWLAN interface is not associated to a network. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.

9.5.12   enableIBSSWithParameters as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Attempts to create a computer-to-computer network with the given parameters.
Notes:

parameters: A dictionary object containing optional parameters for creating an IBSS network. This parameter is optional and may be passed as nil.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional and can be passed as nil.

Return a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the IBSS creation parameters defined in CWGlobals.h for more information. If no IBSS creation parameters are present, the default behavior is to create an open authentication computer-to-computer network using the machine name as the network name. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

9.5.13   enableIBSSWithParameters(byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Attempts to create a computer-to-computer network with the given parameters.
Notes:

parameters: A dictionary object containing optional parameters for creating an IBSS network. This parameter is optional and may be passed as nil.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional and can be passed as nil.

Return a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the IBSS creation parameters defined in CWGlobals.h for more information. If no IBSS creation parameters are present, the default behavior is to create an open authentication computer-to-computer network using the machine name as the network name. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

9.5.14   enableIBSSWithParameters(parameters as dictionary) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Attempts to create a computer-to-computer network with the given parameters.
Notes:

parameters: A dictionary object containing optional parameters for creating an IBSS network. This parameter is optional and may be passed as nil.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional and can be passed as nil.

Return a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the IBSS creation parameters defined in CWGlobals.h for more information. If no IBSS creation parameters are present, the default behavior is to create an open authentication computer-to-computer network using the machine name as the network name. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

9.5.15   enableIBSSWithParameters(parameters as dictionary, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Attempts to create a computer-to-computer network with the given parameters.

Notes:

parameters: A dictionary object containing optional parameters for creating an IBSS network. This parameter is optional and may be passed as nil.
error: An error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional and can be passed as nil.

Return a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

See the IBSS creation parameters defined in CWGlobals.h for more information. If no IBSS creation parameters are present, the default behavior is to create an open authentication computer-to-computer network using the machine name as the network name. This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

9.5.16   interfaceNames as String()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the list of BSD names for WLAN interfaces available on the current system.
Example:

dim names() as string = CWInterfaceMBS.interfaceNames
MsgBox Join(names,EndOfLine)

Notes:

Returns an array of strings representing the supported WLAN BSD interface names avaliable on the current system (i.e. "en1", "en2"). If there are no supported interfaces for the current system, then this method will return an empty NSArray object.
Returns empty array in the case of an error.

Available on Mac OS X 10.7 or later.

9.5.17   interfaceWithName(name as string) as CWInterfaceMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries the interface with the given name.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")

MsgBox c.description

Notes: name: A string representing the name of an Airport interface.

9.5.18   isEqualToInterface(otherInterface as CWInterfaceMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Comparing interfaces.
Notes:

Two CWInterface objects are considered equal if their corresponding <i>name</i>and capabilities properties are equal.

Returns true if both interfaces are equal.

9.5.19   primaryInterface as CWInterfaceMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method for getting an CWInterface object for the primary interface.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.primaryInterface

MsgBox c.name

9.5.20   scanForNetworksWithName(networkName as string, byref error as NSErrorMBS) as CWNetworkMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Scans for networks.
Notes:

networkName: The name (SSID) of the network for which to scan.
error: An NSErrorMBS object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method. This parameter is optional and can be passed as nil.

Returns an array of CWNetworkMBS objects.

If ssid parameter is present, a directed scan will be performed by the interface, otherwise a broadcast scan will be performed. This method will block for the duration of the scan.

Available on Mac OS X 10.7 or later.

9.5.21 scanForNetworksWithParameters as CWNetworkMBS()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Performs a scan with the given CoreWLAN interface, returning any found networks.
Notes:

parameters: A dicitonary object containing optional scan parameters which can be used to control the behavior of the scan. This parameter is optional.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns an array containing CWNetworkMBS objects representing the networks found in the scan.

See the scan parameters defined in CWGlobalsMBS for controlling scan behavior. If no scan parameters are present, the default behavior is to perform a broadcast scan on active channels, for all supported PHY modes. This method will block for the duration of the scan.
See also:

9.5.22 scanForNetworksWithParameters(byref error as NSErrorMBS) as CWNetworkMBS()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Performs a scan with the given CoreWLAN interface, returning any found networks.
Notes:

parameters: A dicitonary object containing optional scan parameters which can be used to control the behavior of the scan. This parameter is optional.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns an array containing CWNetworkMBS objects representing the networks found in the scan.

See the scan parameters defined in CWGlobalsMBS for controlling scan behavior. If no scan parameters are present, the default behavior is to perform a broadcast scan on active channels, for all supported PHY modes. This method will block for the duration of the scan.
See also:

9.5.23   scanForNetworksWithParameters(parameters as dictionary) as CWNetworkMBS()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Performs a scan with the given CoreWLAN interface, returning any found networks.
Notes:

parameters: A dicitonary object containing optional scan parameters which can be used to control the behavior of the scan. This parameter is optional.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns an array containing CWNetworkMBS objects representing the networks found in the scan.

See the scan parameters defined in CWGlobalsMBS for controlling scan behavior. If no scan parameters are present, the default behavior is to perform a broadcast scan on active channels, for all supported PHY modes. This method will block for the duration of the scan.
See also:

9.5.24   scanForNetworksWithParameters(parameters as dictionary, byref error as NSErrorMBS) as CWNetworkMBS()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Performs a scan with the given CoreWLAN interface, returning any found networks.
Notes:

parameters: A dicitonary object containing optional scan parameters which can be used to control the behavior of the scan. This parameter is optional.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns an array containing CWNetworkMBS objects representing the networks found in the scan.

See the scan parameters defined in CWGlobalsMBS for controlling scan behavior. If no scan parameters are present, the default behavior is to perform a broadcast scan on active channels, for all supported PHY modes. This method will block for the duration of the scan.
See also:

9.5.25   scanForNetworksWithSSID(ssid as memoryblock, byref error as NSErrorMBS) as CWNetworkMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Scans for networks.
Notes:

ssid The SSID for which to scan.
error: An NSErrorMBS object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method. This parameter is optional and can be passed as nil.

Returns an array of CWNetworkMBS objects.

If ssid parameter is present, a directed scan will be performed by the interface, otherwise a broadcast scan will be performed. This method will block for the duration of the scan.

Available on Mac OS X 10.7 or later.

9.5.26   setChannel(channel as UInt32) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the channel for the given CoreWLAN interface.
Notes:

channel: An integer representing the channel to which the CoreWLAN interface should be tuned.
error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

The current channel cannot be changed if the CoreWLAN interface is associated to a network. channel must be supported by the given interface.
See also:

9.5.27   setChannel(channel as UInt32, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the channel for the given CoreWLAN interface.
Notes:

channel: An integer representing the channel to which the CoreWLAN interface should be tuned.
error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

The current channel cannot be changed if the CoreWLAN interface is associated to a network. channel must be supported by the given interface.
See also:

9.5.28   setPairwiseMasterKey(key as Memoryblock, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the interface pairwise master key (PMK).
Notes:

key: A memoryblock containing the pairwise master key (PMK).

error: An NSError object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method.
Returns a Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

Key must be 32 octets. If key is nil, this method clears the PMK for the interface.

9.5.29 setPower(p as boolean) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the power state for the given CoreWLAN interface.
Notes:

power: A boolean value indicating the power state to which the CoreWLAN interface should be set. False indicates the "OFF" state.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

- 9.5.30 setPower(p as boolean, byref error as NSErrorMBS) as boolean   243

9.5.30 setPower(p as boolean, byref error as NSErrorMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the power state for the given CoreWLAN interface.
Notes:

power: A boolean value indicating the power state to which the CoreWLAN interface should be set. False indicates the "OFF" state.

error: A error object passed by reference, which will be populated with error code and error description if an error occurs during the execution of the method. This parameter is optional.

Returns a boolean value which will indicate whether or not a failure occured. True indicates no error occured.

This method may prompt for an administrator password if the corresponding preference is enabled in the current configuration.
See also:

9.5.31   setWEPKey(key as Memoryblock, flags as Integer, index as Integer, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the interface WEP key.
Notes:

key: A memoryblock containing the WEP key.
flags: The cipher key flags to use for the specified key. Combination of kCWCipherKeyFlagsNone, kCWCipherKeyFlagsUnicast, kCWCipherKeyFlagsMulticast, kCWCipherKeyFlagsTx or kCWCipherKeyFlagsRx.
index: Integer which default key index to use for the specified key.
error An NSError object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method.

Returns a boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

Key must be 5 octets for WEP-40 or 13 octets for WEP-104. if key is nil, this method clears the WEP key for the interface. index must correspond to default key index 1-4.

9.5.32   setWLANChannel(channel as CWChannelMBS, byref error as NSErrorMBS) as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the interface channel.
Notes:

channel: A CWChannel object corresponding to the channel.
error: An NSErrorMBS object passed by reference, which will be populated with the error code and the error description if an error occurs during the execution of this method. This parameter is optional and can be passed as nil.

A Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

The channel cannot be changed if the interface is associated to a network.

Available on Mac OS X 10.7 or later.

9.5.33 startIBSSModeWithSSID(ssidData as MemoryBlock, security as Integer, channel as Integer, password as string, byref error as NSErrorMBS) as boolean

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a computer-to-computer (ad-hoc) network with the given network name, security type, and password on the specified channel.
Notes:

security: The security type to be used. kCWIBSSModeSecurityNone, kCWIBSSModeSecurityWEP40 or kCWIBSSModeSecurityWEP104.
channel: The channel on which the network will be created.
password: The password to be used. This paramter is not applicable to open system authentication.

Returns a Boolean value which will indicate whether or not a failure occurred during execution. True indicates no error occurred.

This operation may require an administrator password.

9.5.34 supportedChannels as Integer()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Array of channels supported by the CoreWLAN interface for the active country code.
Notes: Dynamically queries the interface for the supported channels.

9.5.35 supportedInterfaces as String()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Getting all supported interfaces
Notes: Returns an array containing strings representing the supported CoreWLAN interface names avaliable on the current system (i.e. "en1", "en2"). If there are no supported interfaces for the current system, then this method will return an empty array.

9.5.36 supportedPHYModes as Integer()

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Array of PHY modes supported by the CoreWLAN interface.

Notes: Dynamically queries the interface for the supported PHY modes.

9.5.37   supportedWLANChannels as CWChannelMBS()

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of channels supported by the interface for the active country code.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
dim channels() as CWChannelMBS = c.supportedWLANChannels
dim lines() as string
for each ch as CWChannelMBS in channels
lines.append str(ch.channelNumber) + ": "+ str(ch.channelBand)
next
MsgBox join(lines,", ")

Notes:

Dynamically queries the interface for the supported channels. Returns an array of CWChannel objects, or nil in the case of an error.

Available on Mac OS X 10.7 or later.

9.5.38   Properties

9.5.39   activePHYMode as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current active PHY modes for the interface.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.activePHYMode)

Notes:

Dynamically queries the interface for the current active PHY mode.
Returns kCWPHYModeNone in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.40   bssid as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current BSSID of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current BSSID.
(Read only property)

9.5.41   bssidData as Memoryblock

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current BSSID of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current BSSID.
(Read only property)

9.5.42   channel as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current channel of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current channel.
(Read only property)

9.5.43   configuration as CWConfigurationMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current stored configuration for the CoreWLAN interface.
Notes: (Read only property)

9.5.44   countryCode as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Country code (ISO/IEC 3166-1:1997) of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current country code.
(Read only property)

9.5.45   description as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The object description.
Notes: (Read only property)

9.5.46   deviceAttached as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The interface has its corresponding hardware attached.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.deviceAttached)

Notes:

Returns false in the case of an error.
Available on Mac OS X 10.7 or later.
(Read only property)

9.5.47   Handle as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.
Notes: (Read and Write property)

9.5.48   hardwareAddress as string

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The hardware media access control (MAC) address for the interface, returned as a UTF-8 string.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox c.hardwareAddress

Notes:

The standard format for printing a MAC-48 address <00:00:00:00:00:00>is used to represent the MAC address as a string. Returns "" in the case of an error.

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.49   interfaceMode as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current mode for the interface.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.interfaceMode)

Notes:

Dynamically queries the interface for the current mode. Returns kCWInterfaceModeNone in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.50   interfaceName as string

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The BSD name of the interface.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox c.interfaceName
MsgBox str(c.noiseMeasurement)

Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.51 interfaceState as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current state of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current interface state.
(Read only property)

9.5.52 name as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** BSD name for the CoreWLAN interface.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.primaryInterface

MsgBox c.name

Notes: (Read only property)

9.5.53 noise as Double

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current aggregate noise measurement (dBm) of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current aggregate noise measurement.
(Read only property)

9.5.54 noiseMeasurement as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current aggregate noise measurement (dBm) for the interface.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.noiseMeasurement)

Notes:

Dynamically queries the interface for the current aggregate noise measurement.
Returns 0 in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.55   opMode as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current operation mode of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current operation mode.
(Read only property)

9.5.56   phyMode as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current active PHY mode of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current active PHY mode.
(Read only property)

9.5.57   power as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current power state for the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current power state.
(Read only property)

9.5.58   powerOn as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The interface power state is set to "ON".
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.rssiValue)

Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.59   powerSave as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current power save state for the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current power save state.
Introduced in 10.6, deprecated in 10.7 and gone in 10.9.
(Read only property)

9.5.60   rssi as Double

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current aggregate RSSI measurement (dBm) of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current aggregate RSSI measurement.
(Read only property)

9.5.61   rssiValue as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current aggregate received signal strength indication (RSSI) measurement (dBm) for the interface.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.rssiValue)

Notes:

Dynamically queries the interface for the current aggregate RSSI measurement.
Returns 0 in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.62 security as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current security mode for the interface.
Notes:

Dynamically queries the interface for the security mode. Returns kCWSecurityUnknown in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.63 securityMode as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current security mode of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current security mode.
(Read only property)

9.5.64 serviceActive as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The interface has its corresponding network service enabled.
Example:

dim c as CWInterfaceMBS = CWInterfaceMBS.interfaceWithName("en0")
MsgBox str(c.serviceActive)

Notes:

Returns false in the case of an error.

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.65   ssid as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current SSID of
the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current SSID.
(Read only property)

9.5.66   ssidData as Memoryblock

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current service
set identifier (SSID) for the interface, returned as data.
Notes:

Dynamically queries the interface for the current SSID. The SSID is 1-32 octets.
Returns nil in the case of an error, or if the interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.67   supportsAES_CCM as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN inter-
face supports AES-CCM (IEEE 802.11i Advanced Encryption Standard - Counter Mode with Cipher-Block
Chaining Message Authentication Code).
Notes: (Read only property)

9.5.68   supportsHostAP as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN inter-
face supports host access point mode.

Notes: (Read only property)

9.5.69   supportsIBSS as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN interface supports IBSS networks (IEEE 802.11 Independent Basic Service Set).
Notes: (Read only property)

9.5.70   supportsMonitorMode as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN interface supports monitor mode.
Notes: (Read only property)

9.5.71   supportsPMGT as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN interface supports power save modes.
Notes: (Read only property)

9.5.72   supportsShortGI20MHz as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN interface supports short guard interval in 20MHz channels.
Notes: (Read only property)

9.5.73   supportsShortGI40MHz as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN interface supports short guard interval in 40MHz channels.
Notes: (Read only property)

9.5.74   supportsTKIP as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN interface supports TKIP (IEEE 802.11i Temporal Key Integrity Protocol).

Notes: (Read only property)

9.5.75   supportsTSN as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN inter-
face supports TSN authentication (Transitional Security Network).
Notes: (Read only property)

9.5.76   supportsWEP as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN inter-
face supports WEP authentication (IEEE 802.11 Wired Equivalent Privacy).
Notes: (Read only property)

9.5.77   supportsWME as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN inter-
face supports WME (IEEE 802.11e Wireless Multimedia Extensions).
Notes: (Read only property)

9.5.78   supportsWoW as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN inter-
face supports wake on wireless capability.
Notes: (Read only property)

9.5.79   supportsWPA as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN inter-
face supports WPA (Wi-Fi Alliance Wi-Fi Protected Access).
Notes: (Read only property)

9.5.80   supportsWPA2 as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN inter-
face supports WPA2 (Wi-Fi Alliance Wi-Fi Protected Access 2).

Notes: (Read only property)

9.5.81   transmitPower as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current transmit power (mW) for the interface.
Notes:

Dynamically queries the interface for the current transmit power.
Returns 0 in the case of an error.

Available on Mac OS X 10.7 or later.
(Read only property)

9.5.82   transmitRate as Double

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current transmit rate (Mbps) for the interface.
Notes:

Dynamically queries the interface for the current transmit rate.
Returns 0 in the case of an error, or if the interface is not participating in a network.
Available on Mac OS X 10.7 or later.
(Read only property)

9.5.83   txPower as Double

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current target transmit power (mW) of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current transmit power.
(Read only property)

9.5.84   txRate as Double

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Current transmit rate (Mbps) of the CoreWLAN interface.
Notes:

Dynamically queries the interface for the current transmit rate.
(Read only property)

9.5.85   wlanChannel as CWChannelMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The current channel
for the interface.
Notes:

Dynamically queries the interface for the current channel. Returns nil in the case of an error, or if the
interface is not participating in a network.

Available on Mac OS X 10.7 or later.
(Read only property)

9.6 class CWMutableConfigurationMBS

9.6.1 class CWMutableConfigurationMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Encapsulates a mutable configuration for an AirPort WLAN interface.
Notes:

Available on Mac OS X 10.7 or later.
Please also check the documentation from Apple for the CWMutableConfiguration class.
Subclass of the CWConfigurationMBS class.

9.6.2 Methods

9.6.3 Constructor

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new mutable configuration.

9.6.4 setNetworkProfiles(values() as CWNetworkProfileMBS)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** An array of remembered CWNetworkProfileMBS objects.
Notes: The order of this array corresponds to the order in which the the CWNetworkProfileMBS objects participate in the auto-join process.

9.6.5 setRememberJoinedNetworks(value as boolean)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** AirPort client will remember all joined networks.

9.6.6 setRequireAdministratorForAssociation(value as boolean)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Require an administrator password to change networks.

9.6.7   setRequireAdministratorForIBSSMode(value as boolean)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Require an administrator password to create a computer-to-computer network.

9.6.8   setRequireAdministratorForPower(value as boolean)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Require an administrator password to change the interface power state.

9.7 class CWMutableNetworkProfileMBS

9.7.1 class CWMutableNetworkProfileMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Encapsulates a mutable network profile entry.
Notes:

Available on Mac OS X 10.7 or later.
Please also check the documentation from Apple for the CWMutableNetworkProfile class.
Subclass of the CWNetworkProfileMBS class.

9.7.2 Methods

9.7.3 Constructor

Plugin Version: 11.3, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The constructor.

9.7.4 setSecurity(value as Integer)

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the security mode for the network profile.
Notes: See kCWSecurity* constants.

9.7.5 setSsidData(data as Memoryblock)

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the service set identifier (SSID) for the network profile, returned as data.
Notes: The SSID is 1-32 octets.

9.8   class CWNetworkMBS

9.8.1   class CWNetworkMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN wireless (IEEE 802.11) network.
Notes:

Encapsulates a wireless network providing read-only accessors to various properties of the network.

Requires Mac OS X 10.6 or newer.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.

9.8.2   Methods

9.8.3   Constructor

Plugin Version: 13.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The private constructor.

9.8.4   copy as CWNetworkMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of this object.

9.8.5   isEqualToNetwork(network as CWNetworkMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Comparing wireless networks.
Notes:

Returns true if the network objects are equal.

Two CWNetworkMBS objects are considered equal if their corresponding ssid, securityMode, and isIBSS properties are equal.

9.8.6 Operator_Compare(profile as CWNetworkMBS) as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Compares two networks.

9.8.7 supportsPHYMode(phyMode as Integer) as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Method for determining which PHY modes a network supports.
Notes:

True if the network supports the specified PHY mode.

Available on Mac OS X 10.7 or later.

9.8.8 supportsSecurity(security as Integer) as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Getting supported security types
Notes:

True if the network supports the specified security type.

Method for determining which security types a network supports.

Available on Mac OS X 10.7 or later.

9.8.9 Properties

9.8.10 beaconInterval as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The beacon interval (ms) for the network.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.8.11   bssid as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Basic service set identifier for the given CWNetworkMBS.
Notes: (Read only property)

9.8.12   bssidData as Memoryblock

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Basic service set identifier for the given CWNetworkMBS.
Notes: (Read only property)

9.8.13   channel as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Channel number for the given CWNetworkMBS.
Notes: (Read only property)

9.8.14   countryCode as string

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The country code (ISO/IEC 3166-1:1997) for the network.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.8.15   description as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The object description.
Notes: (Read only property)

9.8.16   Handle as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

9.8.17   ibss as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The network is an IBSS network.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.8.18   ieData as Memoryblock

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Information element data included in beacon or probe response.
Notes: (Read only property)

9.8.19   informationElementData as Memoryblock

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Information element data included in beacon or probe response frames.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.8.20   isIBSS as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether or not the given CWNetworkMBS is a computer-to-computer network.
Notes: (Read only property)

9.8.21   noise as Double

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Aggregate noise value for the given CWNetworkMBS.
Notes: (Read only property)

9.8.22   noiseMeasurement as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The aggregate noise measurement (dBm) for the network.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.8.23   phyMode as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Physical layer mode for the given CWNetworkMBS.
Notes: (Read only property)

9.8.24   rssi as Double

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Aggregate RSSI value for the given CWNetworkMBS.
Notes: (Read only property)

9.8.25   rssiValue as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The aggregate received signal strength indication (RSSI) measurement (dBm) for the network.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.8.26   securityMode as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Security mode for the given CWNetworkMBS.
Notes: (Read only property)

9.8.27 ssid as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Service set identifier for the given CWNetworkMBS.
Notes: (Read only property)

9.8.28 ssidData as Memoryblock

Plugin Version: 13.5, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The service set identifier (SSID) for the network, returned as data.
Notes:

The SSID is defined as 1-32 octets.
(Read only property)

9.8.29 wirelessProfile as CWWirelessProfileMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Stored CWWirelessProfile for the given CWNetworkMBS.
Notes: (Read only property)

9.8.30 wlanChannel as CWChannelMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The channel for the network.
Notes:

Available on Mac OS X 10.7 or later.
(Read only property)

9.9   class CWNetworkProfileMBS

9.9.1   class CWNetworkProfileMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a network profile.
Notes:

Encapsulates an immutable network profile entry.

Available on Mac OS X 10.7 or later.
Please also check the documentation from Apple for the CWNetworkProfile class.

9.9.2   Methods

9.9.3   Constructor

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method for getting a CWNetworkProfile object.
See also:

9.9.4   Constructor(networkProfile as CWNetworkProfileMBS)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method for getting a CWNetworkProfile object initialized with the given CWNetworkProfile object.
See also:

9.9.5   copy as CWNetworkProfileMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of the object.

9.9.6   isEqualToNetworkProfile(networkProfile as CWNetworkProfileMBS) as boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Comparing network profiles.

Notes:

networkProfile: The CWNetworkProfile object with which to compare the receiver.

CWNetworkMBS objects are considered equal if their corresponding ssidData and securityType properties are equal.

9.9.7   mutableCopy as CWMutableNetworkProfileMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a mutable copy of the object.

9.9.8   networkProfile as CWNetworkProfileMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method for getting a CWNetworkProfile object.

9.9.9   networkProfileWithNetworkProfile(networkProfile as CWNetworkProfileMBS) as CWNetworkProfileMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method for getting a CWNetworkProfile object initialized with the given CWNetworkProfile object.
Notes: networkProfile: The CWNetworkProfile object to use to initialize a new CWNetworkProfile object.

9.9.10   Operator_Compare(networkProfile as CWNetworkProfileMBS) as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Compares two network profiles.

9.9.11   Properties

9.9.12   Handle as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.

Notes: (Read and Write property)

9.9.13   security as Integer

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The security mode for the network profile.
Notes:

See kCWSecurity* constants.
(Read only property)

9.9.14   ssid as string

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The service set identifier (SSID) for the network profile, encoded as a string.
Notes:

If the SSID can not be encoded as a valid UTF-8 or WinLatin1 string, this method returns "".
(Read only property)

9.9.15   ssidData as Memoryblock

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The service set identifier (SSID) for the network profile, returned as data.
Notes:

The SSID is 1-32 octets.
(Read only property)

9.10   class CWWirelessProfileMBS

9.10.1   class CWWirelessProfileMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** CoreWLAN wireless profile.
Notes:

Encapsulates a stored wireless profile entry.

Requires Mac OS X 10.6 or newer.

9.10.2   Methods

9.10.3   Constructor

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an CWWirelessProfile.

9.10.4   copy as CWWirelessProfileMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a copy of this object.

9.10.5   isEqualToProfile(profile as CWWirelessProfileMBS) as boolean

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Comparing wireless profiles.
Notes:

Returns true if both profiles are equal.

Two CWWirelessProfile objects are considered equal if all their corresponding properties are equal.

9.10.6   Operator_Compare(profile as CWWirelessProfileMBS) as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Compares two profiles.

9.10.7   profile as CWWirelessProfileMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Convenience method for getting a new CWWirelessProfile object.

9.10.8   Properties

9.10.9   description as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The object description.
Notes: (Read only property)

9.10.10   Handle as Integer

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internal object reference.
Notes: (Read and Write property)

9.10.11   passphrase as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The passphrase from the default login keychain for the given CWWirelessProfile.
Notes:

This method may prompt the user to allow access to their default login keychain.
(Read and Write property)

9.10.12   securityMode as Double

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Security mode for the given CWWirelessProfile.
Notes: (Read and Write property)

9.10.13   ssid as string

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Wireless network name for the given CWWirelessProfile.
Notes: (Read and Write property)

9.10.14   user8021XProfile as CW8021XProfileMBS

Plugin Version: 11.0, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** User CW8021XProfile for the given CWWirelessProfile.
Notes: (Read and Write property)

Chapter 10

OpenCL

10.1   class CLCommandQueueMBS

10.1.1   class CLCommandQueueMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for an OpenCL command queue.
Example:

dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)

// Create a command queue
dim queue as new CLCommandQueueMBS(context, device, 0)

10.1.2   Methods

10.1.3   Constructor(context as CLContextMBS, device as CLDeviceMBS, flags as Integer = 0)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Create a command-queue on a specific device.
Example:

dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)

// Create a command queue
dim queue as new CLCommandQueueMBS(context, device, 0)

Notes:

context: Must be a valid OpenCL context.
device: Must be a device associated with context. It can either be in the list of devices specified when context is created using CLContextMBS Constructor or have the same device type as the device type specified when the context is created.
flags: Specifies a list of properties for the command-queue. This is a bit-field. Only command-queue properties specified in the table below can be set in properties; otherwise the value specified in properties is considered to be not valid.

Command-Queue Properties	Description
kQueueOutOfOrderExecModeEnable	Determines whether the commands queued in the command-queue are executed in-order or out-of-order. If set, the commands in the command-queue are executed out-of-order. Otherwise, commands are executed in-order.
kQueueProfilingEnable	Enable or disable profiling of commands in the command-queue. If set, the profiling of commands is enabled. Otherwise profiling of commands is disabled. See clGetEventProfilingInfo for more information.

The OpenCL functions that are submitted to a command-queue are enqueued in the order the calls are made but can be configured to execute in-order or out-of-order. The properties argument in clCreateCommandQueue can be used to specify the execution order.

If the kQueueOutOfOrderExecModeEnable property of a command-queue is not set, the commands enqueued to a command-queue execute in order. For example, if an application calls EnqueueNDRangeKernel to execute kernel A followed by a EnqueueNDRangeKernel to execute kernel B, the application can assume that kernel A finishes first and then kernel B is executed. If the memory objects output by kernel A are inputs to kernel B then kernel B will see the correct data in memory objects produced by execution of kernel A. If the kQueueOutOfOrderExecModeEnable property of a commandqueue is set, then there is no guarantee that kernel A will finish before kernel B starts execution.

Applications can configure the commands enqueued to a command-queue to execute out-of-order by setting the kQueueOutOfOrderExecModeEnable property of the command-queue. This can be specified when the command-queue is created or can be changed dynamically using this Constructor. In out-of-order execution mode there is no guarantee that the enqueued commands will finish execution in the order they were queued. As there is no guarantee that kernels will be executed in order, i.e. based on when the EnqueueNDRangeKernel calls are made within a command-queue, it is therefore possible that an earlier EnqueueNDRangeKernel

call to execute kernel A identified by event A may execute and/or finish later than a EnqueueNDRangeKernel call to execute kernel B which was called by the application at a later point in time. To guarantee a specific order of execution of kernels, a wait on a particular event (in this case event A) can be used. The wait for event A can be specified in the event_wait_list argument to EnqueueNDRangeKernel for kernel B.

In addition, a wait for events or a barrier command can be enqueued to the command-queue. The wait for events command ensures that previously enqueued commands identified by the list of events to wait for have finished before the next batch of commands is executed. The barrier command ensures that all previously enqueued commands in a command-queue have finished execution before the next batch of commands is executed.

Similarly, commands to read, write, copy or map memory objects that are enqueued after EnqueueNDRangeKernel, EnqueueTask or EnqueueNativeKernel commands are not guaranteed to wait for kernels scheduled for execution to have completed (if the kQueueOutOfOrderExecModeEnable property is set). To ensure correct ordering of commands, the event object returned by EnqueueNDRangeKernel, EnqueueTask or EnqueueNativeKernel can be used to enqueue a wait for event or a barrier command can be enqueued that must complete before reads or writes to the memory object(s) occur.

Lasterror is set.

10.1.4   Context as CLContextMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the context specified when the command-queue is created.
Notes: Lasterror is set.

10.1.5   Device as CLDeviceMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the device specified when the command-queue is created.
Notes: Lasterror is set.

10.1.6   EnqueueBarrier

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A synchronization point that enqueues a barrier operation.
Notes:

EnqueueBarrier is a synchronization point that ensures that all queued commands in command_queue have finished execution before the next batch of commands can begin execution.

Lasterror is set.

10.1.7   EnqueueCopyBuffer(sourceBuffer as CLMemMBS, destBuffer as CLMemMBS, sourceOffset as Integer, destOffset as Integer, size as Integer)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to copy a buffer object to another buffer object.
Notes:

sourceBuffer: the source memory object.
destBuffer: the destination memory object.
sourceOffset: The offset where to begin copying data from sourceBuffer.
destOffset: The offset where to begin copying data into destBuffer.
size: Refers to the size in bytes to copy.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in event_wait_list act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.
Lasterror is set.
See also:

- 10.1.8 EnqueueCopyBuffer(sourceBuffer as CLMemMBS, destBuffer as CLMemMBS, sourceOffset as Integer, destOffset as Integer, size as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)   278

10.1.8   EnqueueCopyBuffer(sourceBuffer as CLMemMBS, destBuffer as CLMemMBS, sourceOffset as Integer, destOffset as Integer, size as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to copy a buffer object to another buffer object.
Notes:

sourceBuffer: the source memory object.
destBuffer: the destination memory object.
sourceOffset: The offset where to begin copying data from sourceBuffer.
destOffset: The offset where to begin copying data into destBuffer.
size: Refers to the size in bytes to copy.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in event_wait_list act as synchronization points. The context associated

with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.
Lasterror is set.
See also:

- 10.1.7 EnqueueCopyBuffer(sourceBuffer as CLMemMBS, destBuffer as CLMemMBS, sourceOffset as Integer, destOffset as Integer, size as Integer) 278

10.1.9 EnqueueCopyBufferToImage(SourceBuffer as CLMemMBS, destImage as CLMemMBS, sourceOffset as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to copy a buffer object to an image object.
Notes:

SourceBuffer: A valid buffer object.
destImage: A valid image object.

sourceOffset: The offset where to begin copying data from SourceBuffer.

destOrigin: The (x, y, z) offset in pixels where to begin copying data to destImage. If destImage is a 2D image object, the z value given by destOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If destImage is a 2D image object, the depth value given by RegionDepth must be 1.

The size in bytes of the region to be copied from SourceBuffer referred to as src_cb is computed as width * height * depth * bytes/image element if destImage is a 3D image object and is computed as width * height * bytes/image element if destImage is a 2D image object.

EventWaitList: Optionally, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional. Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Lasterror is set.
See also:

- 10.1.10 EnqueueCopyBufferToImage(SourceBuffer as CLMemMBS, destImage as CLMemMBS, source-Offset as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)   280

10.1.10   EnqueueCopyBufferToImage(SourceBuffer as CLMemMBS, destImage as CLMemMBS, sourceOffset as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to copy a buffer object to an image object.
Notes:

SourceBuffer: A valid buffer object.
destImage: A valid image object.

sourceOffset: The offset where to begin copying data from SourceBuffer.

destOrigin: The (x, y, z) offset in pixels where to begin copying data to destImage. If destImage is a 2D image object, the z value given by destOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If destImage is a 2D image object, the depth value given by RegionDepth must be 1.

The size in bytes of the region to be copied from SourceBuffer referred to as src_cb is computed as width * height * depth * bytes/image element if destImage is a 3D image object and is computed as width * height * bytes/image element if destImage is a 2D image object.

EventWaitList: Optionally, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional. Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Lasterror is set.
See also:

- 10.1.9 EnqueueCopyBufferToImage(SourceBuffer as CLMemMBS, destImage as CLMemMBS, source-Offset as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth

10.1.11 EnqueueCopyImage(sourceImage as CLMemMBS, destImage as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to copy image objects.
Notes:

sourceImage: Source image.
destImage: Dest image.

sourceOrigin: Defines the starting (x, y, z) location in pixels in src_image from where to start the data copy. If src_image is a 2D image object, the z value given by sourceOriginZ must be 0.

sourceOrigin: Defines the starting (x, y, z) location in pixels in dst_image from where to start the data copy. If dst_image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If src_image or dst_image is a 2D image object, the depth value given by RegionDepth must be 1.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CommandQueue must be the same.

outEvent: Optional, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

It is currently a requirement that the sourceImage and destImage image memory objects for EnqueueCopyImage must have the exact same image format (i.e. the cl_image_format descriptor specified when sourceImage and destImage are created must match).

sourceImage and destImage can be 2D or 3D image objects allowing us to perform the following actions:

- Copy a 2D image object to a 2D image object.

- Copy a 2D image object to a 2D slice of a 3D image object.

- Copy a 2D slice of a 3D image object to a 2D image object.

- Copy a 3D image object to a 3D image object.

Lasterror is set.
See also:

10.1.12   EnqueueCopyImage(sourceImage as CLMemMBS, destImage as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to copy image objects.
Notes:

sourceImage: Source image.
destImage: Dest image.

sourceOrigin: Defines the starting (x, y, z) location in pixels in src_image from where to start the data copy. If src_image is a 2D image object, the z value given by sourceOriginZ must be 0.

sourceOrigin: Defines the starting (x, y, z) location in pixels in dst_image from where to start the data copy. If dst_image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If src_image or dst_image is a 2D image object, the depth value given by RegionDepth must be 1.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CommandQueue must be the same.

outEvent: Optional, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

It is currently a requirement that the sourceImage and destImage image memory objects for EnqueueCopyImage must have the exact same image format (i.e. the cl_image_format descriptor specified when sourceImage

and destImage are created must match).

sourceImage and destImage can be 2D or 3D image objects allowing us to perform the following actions:

- Copy a 2D image object to a 2D image object.

- Copy a 2D image object to a 2D slice of a 3D image object.

- Copy a 2D slice of a 3D image object to a 2D image object.

- Copy a 3D image object to a 3D image object.

Lasterror is set.
See also:

- 10.1.11 EnqueueCopyImage(sourceImage as CLMemMBS, destImage as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, destOriginX as Integer, destOriginY as Integer, destOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer) 281

10.1.13 EnqueueCopyImageToBuffer(sourceImage as CLMemMBS, destBuffer as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, destOffset as Integer)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to copy an image object to a buffer object.
Notes:

sourceImage: A valid image object.
destBuffer: A valid buffer object.

sourceOrigin: Defines the (x, y, z) offset in pixels in the image from where to copy. If sourceImage is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If sourceImage is a 2D image object, the depth value given by RegionDepth must be 1.

destOffset: The offset where to begin copying data into destBuffer. The size in bytes of the region to be copied referred to as dst_cb is computed as width * height * depth * bytes/image element if sourceImage is a 3D image object and is computed as width * height * bytes/image element if sourceImage is a 2D image object.

EventWaitList: Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Lasterror is set.
See also:

- 10.1.14 EnqueueCopyImageToBuffer(sourceImage as CLMemMBS, destBuffer as CLMemMBS, source-OriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, destOffset as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)   284

10.1.14 EnqueueCopyImageToBuffer(sourceImage as CLMemMBS, destBuffer as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, destOffset as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to copy an image object to a buffer object.
Notes:

sourceImage: A valid image object.
destBuffer: A valid buffer object.

sourceOrigin: Defines the (x, y, z) offset in pixels in the image from where to copy. If sourceImage is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle to copy. If sourceImage is a 2D image object, the depth value given by RegionDepth must be 1.

destOffset: The offset where to begin copying data into destBuffer. The size in bytes of the region to be copied referred to as dst_cb is computed as width * height * depth * bytes/image element if sourceImage is a 3D image object and is computed as width * height * bytes/image element if sourceImage is a 2D image object.

EventWaitList: Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Lasterror is set.
See also:

10.1.15   EnqueueMapBuffer(buffer as CLMemMBS, BlockingMap as boolean, MapFlags as Integer, offset as Integer, size as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) as memoryblock

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to map a region of the buffer object given by buffer into the host address space and returns a pointer to this mapped region.
Notes:

BlockingMap: Optional, Indicates if the map operation is blocking or non-blocking. If BlockingMap is true, EnqueueMapBuffer does not return until the specified region in buffer can be mapped. If BlockingMap is false i.e. map operation is non-blocking, the pointer to the mapped region returned by clEnqueueMapBuffer cannot be used until the map command has completed. The event argument returns an event object which can be used to query the execution status of the map command. When the map command is completed, the application can access the contents of the mapped region using the pointer returned by EnqueueMapBuffer.
MapFlags: Is a bit-field and can be set to kMapRead to indicate that the region specified by (offset, size) in the buffer object is being mapped for reading, and/or kMapWrite to indicate that the region specified by (offset, size) in the buffer object is being mapped for writing.
buffer: A valid buffer object. The OpenCL context associated with CLCommandQueueMBS and buffer must be the same.
offset, size: The offset in bytes and the size of the region in the buffer object that is being mapped.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in EventWaitList act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.
outEvent: Returns an event object that identifies this particular copy command and can be used toquery or queue a wait for this particular command to complete.

Lasterror is set.

The contents of the regions of a memory object mapped for writing (i.e. kMapWrite is set in map_flags argument to EnqueueMapBuffer or EnqueueMapImage) are considered to be undefined until this region is unmapped. Reads and writes by a kernel executing on a device to a memory region(s) mapped for writing are undefined.

Multiple command-queues can map a region or overlapping regions of a memory object for reading (i.e.

MapFlags = kMapRead). The contents of the regions of a memory object mapped for reading can also be read by kernels executing on a device(s). The behavior of writes by a kernel executing on a device to a mapped region of a memory object is undefined. Mapping (and unmapping) overlapped regions of a buffer or image memory object for writing is undefined.

The behavior of OpenCL function calls that enqueue commands that write or copy to regions of a memory object that are mapped is undefined.

Lasterror is set.
See also:

10.1.16   EnqueueMapBuffer(buffer as CLMemMBS, MapFlags as Integer, offset as Integer, size as Integer) as memoryblock

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to map a region of the buffer object given by buffer into the host address space and returns a pointer to this mapped region.
Notes:

BlockingMap: Optional, Indicates if the map operation is blocking or non-blocking. If BlockingMap is true, EnqueueMapBuffer does not return until the specified region in buffer can be mapped. If BlockingMap is false i.e. map operation is non-blocking, the pointer to the mapped region returned by clEnqueueMapBuffer cannot be used until the map command has completed. The event argument returns an event object which can be used to query the execution status of the map command. When the map command is completed, the application can access the contents of the mapped region using the pointer returned by EnqueueMapBuffer.
MapFlags: Is a bit-field and can be set to kMapRead to indicate that the region specified by (offset, size) in the buffer object is being mapped for reading, and/or kMapWrite to indicate that the region specified by (offset, size) in the buffer object is being mapped for writing.
buffer: A valid buffer object. The OpenCL context associated with CLCommandQueueMBS and buffer must be the same.
offset, size: The offset in bytes and the size of the region in the buffer object that is being mapped.
EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in EventWaitList act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.
outEvent: Returns an event object that identifies this particular copy command and can be used toquery or queue a wait for this particular command to complete.

Lasterror is set.

The contents of the regions of a memory object mapped for writing (i.e. kMapWrite is set in map_flags argument to EnqueueMapBuffer or EnqueueMapImage) are considered to be undefined until this region is unmapped. Reads and writes by a kernel executing on a device to a memory region(s) mapped for writing

are undefined.

Multiple command-queues can map a region or overlapping regions of a memory object for reading (i.e. MapFlags = kMapRead). The contents of the regions of a memory object mapped for reading can also be read by kernels executing on a device(s). The behavior of writes by a kernel executing on a device to a mapped region of a memory object is undefined. Mapping (and unmapping) overlapped regions of a buffer or image memory object for writing is undefined.

The behavior of OpenCL function calls that enqueue commands that write or copy to regions of a memory object that are mapped is undefined.

Lasterror is set.
See also:

- 10.1.15 EnqueueMapBuffer(buffer as CLMemMBS, BlockingMap as boolean, MapFlags as Integer, offset as Integer, size as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) as memoryblock   285

10.1.17 EnqueueMapImage(image as CLMemMBS, BlockingMap as boolean, MapFlags as Integer, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, byref RowPitch as Integer, byref SlicePitch as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) as memoryblock

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to map a region of an image object into the host address space and returns a pointer to this mapped region.
Notes:

image: A valid image object. The OpenCL context associated with CLCommandQueueMBS and image must be the same.

BlockingMap: Optional, Indicates if the map operation is blocking or non-blocking. If BlockingMap is true, EnqueueMapImage does not return until the specified region in image can be mapped. If BlockingMap is false i.e. map operation is non-blocking, the pointer to the mapped region returned by EnqueueMapImage cannot be used until the map command has completed. The event argument returns an event object which can be used to query the execution status of the map command. When the map command is completed, the application can access the contents of the mapped region using the pointer returned by EnqueueMapImage.

MapFlags: Is a bit-field and can be set to kMapRead to indicate that the region specified by (origin, region) in the image object is being mapped for reading, and/or kMapWrite to indicate that the region specified by (origin, region) in the image object is being mapped for writing.

origin, region: Define the (x, y, z) offset in pixels and (width, height, depth) in pixels of the 2D or 3D rectangle region that is to be mapped. If image is a 2D image object, the z value given by originZ must be 0 and the depth value given by regionDepth must be 1.

RowPitch: Returns the scan-line pitch in bytes for the mapped region. This must be a non-nil value. SlicePitch: Returns the size in bytes of each 2D slice for the mapped region. For a 2D image, zero is returned if this argument is not nil. For a 3D image, image_slice_pitch must be a non-nil value.

EventWaitList: Optional, Specify events that need to complete before EnqueueMapImage can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and CLCommandQueueMBS must be the same.

outEvent: Optional, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete. event can be nil in which case it will not be possible for the application to query the status of this command or queue a wait for this command to complete.

Lasterror is set.

If the buffer or image object is created with kMemoryUseHostPtr set in mem_flags, the following will be true:

The HostPtr specified in Constructor is guaranteed to contain the latest bits in the region being mapped when the EnqueueMapBuffer or EnqueueMapImage command has completed. The pointer value returned by EnqueueMapBuffer or EnqueueMapImage will be derived from the HostPtr specified when the buffer or image object is created. The contents of the regions of a memory object mapped for writing (i.e. kMapWrite is set in MapFlags argument to EnqueueMapBuffer or EnqueueMapImage) are considered to be undefined until this region is unmapped. Reads and writes by a kernel executing on a device to a memory region(s) mapped for writing are undefined.

Multiple command-queues can map a region or overlapping regions of a memory object for reading (i.e. MapFlags = kMapRead). The contents of the regions of a memory object mapped for reading can also be read by kernels executing on a device(s). The behavior of writes by a kernel executing on a device to a mapped region of a memory object is undefined. Mapping (and unmapping) overlapped regions of a buffer or image memory object for writing is undefined.

The behavior of OpenCL function calls that enqueue commands that write or copy to regions of a memory object that are mapped is undefined. See also:

- 10.1.18 EnqueueMapImage(image as CLMemMBS, MapFlags as Integer, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, byref RowPitch as Integer, byref SlicePitch as Integer) as memoryblock 289

10.1.18 EnqueueMapImage(image as CLMemMBS, MapFlags as Integer, source-OriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, byref RowPitch as Integer, byref SlicePitch as Integer) as memoryblock

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to map a region of an image object into the host address space and returns a pointer to this mapped region.
Notes:

image: A valid image object. The OpenCL context associated with CLCommandQueueMBS and image must be the same.

BlockingMap: Optional, Indicates if the map operation is blocking or non-blocking. If BlockingMap is true, EnqueueMapImage does not return until the specified region in image can be mapped. If BlockingMap is false i.e. map operation is non-blocking, the pointer to the mapped region returned by EnqueueMapImage cannot be used until the map command has completed. The event argument returns an event object which can be used to query the execution status of the map command. When the map command is completed, the application can access the contents of the mapped region using the pointer returned by EnqueueMapImage.

MapFlags: Is a bit-field and can be set to kMapRead to indicate that the region specified by (origin, region) in the image object is being mapped for reading, and/or kMapWrite to indicate that the region specified by (origin, region) in the image object is being mapped for writing.
origin, region: Define the (x, y, z) offset in pixels and (width, height, depth) in pixels of the 2D or 3D rectangle region that is to be mapped. If image is a 2D image object, the z value given by originZ must be 0 and the depth value given by regionDepth must be 1.

RowPitch: Returns the scan-line pitch in bytes for the mapped region. This must be a non-nil value.
SlicePitch: Returns the size in bytes of each 2D slice for the mapped region. For a 2D image, zero is returned if this argument is not nil. For a 3D image, image_slice_pitch must be a non-nil value.

EventWaitList: Optional, Specify events that need to complete before EnqueueMapImage can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and CLCommandQueueMBS must be the same.

outEvent: Optional, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete. event can be nil in which case it will not be possible for the application to query the status of this command or queue a wait for this command to complete.

Lasterror is set.

If the buffer or image object is created with kMemoryUseHostPtr set in mem_flags, the following will be true:

The HostPtr specified in Constructor is guaranteed to contain the latest bits in the region being mapped when the EnqueueMapBuffer or EnqueueMapImage command has completed.

The pointer value returned by EnqueueMapBuffer or EnqueueMapImage will be derived from the HostPtr specified when the buffer or image object is created.

The contents of the regions of a memory object mapped for writing (i.e. kMapWrite is set in MapFlags argument to EnqueueMapBuffer or EnqueueMapImage) are considered to be undefined until this region is unmapped. Reads and writes by a kernel executing on a device to a memory region(s) mapped for writing are undefined.

Multiple command-queues can map a region or overlapping regions of a memory object for reading (i.e. MapFlags = kMapRead). The contents of the regions of a memory object mapped for reading can also be read by kernels executing on a device(s). The behavior of writes by a kernel executing on a device to a mapped region of a memory object is undefined. Mapping (and unmapping) overlapped regions of a buffer or image memory object for writing is undefined.

The behavior of OpenCL function calls that enqueue commands that write or copy to regions of a memory object that are mapped is undefined.
See also:

10.1.19   EnqueueMarker(byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a marker command.
Notes:

Enqueues a marker command to the command queue. The marker command returns an event which can be used to queue a wait on this marker event i.e. wait for all commands queued before the marker command to complete.

Lasterror is set.

10.1.20 EnqueueNativeKernel(FunctionPtr as ptr, args as memoryblock, args-Size as Integer, NumberOfMemoryObjects as Integer, MemList as memoryblock, ArgsMemoryLocations as memoryblock)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to execute a native C/C++ function not compiled using the OpenCL compiler.
Notes:

First a warning: Don't use this with Real Studio methods. You can point to a function written in C which you made thread safe.

self: A valid command-queue. A native user function can only be executed on a command-queue created on a device that has kExceNativeKernel capability set in ExecutionCapabilities property.

FunctionPtr: A pointer to a host-callable user function.

args: A pointer to the args list that FunctionPtr should be called with.
argsSize: The size in bytes of the args list that args points to.

The data pointed to by args and argsSize bytes in size will be copied and a pointer to this copied region will be passed to FunctionPtr. The copy needs to be done because the memory objects (CLMemMBS.handle values) that args may contain need to be modified and replaced by appropriate pointers to global memory. When EnqueueNativeKernel returns, the memory region pointed to by args can be reused by the application.

NumberOfMemoryObjects: The number of buffer objects that are passed in args.

MemList: A list of valid buffer objects, if NumberOfMemoryObjects is greater than 0. The buffer object values specified in MemList are memory object handles (CLMemMBS.handle values) or nil.

ArgsMemoryLocations: A pointer to appropriate locations that args points to where memory object handles (CLMemMBS.handle values) are stored. Before the user function is executed, the memory object handles are replaced by pointers to global memory.

EventWaitList: Optionally, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optionally, Returns an event object that identifies this particular kernel execution instance.

The data pointed to by args and argsSize bytes in size will be copied and a pointer to this copied region will be passed to FunctionPtr. The copy needs to be done because the memory objects (CLMemMBS.handle values) that args may contain need to be modified and replaced by appropriate pointers to global memory.

When EnqueueNativeKernel returns, the memory region pointed to by args can be reused by the application.

Lasterror is set.
See also:

- 10.1.21 EnqueueNativeKernel(FunctionPtr as ptr, args as memoryblock, argsSize as Integer, NumberOfMemoryObjects as Integer, MemList as memoryblock, ArgsMemoryLocations as memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)   292

10.1.21   EnqueueNativeKernel(FunctionPtr as ptr, args as memoryblock, argsSize as Integer, NumberOfMemoryObjects as Integer, MemList as memoryblock, ArgsMemoryLocations as memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to execute a native C/C++ function not compiled using the OpenCL compiler.
Notes:

First a warning: Don't use this with Real Studio methods. You can point to a function written in C which you made thread safe.

self: A valid command-queue. A native user function can only be executed on a command-queue created on a device that has kExceNativeKernel capability set in ExecutionCapabilities property.

FunctionPtr: A pointer to a host-callable user function.

args: A pointer to the args list that FunctionPtr should be called with.
argsSize: The size in bytes of the args list that args points to.

The data pointed to by args and argsSize bytes in size will be copied and a pointer to this copied region will be passed to FunctionPtr. The copy needs to be done because the memory objects (CLMemMBS.handle values) that args may contain need to be modified and replaced by appropriate pointers to global memory. When EnqueueNativeKernel returns, the memory region pointed to by args can be reused by the application.

NumberOfMemoryObjects: The number of buffer objects that are passed in args.

MemList: A list of valid buffer objects, if NumberOfMemoryObjects is greater than 0. The buffer object values specified in MemList are memory object handles (CLMemMBS.handle values) or nil.

ArgsMemoryLocations: A pointer to appropriate locations that args points to where memory object handles (CLMemMBS.handle values) are stored. Before the user function is executed, the memory object handles are replaced by pointers to global memory.

EventWaitList: Optionally, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optionally, Returns an event object that identifies this particular kernel execution instance.

The data pointed to by args and argsSize bytes in size will be copied and a pointer to this copied region will be passed to FunctionPtr. The copy needs to be done because the memory objects (CLMemMBS.handle values) that args may contain need to be modified and replaced by appropriate pointers to global memory. When EnqueueNativeKernel returns, the memory region pointed to by args can be reused by the application.

Lasterror is set.
See also:

- 10.1.20 EnqueueNativeKernel(FunctionPtr as ptr, args as memoryblock, argsSize as Integer, NumberOfMemoryObjects as Integer, MemList as memoryblock, ArgsMemoryLocations as memoryblock) 291

10.1.22   EnqueueNDRangeKernel(kernel as CLKernelMBS, GlobalWorkSize as Integer, LocalWorkSize as Integer)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to execute a kernel on a device.
Notes:

kernel: A valid kernel object. The OpenCL context associated with kernel and command_queue must be the same.
GlobalWorkSize: The number of global work-items.
LocalWorkSize: The number of work-items that make up a work-group (also referred to as the size of the work-group) that will execute the kernel specified by kernel.

The work-group size to be used for kernel can also be specified in the program source using the __attribute__((reqd_work_group_s Y, Z)))qualifier. In this case the size of work group specified by local_work_size must match the value specified by the reqd_work_group_size __attribute__ qualifier.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Optional, Returns an event object that identifies this particular kernel execution instance. Event objects are unique and can be used to identify a particular kernel execution instance later on.

Work-group instances are executed in parallel across multiple compute units or concurrently on the same compute unit.

Each work-item is uniquely identified by a global identifier. The global ID, which can be read inside the kernel, is computed using the value given by GlobalWorkSize and global_work_offset. In OpenCL 1.0, the starting global ID is always (0, 0, ... 0). In addition, a work-item is also identified within a work-group by a unique local ID. The local ID, which can also be read by the kernel, is computed using the value given by LocalWorkSize. The starting local ID is always (0, 0, ... 0).

Lasterror is set.
See also:

10.1.23   EnqueueNDRangeKernel(kernel as CLKernelMBS, GlobalWorkSize as Integer, LocalWorkSize as Integer, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to execute a kernel on a device.
Notes:

kernel: A valid kernel object. The OpenCL context associated with kernel and command_queue must be the same.
GlobalWorkSize: The number of global work-items.
LocalWorkSize: The number of work-items that make up a work-group (also referred to as the size of the work-group) that will execute the kernel specified by kernel.

The work-group size to be used for kernel can also be specified in the program source using the __attribute__((reqd_work_group_s Y, Z)))qualifier. In this case the size of work group specified by local_work_size must match the value specified by the reqd_work_group_size __attribute__ qualifier.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.
outEvent: Optional, Returns an event object that identifies this particular kernel execution instance. Event objects are unique and can be used to identify a particular kernel execution instance later on.

Work-group instances are executed in parallel across multiple compute units or concurrently on the same compute unit.

Each work-item is uniquely identified by a global identifier. The global ID, which can be read inside the kernel, is computed using the value given by GlobalWorkSize and global_work_offset. In OpenCL 1.0, the starting global ID is always (0, 0, ... 0). In addition, a work-item is also identified within a work-group by a unique local ID. The local ID, which can also be read by the kernel, is computed using the value given by LocalWorkSize. The starting local ID is always (0, 0, ... 0).

Lasterror is set.
See also:

10.1.24 EnqueueReadBuffer(buffer as CLMemMBS, BlockingRead as boolean, offset as Integer, size as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueue commands to read from a buffer object to host memory.
Notes:

buffer: Refers to a valid buffer object.
BlockingRead: Optional, Indicates if the read operations are blocking or non-blocking. If BlockingRead is true i.e. the read command is blocking, clEnqueueReadBuffer does not return until the buffer data has been read and copied into memory pointed to by ptr.

If BlockingRead is false i.e. the read command is non-blocking, EnqueueReadBuffer queues a non-blocking read command and returns. The contents of the buffer that ptr points to cannot be used until the read command has completed. The event argument returns an event object which can be used to query the execution status of the read command. When the read command has completed, the contents of the buffer that ptr points to can be used by the application.

offset: The offset in bytes in the buffer object to read from.
size: The size in bytes of data being read.
mem: The pointer to buffer in host memory where data is to be read into.

EventWaitList: Optional, specifies events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and command_queue must be the same.

outEvent: Optional, Returns an event object that identifies this particular read command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueReadBuffer to read a region of the buffer object with the ptr argument value set to mem + offset, where mem is a pointer to the memory region specified when the buffer object being read is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

All commands that use this buffer object have finished execution before the read command begins execution
The buffer object is not mapped
The buffer object is not used by any command-queue until the read command has finished execution

Lasterror is set.
See also:

10.1.25   EnqueueReadBuffer(buffer as CLMemMBS, offset as Integer, size as Integer, mem as Memoryblock)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueue commands to read from a buffer object to host memory.
Notes:

buffer: Refers to a valid buffer object.
BlockingRead: Optional, Indicates if the read operations are blocking or non-blocking. If BlockingRead is true i.e. the read command is blocking, clEnqueueReadBuffer does not return until the buffer data has been read and copied into memory pointed to by ptr.

If BlockingRead is false i.e. the read command is non-blocking, EnqueueReadBuffer queues a non-blocking read command and returns. The contents of the buffer that ptr points to cannot be used until the read command has completed. The event argument returns an event object which can be used to query the execution status of the read command. When the read command has completed, the contents of the buffer that ptr points to can be used by the application.

offset: The offset in bytes in the buffer object to read from.
size: The size in bytes of data being read.
mem: The pointer to buffer in host memory where data is to be read into.

EventWaitList: Optional, specifies events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and command_queue must be the same.

outEvent: Optional, Returns an event object that identifies this particular read command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueReadBuffer to read a region of the buffer object with the ptr argument value set to mem + offset, where mem is a pointer to the memory region specified when the buffer object being read is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

All commands that use this buffer object have finished execution before the read command begins execution
The buffer object is not mapped
The buffer object is not used by any command-queue until the read command has finished execution

Lasterror is set.
See also:

- 10.1.24 EnqueueReadBuffer(buffer as CLMemMBS, BlockingRead as boolean, offset as Integer, size as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 295

10.1.26 EnqueueReadImage(image as CLMemMBS, BlockingRead as boolean, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to read from a 2D or 3D image object to host memory.
Notes:

image: Refers to a valid 2D or 3D image object.

BlockingRead: Optional. Indicates if the read operations are blocking or non-blocking.

If BlockingRead is true i.e. the read command is blocking, clEnqueueReadImage does not return until the buffer data has been read and copied into memory pointed to by mem.

If BlockingRead is false i.e. map operation is non-blocking, clEnqueueReadImage queues a non-blocking read command and returns. The contents of the buffer that mem points to cannot be used until the read command has completed. The event argument returns an event object which can be used to query the execution status of the read command. When the read command has completed, the contents of the buffer that mem points to can be used by the application.

origin: Defines the (x, y, z) offset in pixels in the image from where to read. If image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle being read. If image is a 2D image object, the depth value given by RegionDepth must be 1.

RowPitch: The length of each row in bytes. This value must be greater than or equal to the element size in bytes * width. If RowPitch is set to 0, the appropriate row pitch is calculated based on the size of each element in bytes multiplied by width.

SlicePitch: Size in bytes of the 2D slice of the 3D region of a 3D image being read. This must be 0 if image is a 2D image. This value must be greater than or equal to RowPitch * height. If SlicePitch is set to 0, the appropriate slice pitch is calculated based on the RowPitch * height.

mem: The pointer to a buffer in host memory where image data is to be read from.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional, Returns an event object that identifies this particular read command and can be used to query or queue a wait for this particular command to complete. event can be nil in which case it will not be possible for the application to query the status of this command or queue a wait for this command to complete.

Calling EnqueueReadImage to read a region of the image object with the mem argument value set to HostPtr + (sourceOriginZ * image slice pitch + sourceOriginY * image row pitch + sourceOriginX * bytes per pixel), where host_ptr is a pointer to the memory region specified when the image object being read is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

- All commands that use this image object have finished execution before the read command begins execution.

- The RowPitch and SlicePitch argument values in EnqueueReadImage must be set to the image row pitch and slice pitch.

- The image object is not mapped.

- The image object is not used by any command-queue until the read command has finished execution.

Lasterror is set.
See also:

- 10.1.27 EnqueueReadImage(image as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock)   299

10.1.27 EnqueueReadImage(image as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to read from a 2D or 3D image object to host memory..
Notes:

image: Refers to a valid 2D or 3D image object.

BlockingRead: Optional. Indicates if the read operations are blocking or non-blocking.

If BlockingRead is true i.e. the read command is blocking, clEnqueueReadImage does not return until the buffer data has been read and copied into memory pointed to by mem.

If BlockingRead is false i.e. map operation is non-blocking, clEnqueueReadImage queues a non-blocking read command and returns. The contents of the buffer that mem points to cannot be used until the read command has completed. The event argument returns an event object which can be used to query the execution status of the read command. When the read command has completed, the contents of the buffer that mem points to can be used by the application.

origin: Defines the (x, y, z) offset in pixels in the image from where to read. If image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle being read. If image is a 2D image object, the depth value given by RegionDepth must be 1.

RowPitch: The length of each row in bytes. This value must be greater than or equal to the element size in bytes * width. If RowPitch is set to 0, the appropriate row pitch is calculated based on the size of each element in bytes multiplied by width.

SlicePitch: Size in bytes of the 2D slice of the 3D region of a 3D image being read. This must be 0 if image is a 2D image. This value must be greater than or equal to RowPitch * height. If SlicePitch is set to 0, the appropriate slice pitch is calculated based on the RowPitch * height.

mem: The pointer to a buffer in host memory where image data is to be read from.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional, Returns an event object that identifies this particular read command and can be used to query or queue a wait for this particular command to complete. event can be nil in which case it will not be possible for the application to query the status of this command or queue a wait for this command to complete.

Calling EnqueueReadImage to read a region of the image object with the mem argument value set to HostPtr + (sourceOriginZ * image slice pitch + sourceOriginY * image row pitch + sourceOriginX * bytes per pixel), where host_ptr is a pointer to the memory region specified when the image object being read is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

- All commands that use this image object have finished execution before the read command begins execution.

- The RowPitch and SlicePitch argument values in EnqueueReadImage must be set to the image row pitch and slice pitch.

- The image object is not mapped.

- The image object is not used by any command-queue until the read command has finished execution.

Lasterror is set.
See also:

- 10.1.26 EnqueueReadImage(image as CLMemMBS, BlockingRead as boolean, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)   297

10.1.28   EnqueueReadPicture(image as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, RegionWidth as Integer, RegionHeight as Integer, pic as picture)

Plugin Version: 11.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to read from a 2D or 3D image object to a Real Studio picture object.
Example:

```
const size = 500

// create test picture
dim pic1 as Picture = LogoMBS(size)
// create destination picture
dim pic2 as new Picture(size, size, 32)

// get device list
dim devices() as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)
dim device as CLDeviceMBS = devices(0)
```

```
// Create context for that device
dim c as new CLContextMBS(device)

// query what format Real Studio uses for pictures
dim RowPitch as Integer
dim format as CLImageFormatMBS = OpenCLMBS.GetPictureImageFormat(pic1, RowPitch)

// create a matching memory object
dim m as new CLMemMBS(c, CLMemMBS.kMemoryReadWrite, format, size, size, RowPitch)

// create command queue
dim cq as new CLCommandQueueMBS(c, device, 0)

// copy picture content into CLMem object
cq.EnqueueWritePicture(m, 0, 0, size, size, pic1)

// and copy back to second picture
cq.EnqueueReadPicture(m, 0, 0, size, size, pic2)

// finally display it
Backdrop = pic2
```

Notes:

image: Refers to a valid 2D or 3D image object.

origin: Defines the (x, y) offset in pixels in the image from where to read.
region: Defines the (width, heigh) in pixels of the 2D or 3D rectangle being read.

pic: The Real Studio picture object to write pixel data to.

This command is always blocking.
Lasterror is set.

10.1.29 EnqueueTask(kernel as CLKernelMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to execute a kernel on a device.
Notes:

kernel: A valid kernel object. The OpenCL context associated with kernel and command_queue must be the same.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is not passed or empty, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optional, Returns an event object that identifies this particular kernel execution instance. Event objects are unique and can be used to identify a particular kernel execution instance later on.

The kernel is executed using a single work-item.

EnqueueTask is equivalent to calling EnqueueNDRangeKernel with work_dim = 1, global_work_size set to 1, and local_work_size set to 1.

Lasterror is set.

See also:

10.1.30   EnqueueTask(kernel as CLKernelMBS, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to execute a kernel on a device.

Notes:

kernel: A valid kernel object. The OpenCL context associated with kernel and command_queue must be the same.

EventWaitList: Optional, Specify events that need to complete before this particular command can be executed. If EventWaitList is not passed or empty, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optional, Returns an event object that identifies this particular kernel execution instance. Event objects are unique and can be used to identify a particular kernel execution instance later on.

The kernel is executed using a single work-item.

EnqueueTask is equivalent to calling EnqueueNDRangeKernel with work_dim = 1, global_work_size set to 1, and local_work_size set to 1.

Lasterror is set.

See also:

10.1.31 EnqueueUnmapMemObject(buffer as CLMemMBS, mem as Memory-block)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to unmap a previously mapped region of a memory object.
Notes:

memobj: A valid memory object. The OpenCL context associated with CLCommandQueueMBS and memobj must be the same.

mem: The host address returned by a previous call to EnqueueMapBuffer or EnqueueMapImage for memobj. Do not use this memoryblock after it has been unmapped.

EventWaitList: Optionally, Specify events that need to complete before EnqueueUnmapMemObject can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optionally, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Reads or writes from the host using the pointer returned by EnqueueMapBuffer or EnqueueMapImage are considered to be complete.

EnqueueMapBuffer and EnqueueMapImage increments the mapped count of the memory object. The initial mapped count value of a memory object is zero. Multiple calls to EnqueueMapBuffer or EnqueueMapImage on the same memory object will increment this mapped count by appropriate number of calls. EnqueueUnmapMemObject decrements the mapped count of the memory object.

EnqueueMapBuffer and clEnqueueMapImage act as synchronization points for a region of the memory object being mapped.
See also:

10.1.32 EnqueueUnmapMemObject(buffer as CLMemMBS, mem as Memory-block, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to unmap a previously mapped region of a memory object.
Notes:

memobj: A valid memory object. The OpenCL context associated with CLCommandQueueMBS and memobj must be the same.

mem: The host address returned by a previous call to EnqueueMapBuffer or EnqueueMapImage for memobj. Do not use this memoryblock after it has been unmapped.

EventWaitList: Optionally, Specify events that need to complete before EnqueueUnmapMemObject can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optionally, Returns an event object that identifies this particular copy command and can be used to query or queue a wait for this particular command to complete.

Reads or writes from the host using the pointer returned by EnqueueMapBuffer or EnqueueMapImage are considered to be complete.

EnqueueMapBuffer and EnqueueMapImage increments the mapped count of the memory object. The initial mapped count value of a memory object is zero. Multiple calls to EnqueueMapBuffer or EnqueueMapImage on the same memory object will increment this mapped count by appropriate number of calls. EnqueueUnmapMemObject decrements the mapped count of the memory object.

EnqueueMapBuffer and clEnqueueMapImage act as synchronization points for a region of the memory object being mapped.
See also:

10.1.33   EnqueueWaitForEvents(EventWaitList() as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a wait for a specific event or a list of events to complete before any future commands queued in the command-queue are executed.
Notes:

EventWaitList: Events specified in EventWaitList act as synchronization points.

The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

Lasterror is set.

10.1.34 EnqueueWriteBuffer(buffer as CLMemMBS, BlockingWrite as boolean, offset as Integer, size as Integer, mem as Memoryblock, EventWait-List() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueue commands to write to a buffer object from host memory.
Notes:

buffer: Refers to a valid buffer object.
BlockingWrite: Optional, Indicates if the write operations are blocking or nonblocking.

If blocking_write is true, the OpenCL implementation copies the data referred to by mem and enqueues the write operation in the command-queue. The memory pointed to by mem can be reused by the application after the EnqueueWriteBuffer call returns.

If blocking_write is false, the OpenCL implementation will use mem to perform a nonblocking write. As the write is non-blocking the implementation can return immediately. The memory pointed to by mem cannot be reused by the application after the call returns. The event argument returns an event object which can be used to query the execution status of the write command. When the write command has completed, the memory pointed to by mem can then be reused by the application.

offset: The offset in bytes in the buffer object to write to.
size: The size in bytes of data being written.
mem: The pointer to buffer in host memory where data is to be written from.

EventWaitList: Optional. Specifies events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optional. Returns an event object that identifies this particular write command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueWriteBuffer to update the latest bits in a region of the buffer object with the mem argument value set to host_ptr + offset, where host_ptr is a pointer to the memory region specified when the buffer object being written is created with CL_MEM_USE_HOST_PTR, must meet the following requirements in order to avoid undefined behavior:

The host memory region given by (mem + offset, size) contains the latest bits when the enqueued write command begins execution.
The buffer object is not mapped.
The buffer object is not used by any command-queue until the write command has finished execution.

Lasterror is set.
See also:

10.1.35   EnqueueWriteBuffer(buffer as CLMemMBS, offset as Integer, size as Integer, mem as Memoryblock)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueue commands to write to a buffer object from host memory.
Notes:

buffer: Refers to a valid buffer object.
BlockingWrite: Optional, Indicates if the write operations are blocking or nonblocking.

If blocking_write is true, the OpenCL implementation copies the data referred to by mem and enqueues the write operation in the command-queue. The memory pointed to by mem can be reused by the application after the EnqueueWriteBuffer call returns.

If blocking_write is false, the OpenCL implementation will use mem to perform a nonblocking write. As the write is non-blocking the implementation can return immediately. The memory pointed to by mem cannot be reused by the application after the call returns. The event argument returns an event object which can be used to query the execution status of the write command. When the write command has completed, the memory pointed to by mem can then be reused by the application.

offset: The offset in bytes in the buffer object to write to.
size: The size in bytes of data being written.
mem: The pointer to buffer in host memory where data is to be written from.

EventWaitList: Optional. Specifies events that need to complete before this particular command can be executed. If EventWaitList is empty or not passed, then this particular command does not wait on any event to complete. The events specified in EventWaitList act as synchronization points. The context associated with events in EventWaitList and CLCommandQueueMBS must be the same.

outEvent: Optional. Returns an event object that identifies this particular write command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueWriteBuffer to update the latest bits in a region of the buffer object with the mem argument value set to host_ptr + offset, where host_ptr is a pointer to the memory region specified when the buffer object being written is created with CL_MEM_USE_HOST_PTR, must meet the following requirements in order to avoid undefined behavior:

The host memory region given by (mem + offset, size) contains the latest bits when the enqueued write command begins execution.
The buffer object is not mapped.
The buffer object is not used by any command-queue until the write command has finished execution.

Lasterror is set.
See also:

- 10.1.34 EnqueueWriteBuffer(buffer as CLMemMBS, BlockingWrite as boolean, offset as Integer, size as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS) 305

10.1.36 EnqueueWriteImage(image as CLMemMBS, BlockingWrite as boolean, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to write from a 2D or 3D image object to host memory.
Notes:

image: Refers to a valid 2D or 3D image object.

BlockingWrite: Optional. Indicates if the write operation is blocking or non-blocking.

If BlockingWrite is true the OpenCL implementation copies the data referred to by mem and enqueues the write command in the command-queue. The memory pointed to by mem can be reused by the application after the clEnqueueWriteImage call returns. If BlockingWrite is false the OpenCL implementation will use mem to perform a nonblocking write. As the write is non-blocking the implementation can return immediately. The memory pointed to by mem cannot be reused by the application after the call returns. The event argument returns an event object which can be used to query the execution status of the write command. When the write command has completed, the memory pointed to by mem can then be reused by the application.

origin: Defines the (x, y, z) offset in pixels in the image from where to write or write. If image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle being write or written. If image is a 2D image object, the depth value given by RegionDepth must be 1.

RowPitch

The length of each row in bytes. This value must be greater than or equal to the element size in bytes *
width. If RowPitch is set to 0, the appropriate row pitch is calculated based on the size of each element in
bytes multiplied by width.

RowPitch: Size in bytes of the 2D slice of the 3D region of a 3D image being written. This must be 0 if
image is a 2D image. This value must be greater than or equal to RowPitch * height. If SlicePitch is set to
0, the appropriate slice pitch is calculated based on the RowPitch * height.

mem: The pointer to a buffer in host memory where image data is to be written to.

EventWaitList: Optional. Specify events that need to complete before this particular command can be
executed. The events specified in event_wait_list act as synchronization points. The context associated with
events in event_wait_list and command_queue must be the same.

outEvent: Optional. Returns an event object that identifies this particular write command and can be used
to query or queue a wait for this particular command to complete.

Calling EnqueueWriteImage to update the latest bits in a region of the image object with the mem argument
value set to mem + (sourceOriginZ * image slice pitch + sourceOriginY * image row pitch + sourceOriginX
* bytes per pixel), where mem is a pointer to the memory region specified when the image object being writ-
ten is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined
behavior:

- The host memory region being written contains the latest bits when the enqueued write command
  begins execution.

- The RowPitch and SlicePitch argument values in EnqueueWriteImage must be set to the image row
  pitch and slice pitch.

- The image object is not mapped.

- The image object is not used by any command-queue until the write command has finished execution.

See also:

- 10.1.37 EnqueueWriteImage(image as CLMemMBS,sourceOriginX as Integer, sourceOriginY as In-
  teger, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as
  Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock)   309

10.1.37 EnqueueWriteImage(image as CLMemMBS,sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to write from a 2D or 3D image object to host memory.
Notes:

image: Refers to a valid 2D or 3D image object.

BlockingWrite: Optional. Indicates if the write operation is blocking or non-blocking.

If BlockingWrite is true the OpenCL implementation copies the data referred to by mem and enqueues the write command in the command-queue. The memory pointed to by mem can be reused by the application after the clEnqueueWriteImage call returns. If BlockingWrite is false the OpenCL implementation will use mem to perform a nonblocking write. As the write is non-blocking the implementation can return immediately. The memory pointed to by mem cannot be reused by the application after the call returns. The event argument returns an event object which can be used to query the execution status of the write command. When the write command has completed, the memory pointed to by mem can then be reused by the application.

origin: Defines the (x, y, z) offset in pixels in the image from where to write or write. If image is a 2D image object, the z value given by sourceOriginZ must be 0.

region: Defines the (width, height, depth) in pixels of the 2D or 3D rectangle being write or written. If image is a 2D image object, the depth value given by RegionDepth must be 1.

RowPitch
The length of each row in bytes. This value must be greater than or equal to the element size in bytes * width. If RowPitch is set to 0, the appropriate row pitch is calculated based on the size of each element in bytes multiplied by width.

RowPitch: Size in bytes of the 2D slice of the 3D region of a 3D image being written. This must be 0 if image is a 2D image. This value must be greater than or equal to RowPitch * height. If SlicePitch is set to 0, the appropriate slice pitch is calculated based on the RowPitch * height.

mem: The pointer to a buffer in host memory where image data is to be written to.

EventWaitList: Optional. Specify events that need to complete before this particular command can be executed. The events specified in event_wait_list act as synchronization points. The context associated with events in event_wait_list and command_queue must be the same.

outEvent: Optional. Returns an event object that identifies this particular write command and can be used to query or queue a wait for this particular command to complete.

Calling EnqueueWriteImage to update the latest bits in a region of the image object with the mem argument value set to mem + (sourceOriginZ * image slice pitch + sourceOriginY * image row pitch + sourceOriginX * bytes per pixel), where mem is a pointer to the memory region specified when the image object being written is created with kMemoryUseHostPtr, must meet the following requirements in order to avoid undefined behavior:

- The host memory region being written contains the latest bits when the enqueued write command begins execution.

- The RowPitch and SlicePitch argument values in EnqueueWriteImage must be set to the image row pitch and slice pitch.

- The image object is not mapped.

- The image object is not used by any command-queue until the write command has finished execution.

See also:

- 10.1.36 EnqueueWriteImage(image as CLMemMBS, BlockingWrite as boolean, sourceOriginX as Integer, sourceOriginY as Integer, sourceOriginZ as Integer, RegionWidth as Integer, RegionHeight as Integer, RegionDepth as Integer, RowPitch as Integer, SlicePitch as Integer, mem as Memoryblock, EventWaitList() as CLEventMBS, byref outEvent as CLEventMBS)   307

10.1.38   EnqueueWritePicture(image as CLMemMBS, sourceOriginX as Integer, sourceOriginY as Integer, RegionWidth as Integer, RegionHeight as Integer, pic as picture)

Plugin Version: 11.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Enqueues a command to write from a 2D or 3D image object to a Real Studio Picture.
Example:

const size = 500

// create test picture
dim pic1 as Picture = LogoMBS(size)
// create destination picture
dim pic2 as new Picture(size, size, 32)

// get device list
dim devices() as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)
dim device as CLDeviceMBS = devices(0)

// Create context for that device

dim c as new CLContextMBS(device)

// query what format Real Studio uses for pictures
dim RowPitch as Integer
dim format as CLImageFormatMBS = OpenCLMBS.GetPictureImageFormat(pic1, RowPitch)

// create a matching memory object
dim m as new CLMemMBS(c, CLMemMBS.kMemoryReadWrite, format, size, size, RowPitch)

// create command queue
dim cq as new CLCommandQueueMBS(c, device, 0)

// copy picture content into CLMem object
cq.EnqueueWritePicture(m, 0, 0, size, size, pic1)

// and copy back to second picture
cq.EnqueueReadPicture(m, 0, 0, size, size, pic2)

// finally display it
Backdrop = pic2

Notes:

image: Refers to a valid 2D or 3D image object.

BlockingWrite: Optional. Indicates if the write operation is blocking or non-blocking.

origin: Defines the (x, y) offset in pixels in the image from where to write or write.

region: Defines the (width, height) in pixels of the 2D or 3D rectangle being write or written.

pic: The target Real Studio picture object. This must match in the image format for the image object and the size you specified in region.

This operation is always performed blocked.
Lasterror is set.

10.1.39   Finish

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Blocks until all previously queued OpenCL commands in a command-queue are issued to the associated device and have completed.

Notes:

Blocks until all previously queued OpenCL commands in command_queue are issued to the associated device and have completed.

Finish does not return until all queued commands in command_queue have been processed and completed. clFinish is also a synchronization point.

Lasterror is set.

10.1.40   Flush

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Issues all previously queued OpenCL commands in a command-queue to the device associated with the command-queue.
Notes:

Issues all previously queued OpenCL commands in command_queue to the device associated with command_queue.

Flush only guarantees that all queued commands to command_queue get issued to the appropriate device. There is no guarantee that they will be complete after Flush returns.

Lasterror is set.

Any blocking commands queued in a command-queue such as EnqueueReadImage or EnqueueReadBuffer with BlockingRead set to true, EnqueueWriteImage or EnqueueWriteBuffer with BlockingWrite set to true, EnqueueMapImage or EnqueueMapBuffer with BlockingMap set to true or WaitForEvents perform an implicit flush of the command-queue.

To use event objects that refer to commands enqueued in a command-queue as event objects to wait on by commands enqueued in a different command-queue, the application must call a Flush or any blocking commands that perform an implicit flush of the command-queue where the commands that refer to these event objects are enqueued.
Lasterror is set.

10.1.41   Properties as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the currently specified properties for the command-queue.
Notes: Lasterror is set.

10.1.42 ReferenceCount as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the command-queue reference count.
Notes: Lasterror is set.

10.1.43 Properties

10.1.44 Handle as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internel object reference.
Notes:

Not zero if this object is valid.
(Read and Write property)

10.1.45 LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Notes:

See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

10.2   class CLContextMBS

10.2.1   class CLContextMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The OpenCL class for a context.
Example:

dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)

Notes: Contexts are used by the OpenCL runtime for managing objects such as command-queues, memory, program and kernel objects and for executing kernels on one or more devices specified in the context.

10.2.2   Methods

10.2.3   Constructor(Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an OpenCL context.
Example:

dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)

Notes:

Platform: Optional, Specifies the platform to use.
Devices: The devices you want to use. Can be one or several devices. If you specify none, the default one is picked.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Lasterror is set.
See also:

10.2.4 Constructor(Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an OpenCL context.
Notes:

Platform: Optional, specifies the platform to use.
Devices: The devices you want to use. Can be one or several devices. If you specify none, the default one is picked.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Lasterror is set.
See also:

10.2.5 Constructor(DeviceType as Integer, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Create an OpenCL context from a device type that identifies the specific device(s) to use.
Example:

dim co as new CLContextMBS(CLDeviceMBS.kDeviceTypeAll)

Notes:

Platform: Optional, Specifies the platform to use.
DeviceType: A bit-field that identifies the type of device and is described in the table below.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Constants	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.
See also:

10.2.6   Constructor(Platform as CLPlatformMBS, Device as CLDeviceMBS, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an OpenCL context.
Notes:

Platform: Specifies the platform to use.
Devices: The devices you want to use. Can be one or several devices. If you specify none, the default one is picked.

ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Lasterror is set.
See also:

10.2.7   Constructor(Platform as CLPlatformMBS, Devices() as CLDeviceMBS, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an OpenCL context.
Notes:

Platform: Specifies the platform to use.
Devices: The devices you want to use. Can be one or several devices. If you specify none, the default one is picked.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Lasterror is set.
See also:

10.2.8   Constructor(Platform as CLPlatformMBS, DeviceType as Integer, ErrorHandlerMode as Integer = 0)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Create an OpenCL context from a device type that identifies the specific device(s) to use.
Notes:

Platform: Optional, Specifies the platform to use.
DeviceType: A bit-field that identifies the type of device and is described in the table below.
ErrorHandlerMode: The error handler mode. Check kErrorMode* constants.

Constants	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.
See also:

10.2.9   Devices as CLDeviceMBS()

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the list of devices in context.
Example:

```
// create context for all devices
dim co as new CLContextMBS(CLDeviceMBS.kDeviceTypeAll)

// and query it for it's devices
```

for each d as CLDeviceMBS in co.Devices
MsgBox d.Name
next

10.2.10 GetSupportedImageFormats(flags as UInt64, type as UInt32) as CLImageFormatMBS()

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Get the list of image formats supported by an OpenCL implementation.
Example:

dim co as new CLContextMBS(CLDeviceMBS.kDeviceTypeAll)

dim formats(-1) as CLImageFormatMBS = co.GetSupportedImageFormats(CLMemMBS.kMemoryReadWrite, CLMemMBS.kMemoryTypeImage2D)
dim lines(-1) as string

for each f as CLImageFormatMBS in formats
// see constants for what this values mean
lines.Append hex(f.ImageChannelOrder)+" - "+hex(f.ImageChannelDataType)
next

MsgBox Join(lines,EndOfLine)

Notes:

self: A valid OpenCL context on which the image object(s) will be created.
flags: A bit-field that is used to specify allocation and usage information about the image memory object being created and is described in the List of supported cl_mem_flags values for clCreateBuffer
type: Describes the image type and must be either kMemoryTypeImage2D or kMemoryTypeImage3D.

Returns an array of imageformat objects.

10.2.11 ReferenceCount as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the context reference count.
Example:

dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeGPU)
dim device as CLDeviceMBS = devices(0) // we use first one

// Create a context
dim context as new CLContextMBS(device, CLContextMBS.kErrorModeLogMessagesToSystemLog)

MsgBox str(context.ReferenceCount) // 1

// Create a command queue
dim queue as new CLCommandQueueMBS(context, device, 0)

MsgBox str(context.ReferenceCount) // 2 as the command queue points to the context, too.

10.2.12   Properties

10.2.13   Handle as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internel object reference.
Notes:

Not zero if this object is valid.
(Read and Write property)

10.2.14   LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Notes:

See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

10.2.15   Constants

10.2.16   kErrorModeIgnore = 0

Plugin Version: 11.1. **Function:** One of the error mode constants.

10.2.17   kErrorModeLogMessagesToStderr = 3

Plugin Version: 11.1. **Function:** One of the error mode constants.
Notes: Sends all log messages to the file descriptor stderr.

10.2.18   kErrorModeLogMessagesToStdout = 2

Plugin Version: 11.1. **Function:** One of the error mode constants.
Notes: Sends all log messages to the file descriptor stdout.

10.2.19   kErrorModeLogMessagesToSystemLog = 1

Plugin Version: 11.1. **Function:** One of the error mode constants.
Notes: Fowards on all log messages to the Apple System Logger.

10.3   class CLDeviceMBS

10.3.1   class CLDeviceMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for an OpenCL Device.

10.3.2   Methods

10.3.3   AddressBits as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The default compute device address space size specified as an unsigned integer value in bits.
Example:

dim Devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)

for each p as CLDeviceMBS in Devices
MsgBox p.Name+": "+str(p.AddressBits)
next

Notes:

Currently supported values are 32 or 64 bits.
Lasterror is set.

10.3.4   Available as Boolean

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns true if the device is available and false if the device is not available.
Notes: Lasterror is set.

10.3.5   CompilerAvailable as Boolean

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns false if the implementation does not have a compiler available to compile the program source.
Notes:

Is true if the compiler is available. This can be false for the embededed platform profile only.
Lasterror is set.

10.3.6 DeviceType as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The OpenCL device type.
Notes:

Currently supported values are one of or a combination of: kDeviceTypeCPU, kDeviceTypeGPU, kDevice-TypeAccelerator, or kDeviceTypeDefault.
Lasterror is set.

10.3.7 DeviceVersion as String

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** OpenCL version string.
Notes:

Returns the OpenCL version supported by the device. This version string has the following format:

OpenCL<space><major_version.minor_version><space><vendor-specific information>

The major_version.minor_version value returned will be 1.0.
Lasterror is set.

10.3.8 DriverVersion as String

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** OpenCL software driver version string in the form major_number.minor_number.
Notes: Lasterror is set.

10.3.9 EndianLittle as Boolean

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns true if the OpenCL device is a little endian device and false otherwise.
Notes: Lasterror is set.

10.3.10   ErrorCorrectionSupport as Boolean

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns true if the device implements error correction for the memories, caches, registers etc. in the device.
Notes:

Returns false if the device does not implement error correction. This can be a requirement for certain clients of OpenCL.
Lasterror is set.

10.3.11   ExecutionCapabilities as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the execution capabilities of the device.
Notes:

This is a bit-field that describes one or more of the following values:

kExecKernel - The OpenCL device can execute OpenCL kernels.
kExceNativeKernel - The OpenCL device can execute native kernels.

The mandated minimum capability is kExecKernel.
Lasterror is set.

10.3.12   Extensions as String

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a space separated list of extension names.
Example:

```
// show msgbox with all extensions for first device

dim devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)
dim device as CLDeviceMBS = devices(0)

dim extensions(-1) as string = split(device.Extensions," ")

dim lines(-1) as string

for each extension as string in extensions
lines.append extension
next

MsgBox Join(lines,EndOfLine)
```

Notes:

(the extension names themselves do not contain any spaces).
The list of extension names returned currently can include one or more of the following approved extension names:

cl_khr_fp64
cl_khr_select_fprounding_mode
cl_khr_global_int32_base_atomics
cl_khr_global_int32_extended_atomics
cl_khr_local_int32_base_atomics
cl_khr_local_int32_extended_atomics
cl_khr_int64_base_atomics
cl_khr_int64_extended_atomics
cl_khr_3d_image_writes
cl_khr_byte_addressable_store
cl_khr_fp16

Lasterror is set.

10.3.13   GlobalMemoryCacheLineSize as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Size of global memory cache line in bytes.
Notes: Lasterror is set.

10.3.14   GlobalMemoryCacheSize as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Size of global memory cache in bytes.
Notes: Lasterror is set.

10.3.15   GlobalMemoryCacheType as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Type of global memory cache supported.
Notes:

See kCacheMemType* constants.

Lasterror is set.

10.3.16   GlobalMemorySize as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Size of global device memory in bytes.
Notes: Lasterror is set.

10.3.17   Image2DMaxHeight as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max height of 2D image in pixels.
Notes:

The minimum value is 8192 if ImageSupport is true.
Lasterror is set.

10.3.18   Image2DMaxWidth as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max width of 2D image in pixels.
Notes:

The minimum value is 8192 if ImageSupport is true.
Lasterror is set.

10.3.19   Image3DMaxDepth as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max depth of 3D image in pixels.
Notes:

The minimum value is 2048 if ImageSupport is true.
Lasterror is set.

10.3.20   Image3DMaxHeight as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max height of 3D image in pixels.

Notes:

The minimum value is 2048 if ImageSupport is true.
Lasterror is set.

10.3.21 Image3DMaxWidth as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max width of 3D image in pixels.
Notes:

The minimum value is 2048 if ImageSupport is true.
Lasterror is set.

10.3.22 ImageSupport as Boolean

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns true if images are supported by the OpenCL device and false otherwise.
Notes: Lasterror is set.

10.3.23 LocalMemorySize as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Size of local memory arena in bytes.
Notes:

The minimum value is 16 KB.
Lasterror is set.

10.3.24 LocalMemType as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Type of local memory supported.
Notes:

This can be set to kMemTypeLocal implying dedicated local memory storage such as SRAM, or kMemType-Global.
Lasterror is set.

10.3.25   MaxClockFrequency as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Maximum configured clock frequency of the device in MHz.
Notes: Lasterror is set.

10.3.26   MaxComputeUnits as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The number of parallel compute cores on the OpenCL device.
Notes:

The minimum value is 1.
Lasterror is set.

10.3.27   MaxConstantArgs as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max number of arguments declared with the __constant qualifier in a kernel.
Notes:

The minimum value is 8.
Lasterror is set.

10.3.28   MaxConstantBufferSize as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max size in bytes of a constant buffer allocation.
Notes:

The minimum value is 64 KB.
Lasterror is set.

10.3.29   MaxMemoryAllocSize as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max size of memory object allocation in bytes.
Notes:

The minimum value is max (1/4th of GlobalMemorySize, 128*1024*1024)
Lasterror is set.

10.3.30 MaxParameterSize as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max size in bytes of the arguments that can be passed to a kernel.
Notes:

The minimum value is 256.
Lasterror is set.

10.3.31 MaxReadImageArgs as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max number of simultaneous image objects that can be read by a kernel.
Notes:

Lasterror is set.
The minimum value is 128 if ImageSupport is true.

10.3.32 MaxSamplers as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Maximum number of samplers that can be used in a kernel.
Notes:

The minimum value is 16 if ImageSupport is true.
Lasterror is set.

10.3.33 MaxWorkGroupSize as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Maximum number of work-items in a work-group executing a kernel using the data parallel execution model.
Notes:

(Refer to EnqueueNDRangeKernel). The minimum value is 1.
Lasterror is set.

10.3.34   MaxWorkItemDimensions as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Maximum dimensions that specify the global and local work-item IDs used by the data parallel execution model.
Notes:

(Refer to EnqueueNDRangeKernel). The minimum value is 3.
Lasterror is set.

10.3.35   MaxWriteImageArgs as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Max number of simultaneous image objects that can be written to by a kernel.
Notes:

The minimum value is 8 if ImageSupport is true.
Lasterror is set.

10.3.36   MemoryBaseAddressAlign as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the alignment in bits of the base address of any allocated memory object.
Notes: Lasterror is set.

10.3.37   MinDataTypeAlignSize as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The smallest alignment in bytes which can be used for any data type.
Notes: Lasterror is set.

10.3.38   Name as String

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Device name string.
Example:

dim Devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)

for each p as CLDeviceMBS in Devices
MsgBox p.Name
next

Notes: Lasterror is set.

10.3.39 Platform as CLPlatformMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The platform associated with this device.
Notes: Lasterror is set.

10.3.40 PreferredVectorWidthChar as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes:

The vector width is defined as the number of scalar elements that can be stored in the vector.
Lasterror is set.

10.3.41 PreferredVectorWidthDouble as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes:

The vector width is defined as the number of scalar elements that can be stored in the vector.

If the cl_khr_fp64 extension is not supported, this function must return 0.
Lasterror is set.

10.3.42 PreferredVectorWidthFloat as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes:

The vector width is defined as the number of scalar elements that can be stored in the vector.
Lasterror is set.

10.3.43   PreferredVectorWidthInt as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes:

The vector width is defined as the number of scalar elements that can be stored in the vector.
Lasterror is set.

10.3.44   PreferredVectorWidthLong as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes:

The vector width is defined as the number of scalar elements that can be stored in the vector.
Lasterror is set.

10.3.45   PreferredVectorWidthShort as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Preferred native vector width size for built-in scalar types that can be put into vectors.
Notes:

The vector width is defined as the number of scalar elements that can be stored in the vector.
Lasterror is set.

10.3.46   Profile as String

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** OpenCL profile string.
Notes:

Returns the profile name supported by the device (see note). The profile name returned can be one of the following strings:

FULL_PROFILE - if the device supports the OpenCL specification (functionality defined as part of the core specification and does not require any extensions to be supported).

EMBEDDED_PROFILE - if the device supports the OpenCL embedded profile.
Lasterror is set.

10.3.47 ProfilingTimerResolution as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the resolution of device timer. This is measured in nanoseconds.
Notes: Lasterror is set.

10.3.48 QueueProperties as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the command-queue properties supported by the device.
Notes:

See kQueueOutOfOrderExecModeEnable and kQueueProfilingEnable.
Lasterror is set.

10.3.49 SingleFPConfig as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes single precision floating-point capability of the device.
Notes:

The mandated minimum floating-point capability is kFPRoundToNearest+kFPInfNAN.
Lasterror is set.

10.3.50 Vendor as String

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Vendor name string.
Notes: Lasterror is set.

10.3.51 VendorID as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A unique device vendor identifier.
Notes:

An example of a unique device identifier could be the PCIe ID.
Lasterror is set.

10.3.52   Properties

10.3.53   Handle as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internel object reference.
Notes:

Not zero if this object is valid.
(Read and Write property)

10.3.54   LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Notes:

See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

10.3.55   Constants

10.3.56   kCacheMemTypeNone = 0

Plugin Version: 11.1. **Function:** One of the cache memory type constants.

10.3.57   kCacheMemTypeReadOnlyCache = 1

Plugin Version: 11.1. **Function:** One of the cache memory type constants.
Notes: Read Only Cache.

10.3.58   kCacheMemTypeReadWriteCache = 2

Plugin Version: 11.1. **Function:** One of the cache memory type constants.
Notes: Read/Write Cache.

10.3.59 kDeviceTypeAccelerator = 8

Plugin Version: 11.1. **Function:** One of the device type constants.
Notes: Accelerator = some special acceleration device

10.3.60 kDeviceTypeAll = & Hffffffff

Plugin Version: 11.1. **Function:** One of the device type constants.
Notes: This is the bitmask to catch all possible types.

10.3.61 kDeviceTypeCPU = 2

Plugin Version: 11.1. **Function:** One of the device type constants.
Notes: CPU = your processor

10.3.62 kDeviceTypeDefault = 1

Plugin Version: 11.1. **Function:** One of the device type constants.
Notes: Default device.

10.3.63 kDeviceTypeGPU = 4

Plugin Version: 11.1. **Function:** One of the device type constants.
Notes: GPU = your graphics card

10.3.64 kExceNativeKernel = 2

Plugin Version: 11.1. **Function:** One of the execution capabilities constants.
Notes: The OpenCL device can execute native kernels.

10.3.65 kExecKernel = 1

Plugin Version: 11.1. **Function:** One of the execution capabilities constants.
Notes: The OpenCL device can execute OpenCL kernels.

10.3.66   kFPDenorm = 1

Plugin Version: 11.1. **Function:** One of the floating point capabilities constants.
Notes: denorms are supported

10.3.67   kFPFMA = 32

Plugin Version: 11.1. **Function:** One of the floating point capabilities constants.
Notes: IEEE754-2008 fused multiply-add is supported

10.3.68   kFPInfNAN = 2

Plugin Version: 11.1. **Function:** One of the floating point capabilities constants.
Notes: INF and quiet NaNs are supported

10.3.69   kFPRoundToInf = 16

Plugin Version: 11.1. **Function:** One of the floating point capabilities constants.
Notes: Round to +ve and -ve infinity rounding modes supported

10.3.70   kFPRoundToNearest = 4

Plugin Version: 11.1. **Function:** One of the floating point capabilities constants.
Notes: Round to nearest even rounding mode supported

10.3.71   kFPRoundToZero = 8

Plugin Version: 11.1. **Function:** One of the floating point capabilities constants.
Notes: Round to zero rounding mode supported

10.3.72   kMemTypeGlobal = 2

Plugin Version: 11.1. **Function:** One of the memory type constants.
Notes: Dedicated local memory storage such as SRAM.

10.3.73   kMemTypeLocal = 1

Plugin Version: 11.1. **Function:** One of the memory type constants.

10.3.74   kQueueOutOfOrderExecModeEnable = 1

Plugin Version: 11.1. **Function:** One of the queue properties constants.
Notes: Out of order execution mode enabled.

10.3.75   kQueueProfilingEnable = 2

Plugin Version: 11.1. **Function:** One of the queue properties constants.
Notes: Profiling enabled.

10.4   class CLEventMBS

10.4.1   class CLEventMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for an OpenCL event.
Notes: You can chain several operations together inside a command queue. With events you can have an item execute after another item.

10.4.2   Methods

10.4.3   CommandExecutionStatus as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the execution status of the command identified by event.
Notes:

See kCommandExecutionStatus* constants.
Lasterror is set.

10.4.4   CommandQueue as CLCommandQueueMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the command-queue associated with event.
Notes: Lasterror is set.

10.4.5   CommandType as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the command associated with event.
Notes:

See kCommand* constants.
Lasterror is set.

10.4.6   ProfilingCommandEnd as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A 64-bit value that describes the current device time counter in nanoseconds when the command identified by event has finished

execution on the device.
Notes: Lasterror is set.

10.4.7 ProfilingCommandQueued as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A 64-bit value that describes the current device time counter in nanoseconds when the command identified by event is enqueued in a command-queue by the host.
Notes: Lasterror is set.

10.4.8 ProfilingCommandStart as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A 64-bit value that describes the current device time counter in nanoseconds when the command identified by event starts execution on the device.
Notes: Lasterror is set.

10.4.9 ProfilingCommandSubmit as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** A 64-bit value that describes the current device time counter in nanoseconds when the command identified by event that has been enqueued is submitted by the host to the device associated with the commandqueue.
Notes: Lasterror is set.

10.4.10 ReferenceCount as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the event reference count.
Notes:

The reference count returned should be considered immediately stale. It is unsuitable for general use in applications. This feature is provided for identifying memory leaks.
Lasterror is set.

10.4.11   Properties

10.4.12   Handle as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internel object reference.
Notes:

Not zero if this object is valid.
(Read and Write property)

10.4.13   LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Notes:

See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

10.4.14   Constants

10.4.15   kCommandAcquireGLObjects = & h11FF

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Acquire GL objects

10.4.16   kCommandCopyBuffer = & h11F5

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Copy Buffer

10.4.17   kCommandCopyBufferToImage = & h11FA

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Copy Buffer to Image

10.4.18 kCommandCopyImage = & h11F8

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Copy Image

10.4.19 kCommandCopyImageToBuffer = & h11F9

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Copy Image to Buffer

10.4.20 kCommandExecutionStatusComplete = 0

Plugin Version: 11.1. **Function:** One of the command excecution status constants.
Notes: The command has completed.

10.4.21 kCommandExecutionStatusQueued = 3

Plugin Version: 11.1. **Function:** One of the command excecution status constants.
Notes: command has been enqueued in the command-queue.

10.4.22 kCommandExecutionStatusRunning = 1

Plugin Version: 11.1. **Function:** One of the command excecution status constants.
Notes: Device is currently executing this command.

10.4.23 kCommandExecutionStatusSubmitted = 2

Plugin Version: 11.1. **Function:** One of the command excecution status constants.
Notes: enqueued command has been submitted by the host to the device associated with the command-queue.

10.4.24 kCommandMapBuffer = & h11FB

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Map Buffer

10.4.25   kCommandMapImage = & h11FC

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Map Image

10.4.26   kCommandMarker = & h11FE

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Marker

10.4.27   kCommandNativeKernel = & h11F2

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Execute Native Kernel

10.4.28   kCommandNDRangeKernel = & h11F0

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Execute a ND Range Kernel

10.4.29   kCommandReadBuffer = & h11F3

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Read Buffer

10.4.30   kCommandReadImage = & h11F6

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Read Image

10.4.31   kCommandReleaseGLObjects = & h1200

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Release GL objects

10.4.32 kCommandTask = & h11F1

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Execute task

10.4.33 kCommandUnmapMemObject = & h11FD

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Unmap memory object

10.4.34 kCommandWriteBuffer = & h11F4

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Write Buffer

10.4.35 kCommandWriteImage = & h11F7

Plugin Version: 11.1. **Function:** One of the command type constants.
Notes: Write Image

10.5   class CLImageFormatMBS

10.5.1   class CLImageFormatMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** the OpenCL class
for an image format.

10.5.2   Properties

10.5.3   ImageChannelDataType as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Describes the size
of the channel data type.
Notes:

The number of bits per element determined by the ImageChannelDataType and ImageChannelOrder must
be a power of two. The list of supported values is described in the table below.

Image Channel Data Type	Description
kChannelTypeSNormInt8	Each channel component is a normalized signed 8-bit integer value.
kChannelTypeSNormInt16	Each channel component is a normalized signed 16-bit integer value.
kChannelTypeUNormInt8	Each channel component is a normalized unsigned 8-bit integer value.
kChannelTypeUNormInt16	Each channel component is a normalized unsigned 16-bit integer value.
kChannelTypeUNormShort565	Represents a normalized 5-6-5 3-channel RGB image. The channel order must be kChannelOrderRGB.
kChannelTypeUNormShort555	Represents a normalized x-5-5-5 4-channel xRGB image. The channel order must be kChannelOrderRGB.
kChannelTypeUNormInt101010	Represents a normalized x-10-10-10 4-channel xRGB image. The channel order must be kChannelOrderRGB.
kChannelTypeSignedInt8	Each channel component is an unnormalized signed 8-bit integer value.
kChannelTypeSignedInt16	Each channel component is an unnormalized signed 16-bit integer value.
kChannelTypeSignedInt32	Each channel component is an unnormalized signed 32-bit integer value.
kChannelTypeUnsignedInt8	Each channel component is an unnormalized unsigned 8-bit integer value.
kChannelTypeUnsignedInt16	Each channel component is an unnormalized unsigned 16-bit integer value.
kChannelTypeUnsignedInt32	Each channel component is an unnormalized unsigned 32-bit integer value.
kChannelTypeHalfFloat	Each channel component is a 16-bit half-float value.
kChannelTypeFloat	Each channel component is a single precision floating-point value.

(Read and Write property)

10.5.4 ImageChannelOrder as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Specifies the number of channels and the channel layout i.e. the memory layout in which channels are stored in the image.
Notes:

Valid values are described in the table below.

Format	Description
kChannelOrderR, or kChannelOrderA	
kChannelOrderIntensity	This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelTypeUNormInt16, kChannelTypeSNormInt8, kChannelTypeSNormInt16, kChannelTypeHalfFloat, or kChannelTypeFloat.
kChannelOrderLuminance	This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelTypeUNormInt16, kChannelTypeSNormInt8, kChannelTypeSNormInt16, kChannelTypeHalfFloat, or kChannelTypeFloat.
kChannelOrderRG, or kChannelOrderRA	
kChannelOrderRGB	This format can only be used if channel data type = kChannelTypeUNormShort565, kChannelTypeUNormShort555 or kChannelTypeUNormInt101010.
kChannelOrderRGBA	
kChannelOrderARGB, kChannelOrderBGRA.	This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelTypeSNormInt8, kChannelTypeSignedInt8 or kChannelTypeUnsignedInt8.

(Read and Write property)

10.5.5 Constants

10.5.6 kChannelOrderA = & h10B1

Plugin Version: 11.1. **Function:** One of the channel order constants

10.5.7 kChannelOrderARGB = & h10B7

Plugin Version: 11.1. **Function:** One of the channel order constants

10.5.8 kChannelOrderBGRA = & h10B6

Plugin Version: 11.1. **Function:** One of the channel order constants

10.5.9   kChannelOrderIntensity = & h10B8

Plugin Version: 11.1. **Function:** One of the channel order constants
Notes: This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelType-UNormInt16, kChannelTypeSNormInt8, kChannelTypeSNormInt16, kChannelTypeHalfFloat, or kChannel-TypeFloat.

10.5.10   kChannelOrderLuminance = & h10B9

Plugin Version: 11.1. **Function:** One of the channel order constants
Notes: This format can only be used if channel data type = kChannelTypeUNormInt8, kChannelType-UNormInt16, kChannelTypeSNormInt8, kChannelTypeSNormInt16, kChannelTypeHalfFloat, or kChannel-TypeFloat.

10.5.11   kChannelOrderR = & h10B0

Plugin Version: 11.1. **Function:** One of the channel order constants

10.5.12   kChannelOrderRA = & h10B3

Plugin Version: 11.1. **Function:** One of the channel order constants

10.5.13   kChannelOrderRG = & h10B2

Plugin Version: 11.1. **Function:** One of the channel order constants

10.5.14   kChannelOrderRGB = & h10B4

Plugin Version: 11.1. **Function:** One of the channel order constants
Notes: This format can only be used if channel data type = kChannelTypeUNormShort565, kChannel-TypeUNormShort555 or kChannelTypeUNormInt101010.

10.5.15   kChannelOrderRGBA = & h10B5

Plugin Version: 11.1. **Function:** One of the channel order constants

10.5.16   kChannelTypeFloat = & h10DE

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is a single precision floating-point value.

10.5.17   kChannelTypeHalfFloat = & h10DD

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is a 16-bit half-float value.

10.5.18   kChannelTypeSignedInt16 = & h10D8

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is an unnormalized signed 16-bit integer value.

10.5.19   kChannelTypeSignedInt32 = & h10D9

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is an unnormalized signed 32-bit integer value.

10.5.20   kChannelTypeSignedInt8 = & h10D7

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is an unnormalized signed 8-bit integer value.

10.5.21   kChannelTypeSNormInt16 = & h10D1

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is a normalized signed 16-bit integer value.

10.5.22   kChannelTypeSNormInt8 = & h10D0

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is a normalized signed 8-bit integer value.

10.5.23   kChannelTypeUNormInt101010 = & h10D6

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Represents a normalized x-10-10-10 4-channel xRGB image. The channel order must be kChannelOrderRGB.

10.5.24   kChannelTypeUNormInt16 = & h10D3

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is a normalized unsigned 16-bit integer value.

10.5.25   kChannelTypeUNormInt8 = & h10D2

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is a normalized unsigned 8-bit integer value.

10.5.26   kChannelTypeUNormShort555 = & h10D5

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Represents a normalized x-5-5-5 4-channel xRGB image. The channel order must be kChannelOrderRGB.

10.5.27   kChannelTypeUNormShort565 = & h10D4

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Represents a normalized 5-6-5 3-channel RGB image. The channel order must be kChannelOrderRGB.

10.5.28   kChannelTypeUnsignedInt16 = & h10DB

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is an unnormalized unsigned 16-bit integer value.

10.5.29 kChannelTypeUnsignedInt32 = & h10DC

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is an unnormalized unsigned 32-bit integer value.

10.5.30 kChannelTypeUnsignedInt8 = & h10DA

Plugin Version: 11.1. **Function:** One of the channel data type constants.
Notes: Each channel component is an unnormalized unsigned 8-bit integer value.

10.6   class CLKernelMBS

10.6.1   class CLKernelMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for an OpenCL Kernel.

10.6.2   Methods

10.6.3   Constructor(Program as CLProgramMBS, KernelName as string)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a kernal object.
Notes:

Program: A program object with a successfully built executable.
KernelName: A function name in the program declared with the __kernel qualifier

A kernel is a function declared in a program. A kernel is identified by the __kernel qualifier applied to any function in a program. A kernel object encapsulates the specific __kernel function declared in a program and the argument values to be used when executing this __kernel function.
Lasterror is set.

10.6.4   FunctionName as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the kernel function name.
Notes: Lasterror is set.

10.6.5   GetKernelCompileWorkGroupSize(device as CLDeviceMBS, byref X as Int64, byref Y as Int64, byref Z as Int64)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the work-group size specified by the __attribute__((reqd_work_gr oup_size(X, Y, Z))) qualifier.
Notes:

device: Identifies a specific device in the list of devices associated with kernel. The list of devices is the list of devices in the OpenCL context that is associated with kernel. If the list of devices associated with kernel is a single device, device can be a nil value.

If the work-group size is not specified using the above attribute qualifier (0, 0, 0) is returned.
Lasterror is set.

10.6.6 GetKernelLocalMemorySize(device as CLDeviceMBS = nil) as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the amount
of local memory in bytes being used by a kernel.
Notes:

device: Identifies a specific device in the list of devices associated with kernel. The list of devices is the list
of devices in the OpenCL context that is associated with kernel. If the list of devices associated with kernel
is a single device, device can be a nil value.

This includes local memory that may be needed by an implementation to execute the kernel, variables de-
clared inside the kernel with the __local address qualifier and local memory to be allocated for arguments to
the kernel declared as pointers with the __local address qualifier and whose size is specified with clSetKer-
nelArg.

If the local memory size, for any pointer argument to the kernel declared with the __local address qualifier,
is not specified, its size is assumed to be 0.
Lasterror is set.

10.6.7 GetKernelWorkGroupSize(device as CLDeviceMBS = nil) as Int64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** This provides a
mechanism for the application to query the work-group size that can be used to execute a kernel on a specific
device given by device.
Notes:

device: Identifies a specific device in the list of devices associated with kernel. The list of devices is the list
of devices in the OpenCL context that is associated with kernel. If the list of devices associated with kernel
is a single device, device can be a nil value.

The OpenCL implementation uses the resource requirements of the kernel (register usage etc.) to determine
what this work-group size should be.
Lasterror is set.

10.6.8 NumberOfArguments as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the number
of arguments to kernel.

Notes: Lasterror is set.

10.6.9   ReferenceCount as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the kernel reference count.
Notes:

The reference count returned should be considered immediately stale. It is unsuitable for general use in applications. This feature is provided for identifying memory leaks.
Lasterror is set.

10.6.10   SetKernelArgDouble(index as Integer, value as Double)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the kernel argument with the given index.
Notes:

index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the value.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types.
Lasterror is set.

10.6.11   SetKernelArgFloat(index as Integer, value as Single)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the kernel argument with the given index.
Notes:

index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the value.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types.
Lasterror is set.

10.6.12 SetKernelArgInt32(index as Integer, value as Int32)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the kernel argument with the given index.
Notes:

index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the value.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types. Lasterror is set.

10.6.13 SetKernelArgInt64(index as Integer, value as Int64)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the kernel argument with the given index.
Notes:

index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the value.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types. Lasterror is set.

10.6.14 SetKernelArgMem(index as Integer, mem as CLMemMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Sets the kernel argument with the given index.
Notes:

index: The argument index. Arguments to the kernel are referred by indices that go from 0 for the leftmost argument to n - 1, where n is the total number of arguments declared by a kernel.
value: the memory object to set for argument.

We have currently setters for Int32, Int64, Float, Double and CLMemMBS. Please email for additional types. Lasterror is set.

10.6.15   Properties

10.6.16   Context as CLContextMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the context associated with kernel.
Notes:

Lasterror is set.
(Read and Write property)

10.6.17   Handle as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internel object reference.
Notes:

Not zero if this object is valid.
(Read and Write property)

10.6.18   LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Notes:

See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

10.6.19   Program as CLProgramMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the program object associated with kernel.
Notes:

Lasterror is set.
(Read and Write property)

10.7 class CLMemMBS

10.7.1 class CLMemMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a OpenCL memory block.
Example:

const Size = 4096
dim context as CLContextMBS // your context
dim input as new CLMemMBS(context, CLMEMMBS.kMemoryReadOnly, 4096)

10.7.2 Methods

10.7.3 Constructor(Context as CLContextMBS, Flags as UInt64, ImageFormat as CLImageFormatMBS, Width as Integer, Height as Integer, Depth as Integer, RowPitch as Integer, SlicePitch as Integer, HostPtr as Memoryblock = nil)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a 3D image object.
Notes:

context: A valid OpenCL context on which the image object is to be created.
flags: A bit-field that is used to specify allocation and usage information about the image memory object being created. See kMemory* constants.
ImageFormat: the image format properties of the image to be allocated.
Width, Height: The width and height of the image in pixels. These must be values greater than or equal to 1.
Depth: The depth of the image in pixels. This must be a value greater than 1.
RowPitch: The scan-line pitch in bytes. This must be 0 if HostPtr is nil and can be either 0 or greater than or equal to Width * size of element in bytes if HostPtr is not nil. If HostPtr is not nil and RowPitch is equal to 0, RowPitch is calculated as Width * size of element in bytes. If RowPitch is not 0, it must be a multiple of the image element size in bytes.
SlicePitch: The size in bytes of each 2D slice in the 3D image. This must be 0 if HostPtr is nil and can be either 0 or greater than or equal to RowPitch * Height if HostPtr is not nil. If HostPtr is not nil and SlicePitch equal to 0, SlicePitch is calculated as RowPitch * Height. If SlicePitch is not 0, it must be a multiple of the RowPitch.
HostPtr: A pointer to the image data that may already be allocated by the application. The size of the buffer that HostPtr points to must be greater than or equal to SlicePitch * image_depth. The size of each element in bytes must be a power of 2. The image data specified by HostPtr is stored as a linear sequence of adjacent 2D slices. Each 2D slice is a linear sequence of adjacent scanlines. Each scanline is a linear sequence of image elements.

Lasterror is set.
See also:

- 10.7.4 Constructor(Context as CLContextMBS, Flags as UInt64, ImageFormat as CLImageFormatMBS, Width as Integer, Height as Integer, RowPitch as Integer, HostPtr as Memoryblock = nil)   356

- 10.7.5 Constructor(Context as CLContextMBS, Flags as UInt64, Size as Integer, HostPtr as Memoryblock = nil)   357

10.7.4   Constructor(Context as CLContextMBS, Flags as UInt64, ImageFormat as CLImageFormatMBS, Width as Integer, Height as Integer, RowPitch as Integer, HostPtr as Memoryblock = nil)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a 2D image object.
Notes:

context: A valid OpenCL context on which the image object is to be created.
flags: A bit-field that is used to specify allocation and usage information about the image memory object being created. See kMemory* constants.
ImageFormat: The format properties of the image to be allocated.
Width and Height: The width and height of the image in pixels. These must be values greater than or equal to 1.
RowPitch: The scan-line pitch in bytes. This must be 0 if HostPtr is nil and can be either 0 or greater than or equal to Width * size of element in bytes if HostPtr is not nil. If HostPtr is not nil and RowPitch is equal to 0, RowPitch is calculated as Width * size of element in bytes. If RowPitch is not 0, it must be a multiple of the image element size in bytes.
HostPtr: A pointer to the image data that may already be allocated by the application. The size of the buffer that HostPtr points to must be greater than or equal to RowPitch * Height. The size of each element in bytes must be a power of 2. The image data specified by HostPtr is stored as a linear sequence of adjacent scanlines. Each scanline is stored as a linear sequence of image elements.

Lasterror is set.
See also:

- 10.7.3 Constructor(Context as CLContextMBS, Flags as UInt64, ImageFormat as CLImageFormatMBS, Width as Integer, Height as Integer, Depth as Integer, RowPitch as Integer, SlicePitch as Integer, HostPtr as Memoryblock = nil)   355

- 10.7.5 Constructor(Context as CLContextMBS, Flags as UInt64, Size as Integer, HostPtr as Memoryblock = nil)   357

10.7.5 Constructor(Context as CLContextMBS, Flags as UInt64, Size as Integer, HostPtr as Memoryblock = nil)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new buffer object.
Notes:

context: A valid OpenCL context used to create the buffer object.
flags: A bit-field that is used to specify allocation and usage information such as the memory arena that should be used to allocate the buffer object and how it will be used. The following table describes the possible values for flags:
size: The size in bytes of the buffer memory object to be allocated.
HostPtr: A memoryblock that may already be allocated by the application. The size of the buffer that HostPtr points to must be greater than or equal to the size bytes.

Flags	Description
kMemoryReadWrite	This flag specifies that the memory object will be read and written by a kernel. This is the default.
kMemoryWriteOnly	This flags specifies that the memory object will be written but not read by a kernel. Reading from a buffer or image object created with kMemoryWriteOnly inside a kernel is undefined.
kMemoryReadOnly	This flag specifies that the memory object is a read-only memory object when used inside a kernel. Writing to a buffer or image object created with kMemoryReadOnly inside a kernel is undefined.
kMemoryUseHostPtr	This flag is valid only if HostPtr is not nil. If specified, it indicates that the application wants the OpenCL implementation to use memory referenced by HostPtr as the storage bits for the memory object. OpenCL implementations are allowed to cache the buffer contents pointed to by HostPtr in device memory. This cached copy can be used when kernels are executed on a device. The result of OpenCL commands that operate on multiple buffer objects created with the same HostPtr or overlapping host regions is considered to be undefined.
kMemoryAllocHostPtr	This flag specifies that the application wants the OpenCL implementation to allocate memory from host accessible memory. kMemoryAllocHostPtr and kMemoryUseHostPtr are mutually exclusive.
kMemoryCopyHostPtr	This flag is valid only if HostPtr is not nil. If specified, it indicates that the application wants the OpenCL implementation to allocate memory for the memory object and copy the data from memory referenced by HostPtr. kMemoryCopyHostPtr and kMemoryUseHostPtr are mutually exclusive. kMemoryCopyHostPtr can be used with kMemoryAllocHostPtr to initialize the contents of the cl_mem object allocated using host-accessible (e.g. PCIe) memory.

Lasterror is set.
See also:

- 10.7.3 Constructor(Context as CLContextMBS, Flags as UInt64, ImageFormat as CLImageFormatMBS,

10.7.6   Context as CLContextMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return context specified when memory object is created.
Notes: Lasterror is set.

10.7.7   Flags as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the flags argument value specified with Constructor.
Notes: Lasterror is set.

10.7.8   ImageDepth as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return depth of the image in pixels.
Notes:

For a 2D image, depth equals 0.
Lasterror is set.

10.7.9   ImageElementSize as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return size of each element of the image memory object given by image.
Notes:

An element is made up of n channels. The value of n is given with image format descriptor.
Lasterror is set.

10.7.10   ImageFormat as CLImageFormatMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return image format descriptor.

Notes: Lasterror is set.

10.7.11   ImageHeight as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return height of image in pixels.
Notes: Lasterror is set.

10.7.12   ImageRowPitch as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return size in bytes of a row of elements of the image object given by image.
Notes: Lasterror is set.

10.7.13   ImageSlicePitch as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return size in bytes of a 2D slice for the 3D image object given by image.
Notes:

For a 2D image object this value will be 0.
Lasterror is set.

10.7.14   ImageWidth as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return width of image in pixels.
Notes: Lasterror is set.

10.7.15   ReferenceCount as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return memory object reference count.
Notes:

The reference count returned should be considered immediately stale. It is unsuitable for general use in applications. This feature is provided for identifying memory leaks.
Lasterror is set.

10.7.16   Size as UInt64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return actual size of memory object in bytes.
Notes: Lasterror is set.

10.7.17   Type as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the memory type.
Notes:

Either normal buffer, image 2D or image 3D.
Lasterror is set.

10.7.18   Properties

10.7.19   Handle as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internel object reference.
Notes:

Not zero if this object is valid.
(Read and Write property)

10.7.20   LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Notes:

See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

10.7.21   Target as Memoryblock

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The reference to the memoryblock if you used kMemoryUseHostPtr to create this memory object.
Notes: (Read and Write property)

10.7.22 Constants

10.7.23 kMapRead = 1

Plugin Version: 11.1. **Function:** One of the mapping mode constants.

10.7.24 kMapWrite = 2

Plugin Version: 11.1. **Function:** One of the mapping mode constants.

10.7.25 kMemoryAllocHostPtr = 16

Plugin Version: 11.1. **Function:** One of the flag constants for creating a memory block.

10.7.26 kMemoryCopyHostPtr = 32

Plugin Version: 11.1. **Function:** One of the flag constants for creating a memory block.

10.7.27 kMemoryReadOnly = 4

Plugin Version: 11.1. **Function:** One of the flag constants for creating a memory block.

10.7.28 kMemoryReadWrite = 1

Plugin Version: 11.1. **Function:** One of the flag constants for creating a memory block.

10.7.29 kMemoryTypeBuffer = & h10F0

Plugin Version: 11.1. **Function:** One of the memory object types.
Notes: A normal memory buffer.

10.7.30   kMemoryTypeImage2D = & h10F1

Plugin Version: 11.1. **Function:** One of the memory object types.
Notes: 2D Image

10.7.31   kMemoryTypeImage3D = & h10F2

Plugin Version: 11.1. **Function:** One of the memory object types.
Notes: 3D Image

10.7.32   kMemoryUseHostPtr = 8

Plugin Version: 11.1. **Function:** One of the flag constants for creating a memory block.

10.7.33   kMemoryWriteOnly = 2

Plugin Version: 11.1. **Function:** One of the flag constants for creating a memory block.
Notes:

This flags specifies that the memory object will be written but not read by a kernel.

Reading from a buffer or image object created with kMemoryWriteOnly inside a kernel is undefined.

10.8 class CLPlatformMBS

10.8.1 class CLPlatformMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The OpenCL class for a platform.

10.8.2 Methods

10.8.3 DeviceCount(types as Int64) as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries number of devices with given types.
Example:

dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+str(p.DeviceCount(CLDeviceMBS.kDeviceTypeAll))+" devices"
next

Notes:

types: A bitfield that identifies the type of OpenCL device. The device_type can be used to query specific OpenCL devices or all OpenCL devices available. The valid values for device_type are specified in the following table.

cl_device_type	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.

10.8.4   Devices(types as Int64) as CLDeviceMBS()

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries devices with given types.
Example:

// check all platforms
dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
dim lines(-1) as string

lines.Append p.Name
lines.Append ""

// and show device names
for each d as CLDeviceMBS in p.Devices(CLDeviceMBS.kDeviceTypeAll)
lines.Append d.name
next

MsgBox Join(lines,EndOfLine)
next

Notes:

types: A bitfield that identifies the type of OpenCL device. The device_type can be used to query specific OpenCL devices or all OpenCL devices available. The valid values for device_type are specified in the following table.

cl_device_type	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.

10.8.5 Extensions as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns a space-separated list of extension names (the extension names themselves do not contain any spaces) supported by the platform.
Example:

dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+p.Extensions
next

Notes:

Extensions defined here must be supported by all devices associated with this platform.
Lasterror is set.

10.8.6 Name as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Platform name string.
Example:

dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name
next

Notes: Lasterror is set.

10.8.7 Profile as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** OpenCL profile string.
Example:

dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+p.Profile

next

Notes:

Returns the profile name supported by the implementation. The profile name returned can be one of the following strings:

FULL_PROFILE - if the implementation supports the OpenCL specification (functionality defined as part of the core specification and does not require any extensions to be supported).

EMBEDDED_PROFILE - if the implementation supports the OpenCL embedded profile. The embedded profile is defined to be a subset for each version of OpenCL.

Lasterror is set.

10.8.8   Vendor as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Platform vendor string.
Example:

dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+p.Vendor
next

Notes: Lasterror is set.

10.8.9   Version as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** OpenCL version string.
Example:

dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name+": "+p.Version
next

Notes:

Returns the OpenCL version supported by the implementation. This version string has the following format:

OpenCL<space><major_version.minor_version><space><platform-specific information>

The major_version.minor_version value returned will be 1.0.
Lasterror is set.

10.8.10   Properties

10.8.11   Handle as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internel object reference.
Notes:

Not zero if this object is valid.
(Read and Write property)

10.8.12   LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Notes:

See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

10.9   class CLProgramMBS

10.9.1   class CLProgramMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The OpenCL class for a program.

10.9.2   Methods

10.9.3   Binaries as String()

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the program binaries for all devices associated with program.
Notes:

For each device in program, the binary returned can be the binary specified for the device when program is created with Constructor or it can be the executable binary generated by BuildProgram. If program is created with Constructor (with Source code), the binary returned is the binary generated by BuildProgram. The bits returned can be an implementation-specific intermediate representation (a.k.a. IR) or device specific executable bits or both. The decision on which information is returned in the binary is up to the OpenCL implementation.

Each entry in this array is used by the implementation as the location in memory where to copy the program binary for a specific device, if there is a binary available.

Lasterror is set.

10.9.4   BinarySizes as UInt64()

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns an array that contains the size in bytes of the program binary for each device associated with program.
Notes:

The size of the array is the number of devices associated with program. If a binary is not available for a device(s), a size of zero is returned.

Lasterror is set.

10.9.5   BuildLog(device as CLDeviceMBS) as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the build log when BuildProgram was called for device.
Notes:

If build status of program for device is kBuildNone, an empty string is returned.
Lasterror is set.

10.9.6   BuildOptions(device as CLDeviceMBS) as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the build options specified by the options argument in BuildProgram for device.
Notes:

If build status of program for device is kBuildNone, an empty string is returned.
Lasterror is set.

10.9.7   BuildProgram(device as CLDeviceMBS, options as string = "")

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Builds (compiles and links) a program executable from the program source or binary.
Notes: See other BuildProgram method for details
See also:

10.9.8   BuildProgram(devices() as CLDeviceMBS, options as string = "")

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Builds (compiles and links) a program executable from the program source or binary.
Notes:

devices	Optional, a list of devices you want to build for. If you specify no device, you build for all devices.
device	Optional, the device you want to build for. If you specify no device, you build for all devices.
options	A string that describes the build options to be used for building the program executable. The list of supported options is described in "Build Options" below.

OpenCL allows program executables to be built using the source or the binary.

The build options are categorized as pre-processor options, options for math intrinsics, options that control optimization and miscellaneous options. This specification defines a standard set of options that must be supported by an OpenCL compiler when building program executables online or offline. These may be extended by a set of vendor- or platform-specific options.

Preprocessor Options

These options control the OpenCL preprocessor which is run on each program source before actual compilation. -D options are processed in the order they are given in the options argument to clBuildProgram.
-D name
Predefine name as a macro, with definition 1.

-D name=definition
The contents of definition are tokenized and processed as if they appeared during translation phase three in a '# define' directive. In particular, the definition will be truncated by embedded newline characters.

-I dir
Add the directory dir to the list of directories to be searched for header files.

Math Intrinsics Options

These options control compiler behavior regarding floating-point arithmetic. These options trade off between speed and correctness.

-cl-single-precision-constant
Treat double precision floating-point constant as single precision constant.

-cl-denorms-are-zero
This option controls how single precision and double precision denormalized numbers are handled. If specified as a build option, the single precision denormalized numbers may be flushed to zero and if the optional extension for double precision is supported, double precision denormalized numbers may also be flushed to zero. This is intended to be a performance hint and the OpenCL compiler can choose not to flush denorms to zero if the device supports single precision (or double precision) denormalized numbers.

This option is ignored for single precision numbers if the device does not support single precision denormalized numbers i.e. kFPDenorm bit is not set in SingleFPConfig.

This option is ignored for double precision numbers if the device does not support double precision or if it does support double precison but CL_FP_DENORM bit is not set in CL_DEVICE_DOUBLE_FP_CONFIG.

This flag only applies for scalar and vector single precision floating-point variables and computations on these floating-point variables inside a program. It does not apply to reading from or writing to image objects.

Optimization Options

These options control various sorts of optimizations. Turning on optimization flags makes the compiler attempt to improve the performance and/or code size at the expense of compilation time and possibly the ability to debug the program.
-cl-opt-disable
This option disables all optimizations. The default is optimizations are enabled.

-cl-strict-aliasing
This option allows the compiler to assume the strictest aliasing rules.

The following options control compiler behavior regarding floating-point arithmetic. These options trade off between performance and correctness and must be specifically enabled. These options are not turned on by default since it can result in incorrect output for programs which depend on an exact implementation of IEEE 754 rules/specifications for math functions.

-cl-mad-enable
Allow a * b + c to be replaced by a mad. The mad computes a * b + c with reduced accuracy. For example, some OpenCL devices implement mad as truncate the result of a * b before adding it to c.

-cl-no-signed-zeros
Allow optimizations for floating-point arithmetic that ignore the signedness of zero. IEEE 754 arithmetic specifies the behavior of distinct +0.0 and -0.0 values, which then prohibits simplification of expressions such as x+0.0 or 0.0*x (even with -clfinite-math only). This option implies that the sign of a zero result isn't significant.

-cl-unsafe-math-optimizations
Allow optimizations for floating-point arithmetic that (a) assume that arguments and results are valid, (b) may violate IEEE 754 standard and (c) may violate the OpenCL numerical compliance requirements as defined in section 7.4 for single-precision floating-point, section 9.3.9 for double-precision floating-point, and edge case behavior in section 7.5. This option includes the -cl-no-signed-zeros and -cl-mad-enable options.

-cl-finite-math-only
Allow optimizations for floating-point arithmetic that assume that arguments and results are not NaNs or . This option may violate the OpenCL numerical compliance requirements defined in in section 7.4 for single-precision floating-point, section 9.3.9 for double-precision floating-point, and edge case behavior in section 7.5.

-cl-fast-relaxed-math

Sets the optimization options -cl-finite-math-only and -cl-unsafe-math-optimizations. This allows optimizations for floating-point arithmetic that may violate the IEEE 754 standard and the OpenCL numerical compliance requirements defined in the specification in section 7.4 for single-precision floating-point, section 9.3.9 for double-precision floating-point, and edge case behavior in section 7.5. This option causes the preprocessor macro __FAST_RELAXED_MATH__ to be defined in the OpenCL program.

Options to Request or Suppress Warnings

Warnings are diagnostic messages that report constructions which are not inherently erroneous but which are risky or suggest there may have been an error. The following languageindependent options do not enable specific warnings but control the kinds of diagnostics produced by the OpenCL compiler.
-w
Inhibit all warning messages.

-Werror
Make all warnings into errors.

Lasterror is set.
See also:

10.9.9   BuildProgram(options as string = "")

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Builds (compiles and links) a program executable from the program source or binary.
Notes:

See other BuildProgram method for details
Lasterror is set.
See also:

10.9.10   BuildStatus(device as CLDeviceMBS) as Int64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the build status of program for a specific device as given by device.
Notes:

See kBuild* constants.
Lasterror is set.

10.9.11 Constructor(context as CLContextMBS, devices() as CLDeviceMBS, binaries() as string, status() as Integer)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a program object for a context, and loads specified binary data into the program object.
Notes:

context: Must be a valid OpenCL context.
devices: a list of devices that are in context. The binaries are loaded for devices specified in this list.

The devices associated with the program object will be the list of devices specified by devices. The list of devices specified by devices must be devices associated with context.

binaries: An array of strings containing the program binaries to be loaded for devices specified by devices. For each device given by devices(i), the string with the program binary for that device is given by binaries(i).

The program binaries specified by binaries contain the bits that describe the program executable that will be run on the device(s) associated with context. The program binary can consist of either or both of device-specific executable(s), and/or implementation-specific intermediate representation (IR) which will be converted to the device-specific executable.

sttaus: Returns whether the program binary for each device specified in devices was loaded successfully or not. It is an array of ubound -1 and is filled by the plugin.

Lasterror is set.

OpenCL allows applications to create a program object using the program source or binary and build appropriate program executables. This allows applications to determine whether they want to use the pre-built offline binary or load and compile the program source and use the executable compiled/linked online as the program executable. This can be very useful as it allows applications to load and build program executables online on its first instance for appropriate OpenCL devices in the system. These executables can now be queried and cached by the application. Future instances of the application launching will no longer need to compile and build the program executables. The cached executables can be read and loaded by the application, which can help significantly reduce the application initialization time.
See also:

10.9.12   Constructor(context as CLContextMBS, line as string)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a program object for a context, and loads the source code specified by the line string into the program object.
Notes:

context: Must be a valid OpenCL context.
line: A string with all the lines of the program.

The devices associated with the program object are the devices associated with context.

OpenCL allows applications to create a program object using the program source or binary and build appropriate program executables. This allows applications to determine whether they want to use the pre-built offline binary or load and compile the program source and use the executable compiled/linked online as the program executable. This can be very useful as it allows applications to load and build program executables online on its first instance for appropriate OpenCL devices in the system. These executables can now be queried and cached by the application. Future instances of the application launching will no longer need to compile and build the program executables. The cached executables can be read and loaded by the application, which can help significantly reduce the application initialization time.

An OpenCL program consists of a set of kernels that are identified as functions declared with the __kernel qualifier in the program source. OpenCL programs may also contain auxiliary functions and constant data that can be used by __kernel functions. The program executable can be generated online or offline by the OpenCL compiler for the appropriate target device(s).

Lasterror is set.
See also:

- 10.9.11 Constructor(context as CLContextMBS, devices() as CLDeviceMBS, binaries() as string, status() as Integer)   373

- 10.9.13 Constructor(context as CLContextMBS, lines() as string)   374

10.9.13   Constructor(context as CLContextMBS, lines() as string)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a program object for a context, and loads the source code specified by the text strings in the lines array into the program object.
Notes:

context: Must be a valid OpenCL context.
lines: An array of strings that make up the source code.

The devices associated with the program object are the devices associated with context.

OpenCL allows applications to create a program object using the program source or binary and build appropriate program executables. This allows applications to determine whether they want to use the pre-built offline binary or load and compile the program source and use the executable compiled/linked online as the program executable. This can be very useful as it allows applications to load and build program executables online on its first instance for appropriate OpenCL devices in the system. These executables can now be queried and cached by the application. Future instances of the application launching will no longer need to compile and build the program executables. The cached executables can be read and loaded by the application, which can help significantly reduce the application initialization time.

An OpenCL program consists of a set of kernels that are identified as functions declared with the __kernel qualifier in the program source. OpenCL programs may also contain auxiliary functions and constant data that can be used by __kernel functions. The program executable can be generated online or offline by the OpenCL compiler for the appropriate target device(s).

Lasterror is set.
See also:

10.9.14   Context as CLContextMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The context for this program.
Notes: Lasterror is set.

10.9.15   CreateKernelsInProgram(maxKernels as Integer = 100) as CLKernelMBS()

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates kernel objects for all kernel functions in program.
Notes:

maxKernels: maximum number of kernels to return.

Kernel objects are not created for any __kernel functions in program that do not have the same function definition across all devices for which a program executable has been successfully built.

Kernel objects can only be created once you have a program object with a valid program source or binary loaded into the program object and the program executable has been successfully built for one or more devices associated with program. No changes to the program executable are allowed while there are kernel objects associated with a program object. This means that calls to BuildProgram return kInvalidOperation

(in lasterror) if there are kernel objects attached to a program object. The OpenCL context associated with program will be the context associated with kernel. The list of devices associated with program are the devices associated with kernel. Devices associated with a program object for which a valid program executable has been built can be used to execute kernels declared in the program object.

Lasterror is set.

10.9.16   Devices as CLDeviceMBS()

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the list of devices associated with the program object.
Notes: This can be the devices associated with context on which the program object has been created or can be a subset of devices that are specified when a progam object is created.

10.9.17   NumDevices as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the number of devices associated with program.
Notes: Lasterror is set.

10.9.18   ReferenceCount as UInt32

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the program reference count.
Notes: Lasterror is set.

10.9.19   Source as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the program source code specified in the Constructor.
Notes: The source string returned is a concatenation of all source strings specified to Constructor.

10.9.20 Properties

10.9.21 Handle as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internel object reference.
Notes:

Not zero if this object is valid.
(Read and Write property)

10.9.22 LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Notes:

See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

10.9.23 Constants

10.9.24 kBuildError = -2

Plugin Version: 11.1. **Function:** One of the build status constants
Notes: The build status returned if the last call to BuildProgram on the specified program object for device generated an error.

10.9.25 kBuildInProgress = -3

Plugin Version: 11.1. **Function:** One of the build status constants
Notes: The build status returned if the last call to BuildProgram on the specified program object for device has not finished.

10.9.26 kBuildNone = -1

Plugin Version: 11.1. **Function:** One of the build status constants
Notes: The build status returned if no build has been performed on the specified program object for device.

10.9.27   kBuildSuccess = 0

Plugin Version: 11.1. **Function:** One of the build status constants
Notes: The build status returned if the last call to BuildProgram on the specified program object for device was successful.

10.10 class CLSamplerMBS

10.10.1 class CLSamplerMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The class for a Sampler.

10.10.2 Methods

10.10.3 AddressingMode as UInt32

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the value specified by addressingmode argument to Constructor.

10.10.4 Constructor(Context as CLContextMBS, NormalizedCoords as Boolean, AddressingMode as UInt32, FilterMode as UInt32)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a sampler object.
Notes:

context: Must be a valid OpenCL context.

NormalizedCoords: Determines if the image coordinates specified are normalized (if normalized_coords is true) or not (if normalized_coords is false).

AddressingMode: Specifies how out-of-range image coordinates are handled when reading from an image. This can be set to kAddressRepeat, kAddressClampToEdge, kAddressClamp, and kAddressNone.

FilterMode: Specifies the type of filter that must be applied when reading an image. This can be kFilterNearest or kFilterLinear.

Lasterror is set.

A sampler object describes how to sample an image when the image is read in the kernel. The built-in functions to read from an image in a kernel take a sampler as an argument. The sampler arguments to the image read function can be sampler objects created using OpenCL functions and passed as argument values to the kernel or can be samplers declared inside a kernel. In this section we discuss how sampler objects are created using OpenCL functions.

10.10.5   Context as CLContextMBS

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the context specified when the sampler is created.

10.10.6   FilterMode as UInt32

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the value specified by filterMode argument to Constructor.

10.10.7   NormalizedCoords as Boolean

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the value specified by normalizedCoords argument to Constructor.

10.10.8   ReferenceCount as UInt32

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Return the sampler reference count.
Notes: The reference count returned should be considered immediately stale. It is unsuitable for general use in applications. This feature is provided for identifying memory leaks.

10.10.9   Properties

10.10.10   Handle as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The internel object reference.
Notes:

Not zero if this object is valid.
(Read and Write property)

10.10.11   LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Notes:

See error constants in OpenCLMBS module.
The plugin uses lasterror = -1 for the case a function is not available.
(Read and Write property)

10.10.12 Constants

10.10.13 kAddressClamp = & h1132

Plugin Version: 11.1. **Function:** One of the address modes.

10.10.14 kAddressClampToEdge = & h1131

Plugin Version: 11.1. **Function:** One of the address modes.

10.10.15 kAddressNone = & h1130

Plugin Version: 11.1. **Function:** One of the address modes.

10.10.16 kAddressRepeat = & h1133

Plugin Version: 11.1. **Function:** One of the address modes.

10.10.17 kFilterLinear = & h1141

Plugin Version: 11.1. **Function:** One of the filter mode constants.

10.10.18 kFilterNearest = & h1140

Plugin Version: 11.1. **Function:** One of the filter mode constants.

10.11   module OpenCLMBS

10.11.1   module OpenCLMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The module for OpenCL.
Notes:

from wikipedia:

OpenCL (Open Computing Language) is a framework for writing programs that execute across heterogeneous platforms consisting of CPUs, GPUs, and other processors. OpenCL includes a language (based on C99) for writing kernels (functions that execute on OpenCL devices), plus APIs that are used to define and then control the platforms. OpenCL provides parallel computing using task-based and data-based parallelism.

10.11.2   Methods

10.11.3   AllDeviceCount(types as Int64) as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries number of devices with given types.
Example:

dim c as Integer = OpenCLMBS.AllDeviceCount(CLDeviceMBS.kDeviceTypeCPU)
dim g as Integer = OpenCLMBS.AllDeviceCount(CLDeviceMBS.kDeviceTypeGPU)
MsgBox str(c)+" CPU and "+str(g)+" GPU"

Notes:

types: A bitfield that identifies the type of OpenCL device. The device_type can be used to query specific OpenCL devices or all OpenCL devices available. The valid values for device_type are specified in the following table.

Lasterror is set.

10.11.4   AllDevices(types as Int64) as CLDeviceMBS()

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries devices with given types.
Example:

cl_device_type	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

dim Devices(-1) as CLDeviceMBS = OpenCLMBS.AllDevices(CLDeviceMBS.kDeviceTypeAll)

for each p as CLDeviceMBS in Devices
MsgBox p.Name
next

Notes:

types: A bitfield that identifies the type of OpenCL device. The device_type can be used to query specific OpenCL devices or all OpenCL devices available. The valid values for device_type are specified in the following table.

cl_device_type	Description
kDeviceTypeCPU	An OpenCL device that is the host processor. The host processor runs the OpenCL implementations and is a single or multi-core CPU.
kDeviceTypeGPU	An OpenCL device that is a GPU. By this we mean that the device can also be used to accelerate a 3D API such as OpenGL or DirectX.
kDeviceTypeAccelerator	Dedicated OpenCL accelerators (for example the IBM CELL Blade). These devices communicate with the host processor using a peripheral interconnect such as PCIe.
kDeviceTypeDefault	The default OpenCL device in the system.
kDeviceTypeAll	All OpenCL devices available in the system.

Lasterror is set.

10.11.5 GetExtensionFunctionAddress(name as string) as ptr

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Returns the address of the extension function named by funcname.
Notes:

The function GetExtensionFunctionAddress returns the address of the extension function named by funcname. The pointer returned should be cast to a function pointer type matching the extension function's definition defined in the appropriate extension specification and header file. A return value of nil indicates that the specified function does not exist for the implementation. A non-nil return value for GetExtensionFunctionAddress does not guarantee that an extension function is actually supported. The application must also make a corresponding query using CLPlatformMBS.Extensions or CLDeviceMBS.Extensions to determine if an extension is supported by the OpenCL implementation.

GetExtensionFunctionAddress may not be queried for core (non-extension) functions in OpenCL. For functions that are queryable with clGetExtensionFunctionAddress, implementations may choose to also export those functions statically from the object libraries implementing those functions. However, portable applications cannot rely on this behavior.

Since there is no way to qualify the query with a device, the function pointer returned must work for all implementations of that extension on different devices. The behavior of calling a device extension function on a device not supporting that extension is undefined.

10.11.6 GetPictureImageFormat(pic as picture, byref RowPitch as Integer) as CLImageFormatMBS

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries the image format this picture would need when creating a storage object with CLMemMBS.
Example:

dim p as new Picture(100,100,32)
dim rowbytes as Integer
dim format as CLImageFormatMBS = OpenCLMBS.GetPictureImageFormat(p, rowbytes)

MsgBox hex(format.ImageChannelOrder)+" "+hex(format.ImageChannelDataType)+" "+str(rowbytes)
// shows 10B7 and 10D2 and 416 on Mac OS X Carbon

Notes: As Real Studio uses 4 bytes per pixel on Mac and Windows, the plugin returns ARGB (or other byte order). The alpha channel is not used as Real Studio stores

10.11.7 isAvailable as boolean

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Whether OpenCL is available.
Example:

if not OpenCLMBS.isAvailable then
if TargetMachO and TargetX86 then

MsgBox "OpenCL not available. Please install Mac OS X 10.6 to use it."
else
MsgBox "OpenCL not available. You need a Mac with Intel processor running Mac OS X 10.6."
end if
end if

Notes: Should return true on Mac OS X 10.6 and false everywhere else.

10.11.8   PlatformCount as Int64

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Queries number of platforms available.
Example:

MsgBox str(OpenCLMBS.PlatformCount)

Notes:

Typically you have two with modern Macs as you get both CPU and GPU listed.
Lasterror is set.

10.11.9   Platforms as CLPlatformMBS()

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Obtain the list of platforms available.
Example:

dim Platforms(-1) as CLPlatformMBS = OpenCLMBS.Platforms

for each p as CLPlatformMBS in Platforms
MsgBox p.Name
next

Notes: Lasterror is set.

10.11.10   UnloadCompiler

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Allows the implementation to release the resources allocated by the OpenCL compiler.
Example:

OpenCLMBS.UnloadCompiler
MsgBox OpenCLMBS.LastErrorMessage

Notes:

This is a hint from the application and does not guarantee that the compiler will not be used in the future or that the compiler will actually be unloaded by the implementation. Calls to BuildProgram after Unload-Compiler will reload the compiler, if necessary, to build the appropriate program executable.
Lasterror is set.

10.11.11   WaitForEvents(events() as CLEventMBS)

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Waits on the host thread for commands identified by event objects to complete.
Notes:

events: The events specified in event_list act as synchronization points.

Waits on the host thread for commands identified by event objects in event_list to complete. A command is considered complete if its execution status is kCommandExecutionStatusComplete or a negative value.

Lasterror is set.

10.11.12   Properties

10.11.13   LastError as Integer

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The last error code.
Example:

MsgBox str(OpenCLMBS.LastError)

Notes:

All the functions in all the OpenCL classes set this property, too.

(Read only property)

10.11.14 LastErrorMessage as string

Plugin Version: 11.1, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** The text message for the last error code.
Example:

MsgBox OpenCLMBS.LastErrorMessage

Notes: (Read only property)

10.11.15 Constants

10.11.16 kBuildProgramFailure = -11

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.17 kCompilerNotAvailable = -3

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.18 kDeviceNotAvailable = -2

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.19 kDeviceNotFound = -1

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.20 kImageFormatMismatch = -9

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.21   kImageFormatNotSupported = -10

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.22   kInvalidArgIndex = -49

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.23   kInvalidArgSize = -51

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.24   kInvalidArgValue = -50

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.25   kInvalidBinary = -42

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.26   kInvalidBufferSize = -61

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.27   kInvalidBuildOptions = -43

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.28   kInvalidCommandQueue = -36

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.29   kInvalidContext = -34

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.30   kInvalidDevice = -33

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.31   kInvalidDeviceType = -31

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.32   kInvalidEvent = -58

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.33   kInvalidEventWaitList = -57

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.34   kInvalidGlobalOffset = -56

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.35   kInvalidGlObject = -60

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.36   kInvalidHostPtr = -37

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.37   kInvalidImageFormatDescriptor = -39

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.38   kInvalidImageSize = -40

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.39   kInvalidKernel = -48

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.40   kInvalidKernelArgs = -52

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.41   kInvalidKernelDefinition = -47

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.42   kInvalidKernelName = -46

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.43   kInvalidMemObject = -38

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.44   kInvalidMipLevel = -62

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.45 kInvalidOperation = -59

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.46 kInvalidPlatform = -32

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.47 kInvalidProgram = -44

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.48 kInvalidProgramExecutable = -45

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.49 kInvalidQueueProperties = -35

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.50 kInvalidSampler = -41

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.51 kInvalidValue = -30

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.52 kInvalidWorkDimension = -53

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.53   kInvalidWorkGroupSize = -54

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.54   kInvalidWorkItemSize = -55

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.55   kMapFailure = -12

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.56   kMemCopyOverlap = -8

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.57   kMemObjectAllocationFailure = -4

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.58   kOutOfHostMemory = -6

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.59   kOutOfResources = -5

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.60   kProfilingInfoNotAvailable = -7

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

10.11.61   kSuccess = 0

Plugin Version: 9.6. **Function:** One of the constants for OpenCL errors.

Chapter 11

QuickLook

11.1 class QLPreviewPanelMBS

11.1.1 class QLPreviewPanelMBS

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The QLPreviewPanel class implements the Preview Panel - a user interface object that displays the preview of a list of items.
Notes:

Every application only has on instance of QLPreviewPanel.
Subclass of the NSPanelMBS class.

11.1.2 Methods

11.1.3 Available as boolean

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether this panel is available.
Notes: Returns true on Snow Leopard.

11.1.4 Constructor

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The constructor for a new panel.

11.1.5   currentPreviewItem as folderitem

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The currently pre-
viewed item in the preview panel or nil if there is none.

11.1.6   enterFullScreenMode(screen as NSScreenMBS)

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Enters full screen
mode.
Notes: If panel is not on-screen, the panel will go directly to full screen mode.

11.1.7   exitFullScreenMode

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Exits full screen mode.

11.1.8   refreshCurrentPreviewItem

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Asks the Preview
Panel to recompute the preview of the currently previewed item.

11.1.9   reloadData

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Asks the Preview
Panel to reload its data from its data source.
Notes: This method does not refresh the visible item if it has not changed.

11.1.10   updateController

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Asks the Preview
Panel to update its current controller.
Notes: The Preview Panel automatically updates its controller (by searching the responder chain) whenever
the main or key window changes. Invoke updateController if the responder chain changes without explicit
notice.

11.1.11 Properties

11.1.12 currentPreviewItemIndex as Integer

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The index of the currently previewed item in the preview panel or NSNotFound (-1) if there is none.
Notes: (Read and Write property)

11.1.13 inFullScreenMode as boolean

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** True if the panel is currently open and in full screen mode.
Notes: (Read only property)

11.1.14 PreviewView as QLPreviewViewMBS

Plugin Version: 14.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Returns the preview view in the panel.
Notes: (Read only property)

11.1.15 Events

11.1.16 didLoadPreviewItem(file as folderitem)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is called after an item has been loaded.

11.1.17 handleEvent(e as NSEventMBS) as boolean

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked by the preview panel when it receives an event it doesn't handle.
Notes: Returns true if you did not handle this event.

11.1.18 numberOfPreviewItems as Integer

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called to ask you for the number of items that the preview panel should preview.

11.1.19   previewItemAtIndex(index as Integer) as folderitem

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event is called to ask you for the item with the given index.

11.1.20   sourceFrameOnScreenForPreviewItem(file as folderitem) as NSRectMBS

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Invoked when the preview panel opens or closes to provide a zoom effect.
Notes: Return a zero rect if there is no origin point, this will produce a fade of the panel. The coordinates are screen based.

11.1.21   transitionImageForPreviewItem(file as folderitem, byref contentRect as NSRectMBS) as NSImageMBS

Plugin Version: 9.6, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called to ask you for the transition image for a given preview item.
Notes:

Invoked when the preview panel opens or closes to provide a smooth transition when zooming.

contentRect: The rect within the image that actually represents the content of the document. For example, for icons the actual rect is generally smaller than the icon itself.

Return an image the panel will crossfade with when opening or closing. You can specify the actual "document" content rect in the image in contentRect.

11.1.22   willLoadPreviewItem(file as folderitem)

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event is called before an item is loaded.

11.2 control QLPreviewViewControlMBS

11.2.1 control QLPreviewViewControlMBS

Plugin Version: 15.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The Xojo control for a QLPreviewViewMBS.

11.2.2 Properties

11.2.3 View as QLPreviewViewMBS

Plugin Version: 15.0, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The view this control shows.
Notes: (Read only property)

11.2.4 Events

11.2.5 BoundsChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the bounds, but not the frame, changed.

11.2.6 EnableMenuItems

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event where you can enable menu items.

11.2.7 FrameChanged

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The event called when the frame changed.

11.2.8 GotFocus

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control itself got focus.

Notes: This only fires if the control itself got focus and not a sub control.

11.2.9   LostFocus

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The control lost focus.
Notes: This only fires if the control itself lost focus and not a sub control.

11.2.10   MenuAction(HitItem as MenuItem) As Boolean

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Called when a menuitem is choosen.
Notes: This allows the control to react on its relevant menu items. Please return true if you handled it or false to give others a chance.

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

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was pressed inside the controls region at the location passed in to x, y.
Notes:

The coordinates x and y are local to the control, i.e. they represent the position of the mouse click relative to the upper-left corner or the Control.
Return True if you are going to handle the MouseDown. In such a case:

- The Action event, if any, will not execute and the state of the object will not change.

- You will receive the MouseDrag and MouseUp events.

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

11.2.12   MouseDrag(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** This event fires continuously after the mouse button was pressed inside the Control.
Notes:

Mouse location is local to the control passed in to x, y.
As this event is fired continuously (hundreds of time per second), it is your responsibility to determine if the

mouse has really moved.

11.2.13 MouseUp(x as Integer, y as Integer)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The mouse button was released.
Notes: Use the x and y parameters to determine if the mouse button was released within the control's boundaries.

11.2.14 ScaleFactorChanged(NewFactor as Double)

Plugin Version: 17.1, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The backing store scale factor has changed.
Notes: Please invalidate any cached bitmaps or other relevant state.

11.3   class QLPreviewViewMBS

11.3.1   class QLPreviewViewMBS

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The class for using a preview view from QuickLook in Real Studio.
Notes:

If you want to show previews of files in your application, use this view. For example if you not just want to show previews of pictures, but also from Movies, PDF, Office and iWork files.
Requires Mac OS X 10.6 or newer.

You can embed this view in a CustomNSViewMBS to get more events for mouse and keyboard.
Subclass of the NSViewMBS class.

11.3.2   Methods

11.3.3   Available as boolean

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether this class is available.
Notes: Returns true on Mac OS X 10.6 or newer.

11.3.4   close

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Closes the receiver, releasing the current preview item.
Notes:

Once the receiver has closed, it will no longer accept preview items.

The application is required to call close when the receiver is no longer needed if shouldCloseWithWindow is false.
The close method will be called automatically when the window closes if shouldCloseWithWindow is true.

11.3.5   Constructor

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new quicklook preview view with size 100/100 and position 0/0
Example:

dim t as new QLPreviewViewMBS

Notes: On success the handle property is not zero.
See also:

11.3.6   Constructor(Handle as Integer)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates an object based on the given QLPreviewView handle.
Example:

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

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

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

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

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new QuickLook preview view with the given size and position.
Example:

dim x as new QLPreviewViewMBS(0, 0, 100, 100)

Notes: On success the handle property is not zero.
See also:

11.3.8   Constructor(left as Double, top as Double, width as Double, height as Double, style as Integer)

Plugin Version: 11.2, Console & Web: Yes, Mac: Yes, Win: No, Linux: No. **Function:** Creates a new QuickLook preview view with the given size and position.
Example:

dim view as new QLPreviewViewMBS(0, 0, 200, 200, QLPreviewViewMBS.StyleCompact)

Notes:

On success the handle property is not zero.

On Mac OS X 10.7 or later we use the new style parameter to create a Preview view with the given style.
See also:

11.3.9   refreshPreviewItem

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Asks the Preview view to recompute the preview of the currently previewed item.

11.3.10   Properties

11.3.11   autostarts as boolean

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Whether playback of audio/video files automatically starts.
Notes: (Read and Write computed property)

11.3.12   previewItem as folderitem

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** The current visible item in the view.
Notes: (Read and Write computed property)

11.3.13   shouldCloseWithWindow as boolean

Plugin Version: 11.2, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Function:** Set whether the receiver closes when its window closes.
Notes:

See close method.
(Read and Write computed property)

11.3.14   Constants

11.3.15   StyleCompact = 1

Plugin Version: 11.2. **Function:** One of the style constants.
Notes: Use in inspectors.

11.3.16   StyleNormal = 0

Plugin Version: 11.2. **Function:** One of the style constants.
Notes: Use in full previews.

Chapter 12

List of Questions in the FAQ

Chapter 13

The FAQ

13.0.1 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)

13.0.2   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.NSCalibrate-dRGBColorSpace)
If rgbColor <>Nil Then
Dim red as Integer = rgbColor.redComponent * 255.0
Dim green as Integer = rgbColor.greenComponent * 255.0
Dim blue as Integer = rgbColor.blueComponent * 255.0
Return RGB(red, green, blue)
Else
Return HighlightColor
End If
# else

```
return HighlightColor
# endif
End Function
```

Notes: As you see we convert color to Calibrated RGB for best results.
See also:

13.0.3   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:

13.0.4   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:

13.0.5   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:

13.0.6   How to detect if CPU if 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:

13.0.7   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:

13.0.8 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
```

13.0.9 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.

13.0.10   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

13.0.11   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.

13.0.12   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 librery as string = Join(libjs, "")
dim vm as new JavaVMMBS(librery)

if vm.Handle = 0 then
MsgBox "Failed to initialize virtual machine"
else
// now make a new database connection with ucanaccess
dim d as new JavaDatabaseMBS(vm,"net.ucanaccess.jdbc.UcanaccessDriver")
Dim DbFile as FolderItem = appFolder.Parent.Child("Database11.accdb")
dim j as JavaConnectionMBS = d.getConnection("jdbc:ucanaccess://"+DbFile.NativePath)

// select and show values
dim r as JavaResultSetMBS = j.MySelectSQL("Select * From test")
while r.NextRecord
MsgBox r.getString("FirstName") +" "+ r.getString("LastName")
wend

end if

Exception e as JavaExceptionMBS
```

MsgBox e.message+" errorcode: "+str(e.ErrorNumber)

Notes:

see website:
http://ucanaccess.sourceforge.net/site.html

13.0.13   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

13.0.14   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.

13.0.15　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

13.0.16　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.

13.0.17　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.

13.0.18　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(& hFFFFFF)

// Set the center of the pie at (180, 140) and the radius to 100 pixels
c.setPieSize 350,300,150
// Set the sector colors
c.setColors(c.kDataColor, colors)

// Draw the pie in 3D with a pie thickness of 20 pixels
c.set3D(20)

dim t as CDTextBoxMBS = c.setLabelStyle("arialbd.ttf", 10, & h000000)
t.setBackground(CDPieChartMBS.kSameAsMainColor, CDPieChartMBS.kTransparent, CDPieChartMBS.soft-
Lighting(CDPieChartMBS.kRight, 0))
t.setRoundedCorners(8)

// Use local gradient shading for the sectors, with 5 pixels wide
// semi-transparent white (bbffffff) borders
c.setSectorStyle(CDPieChartMBS.kLocalGradientShading, & hbbffffff, 0)

// Set the pie data and the pie labels
c.setData data,labels
call c.setLabelStyle "arialbd.ttf",18

dim pic as picture = c.makeChartPicture
dim wp as new WebPicture(pic, Picture.FormatJPEG) // JPEG makes it smaller and faster

ImageView1.Picture=wp
```

Notes:

Be aware that our plugin produces pictures for you, which you assign to ImageViews. Tranfserring those pictures takes time, so you can optimize that with using WebPicture class. There you can decide between different compressions to improve speed (use JPEG instead of PNG).

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

13.0.19   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

13.0.20   Can I use your plugin controls on a web application?

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

13.0.21   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.

13.0.22 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 bound-
ary. 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

13.0.23 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 spec-
ified 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 Axis.setTitlePos for axis title positioning only. For a vertical axis, TopLeft2 refers to refers to the left of the top side, while TopLeft refers to the top of the left side. The reverse applies for a horizontal axis.
TopRight2	11	An alternative top-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, TopRight2 refers to refers to the right of the top side, while TopRight refers to the top of the right side. The reverse applies for a horizontal axis.
BottomLeft2	12	An alternative bottom-left position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomLeft2 refers to refers to the left of the bottom side, while BottomLeft refers to the bottom of the left side. The reverse applies for a horizontal axis.
BottomRight2	13	An alternative bottom-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomRight2 refers to refers to the right of the bottom side, while BottomRight refers to the bottom of the right side. The reverse applies for a horizontal axis.

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 all at. This is equivalent to traditional RGB colors. A non-zero alpha transparency means the the color is partially transparent. The larger the alpha transparency, the more transparent the color will be. If a partially transparent color is used to draw something, the underlying background can still be seen.

For example, 80FF0000 is a partially transparent red color, while 00FF0000 is a non-transparent red color.

Note that ChartDirector's ARGB color is web and HTML compatible. For example, red is FF0000, the same as in HTML. There are many resources on the web that provide tables in which you can click a color and it will show its HTML color code. These color codes can be used in ChartDirector.

If alpha transparency is FF (255), the color is totally transparent. That means the color is invisible. It does not matter what the RGB components are. So in ChartDirector, only one totally transparent color is used - FF000000. All other colors of the form FFnnnnnn are reserved to represent palette colors and dynamic colors, and should not be interpreted as the normal ARGB colors.

The totally transparent color FF000000 is often used in ChartDirector to disable drawing something. For example, if you want to disable drawing the border of a rectangle, you can set the border color to totally transparent.

For convenience, ChartDirector defines a constant called Transparent, which is equivalent to FF000000.Pattern Color
A pattern color is a dynamic color that changes according to a 2D periodic pattern. When it is used to fill an area, the area will look like being tiled with a wallpaper pattern.

Pattern colors are created using BaseChart.patternColor, BaseChart.patternColor2, DrawArea.patternColor and DrawArea.patternColor2. The patternColor method creates pattern colors using an array of colors as a bitmap. The patternColor2 method creates pattern colors by loading the patterns from image files.

These methods return a 32-bit integer acting as a handle to the pattern color. The handle can be used in any ChartDirector API that expects a color as its input.Metal Color
A metal color is a color of which the brightness varies smoothly across the chart surface as to make the surface looks shiny and metallic. ChartDirector supports using any color as the base color of the metal color. In particular, using yellow and grey as the base colors will result in metal colors that look gold and silver.

Metal colors are most often used as background colors of charts. They are created using CDBaseChartMBS.metalColor, CDBaseChartMBS.goldColor and CDBaseChartMBS.silverColor. The first method allows you to specify an arbitrary base color. The second and third methods use yellow and grey as the base colors, resulting in gold and silver metal colors.

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any ChartDirector API that expects a color as its input.Gradient Color
A gradient color is a color that changes progressively across a direction.

Gradient colors are created using BaseChart.gradientColor, BaseChart.gradientColor2, DrawArea.gradientColor and DrawArea.gradientColor2. The gradientColor method creates a 2-point gradient color that changes from color A to color B. The gradientColor2 method creates a multi-point gradient colors that changes from color A to B to C ....

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any ChartDirector API that expects a color as its input.

One common use of multi-point gradient colors is to define colors that have metallic look and feel. Please refer to DrawArea.gradientColor2 for details.Dash Line Colors
A dash line color is a color that switches on and off periodically. When used to draw a line, the line will appear as a dash line.

Dash line colors are created using BaseChart.dashLineColor and DrawArea.dashLineColor. They accept a line color and a dash pattern code as arguments, and return a 32-bit integer acting as a handle to the dash line color. The handle can be used in any ChartDirector API that expects a color as its input.Zone Colors
A zone color is for XY charts only. It is a color that automatically changes upon reaching a data threshold value along the x-axis or y-axis. Zone colors are created using Layer.xZoneColor, Layer.yZoneColor, XY-Chart.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.

13.0.24   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 "Gill-Sans.dfont" file contains 6 fonts.

So in addition to the file name, an index is needed to determine the font. The index is specified by appending a " | " character to the font name, followed by the index number. For example, the third font in "GillSans.dfont" is denoted as "GillSans.dfont | 2". (Note: The first font starts at 0.) If no index number is provided, the first font is assumed.

ChartDirector also supports using Mac OS X Font Manager names. For example, one may use "Gill Sans Light Italic" instead of using "GillSans.dfont | 1" as the font name. However, the Mac OS X Font Manager

is active only if someone has logged into the Mac GUI console, so this method is only recommended for developing applications that run on the GUI console.

The sample programs that come with ChartDirector are designed to run on all operating systems, so they use generic font file names (eg. "arial.ttf") instead of Mac OS X specific names. To allow them to run on Mac OS X, ChartDirector on Mac OS X has a built-in table to map common font file names to Mac OS X font names:

"arial.ttf", "arialbd.ttf", "ariali.ttf" and "arialbi.ttf" are mapped to "Arial | 0" (Arial), "Arial | 1" (Arial Bold), "Arial | 2" (Arial Italic) and "Arial | 3" (Arial Bold Italic)

"times.ttf", "timesbd.ttf", "timesi.ttf" and "timesbi.ttf" are mapped to "Times New Roman | 0" (Times New Roman), "Times New Roman | 1" (Times New Roman Bold), "Times New Roman | 2" (Times New Roman Italic) and "Times New Roman | 3" (Times New Roman Bold Italic)

"cour.ttf", "courbd.ttf", "couri.ttf" and "courbi.ttf" are mapped to "Courier New | 0" (Courier New), "Courier New | 1" (Courier New Bold), "Courier New | 2" (Courier New Italic) and "Courier New | 3" (Courier New Bold Italic)

Font Location
ChartDirector on Windows does not come with any font files. It relies on the operating system's font files in the " [windows] \Fonts" directory. To see what fonts are installed in your operating system and their file names, use the File Explorer to view that directory.

ChartDirector on Windows will also search for the font files in the "fonts" subdirectory (if it exists) under the directory where the ChartDirector DLL "chartdir.dll" is installed. This is useful for private fonts. Also, for some especially secure web servers, the web anonymous user may not have access to the " [windows] \Fonts" directory. In this case, you may copy the font files to the above subdirectory.

ChartDirector on Mac OS X relies on operating system font files in "/Library/Fonts" and "/System/Library/Fonts".

ChartDirector on Linux, FreeBSD and Solaris assume the fonts files are in the "fonts" subdirectory under the directory where the ChartDirector shared object "libchartdir.so" is installed. ChartDirector on Linux, FreeBSD and Solaris come with a number of font files in the "fonts" subdirectory.

To keep the download size small, ChartDirector on Linux, FreeBSD and Solaris only come with some commonly used fonts. You may download additional fonts from the Internet. In particular, the Microsoft fonts at
http://sourceforge.net/project/showfiles.php?group_id=34153& release_id=105355
is highly recommended. Please refer to
http://www.microsoft.com/typography/faq/faq8.htm
on how you could use the fonts legally in your system.

ChartDirector supports True Type fonts (.ttf), Type 1 fonts (.pfa and .pfb) and Windows bitmap fonts (.fon). On Mac OS X, ChartDirector also supports Font Suitcase and Datafork (.dfont) files. On Linux, FreeBSD and Solaris, ChartDirector also supports Portable Compiled Fonts (.pcf fonts).

If you want ChartDirector to search other directories for the font files, you may list the directories in an environment variable called "FONTPATH".

If you specify an absolute path name for the font file, ChartDirector will use the absolute path name and will not search other directories.Artificial Boldening and Italicizing
Whereas most popular font comes with different styles for "normal", "bold", "italic" and "bold italic", some fonts only come with one style (the normal style). For example, the Monotype Corsiva font that comes with MS Office only has the normal style (mtcorsva.ttf). For these cases, you may append the "Bold" and/or "Italic" words after the font file name (separated with a space) to ask ChartDirector to artificially bolden and/or italicize the font. For example, you may specify the font name as "mtcorsva.ttf Bold".Font List
Instead of specifying a single font file as the font name, you may specify a list of font files as the font name, separated by semi-colons. This is useful when using international characters that are only available in some fonts.

For example, if you would like to use the Arial font ("arial.ttf") for western characters, and the MingLiu font "mingliu.ttc" for Chinese characters (since the Arial font does not have Chinese characters), you may specify the font name as "arial.ttf;mingliu.ttc". In this case, ChartDirector will try the Arial font first. If it cannot find a certain character there, it will try the MingLiu font.Indirect Font Names
ChartDirector supports several special keywords for specifying the font name indirectly. When these keywords are used as font names, ChartDirector will look up the actual font names from a font table. The keywords are as follows:

KeywordsDescription

"normal"	This default normal font, which is the first font in the font table. This is initially mapped to "arial.ttf" (Arial).
"bold"	The default bold font, which is the second font in the font table. This is initially mapped to "arialbd.ttf" (Arial Bold).
"italic"	The default italic font, which is the third font in the font table. This is initially mapped to "ariali.ttf" (Arial Italic).
"boldItalic"	The default bold-italic font, which is the fourth font in the font table. This is initially mapped to "arialbi.ttf" (Arial Bold Italic).
"fontN"	The $(N + 1)$th font in the font table (the first font is "font0").

The font table can be modified using BaseChart.setFontTable or DrawArea.setFontTable.

The advantage of using indirect font names is that you can change the fonts fonts in your charts in one place.Font Index

Most font files contain one font. However, it is possible a font file contains multiple fonts (that is, a font collection). For example, in True Type fonts, font files with extension ".ttc" may represent a font collection.

If a font file contains multiple font, the font index can be used to specify which font to use. By default, the font index is 0, which means the first font in the font file will be used.Font Size

The font size decides how big a font will appear in the image. The font size is expressed in a font unit called points. This is the same unit used in common word processors.

Instead of specifying font size, some ChartDirector API (eg. TextBox.setFontSize) allow you to specify font height and font width separately. You may use different point sizes for font height and font width to create special effects.Font Color

This is the color to draw the font. (See Color Specification on how colors are represented in ChartDirector.)Font Angle

This is the angle in degrees by which the font should be rotated anti-clockwise.Vertical Layout

By default, text are laid out horizontally, with characters being drawn from left to right.

ChartDirector also supports vertical layout, with characters being drawn from top to bottom. For example, you may use BaseChart.addText to add text that are laid out vertically. Vertical layout is common for oriental languages such as Chinese, Japanese and Korean.

13.0.25   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.

13.0.26   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 BaseChart.addExtraField or BaseChart.addExtraField2.

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.

13.0.27   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

13.0.28 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.

13.0.29 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)

13.0.30   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.
Than we can talk about the plugin.

13.0.31   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. Than you simply start again with FetchNext to get the second record set. Even the RecordSet functions should work, just use them twice to get all records from both record sets.

13.0.32 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.

13.0.33 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

13.0.34 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.

13.0.35 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.

13.0.36   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.

13.0.37   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.

13.0.38   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.

13.0.39   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.

13.0.40 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.

13.0.41 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.

13.0.42 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.

13.0.43 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.

13.0.44   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

13.0.45   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.

13.0.46   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!# $ % & '*+/=?^_' { | }
textasciitilde - ] +(?:\. [ a-z0-9!# $ % & '*+/=?^_' { | }
textasciitilde - ] +)*@(?: [ a-z0-9 ] (?: [ a-z0-9- ] * [ a-z0-9 ] )?\.)+ [ a-z0-9 ] (?: [ a-z0-9- ] * [ a-z0-9 ] )?"
rm = re.Search(editField1.Text)

if rm = Nil Then
StaticText2.text = editField1.Text + " not valid email"
Else
StaticText2.Text = editField1.Text + " is valid"
End if
```

Notes:

Adapted from:
http://www.regular-expressions.info/email.html

13.0.47 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.

13.0.48 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.

13.0.49   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.

13.0.50   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.

13.0.51 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.

13.0.52   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
```

13.0.53   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.

13.0.54   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.

13.0.55   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.

13.0.56   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.

13.0.57   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.

13.0.58   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.

13.0.59 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.

13.0.60 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.

13.0.61 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.

13.0.62   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.

13.0.63   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).

13.0.64 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.

13.0.65 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.

13.0.66   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>
```

13.0.67   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/NSAutorelease-Pool_Class/Reference/Reference.html

13.0.68   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.

13.0.69   How to bring my application to front?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: No, Linux: No. **Answer:** This makes SimpleText (Code ttxt) to the frontmost application:
Example:

```
Dim A As AppleEvent
A = NewAppleEvent("misc","actv","")
If Not A.Send then
Beep
end if
```

Notes: (Code is Mac only)

13.0.70   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 catched, a flag is set and you can ask later in your normal application flow for the result.

13.0.71   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.

13.0.72   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/ .

13.0.73   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.

13.0.74   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.

13.0.75   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

13.0.76 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.

13.0.77   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.

13.0.78   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.

13.0.79 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.

13.0.80   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.

13.0.81   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
```

13.0.82   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

13.0.83   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

13.0.84   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 althrough it's not perfect.
You need to set lc to the current color you use.
Example:

```
dim outstring as string
dim theMac, thePC as textencoding
dim Mac2PC as textconverter

theMac = getTextEncoding(0) // MacRoman
thePC = getTextEncoding(& h0201) // ISOLatin1

Mac2PC = getTextConverter(theMac, thePC)
// if you wanted to do the opposite just create a converter
// PC2Mac = getTextConverter(thePC, theMac)

outstring = Mac2PC.convert("Bjrn, this text should be converted")
Mac2PC.clear
```

Notes: You have to call Mac2PC.clear after every conversion to reset the encoding engine.

13.0.85   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.

13.0.86   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.

13.0.87   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

13.0.88   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
```

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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.

13.0.89   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.

13.0.90   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.

13.0.91   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.

13.0.92 How to create a GUID?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Use the UUIDMBS class for this.

13.0.93 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("AQAAAAAAAAAAAAAAAACAFRDRVIAAAABAAAAAAAAABUQ0lQAAAAA
r.AddResource(data,"drag",128,"") 'ditto
r.Close

Notes: In general Apple has deprecated this, but a few application still support clippings.

13.0.94   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.

13.0.95   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.

13.0.96   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.

13.0.97   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 intrepreted as a file name, so the data is read from the given file. You'll need to open this file and pass data with the Read event as needed. (See CURLS ftp file upload example project)

- The last option -H specifies an additional header for the upload. Pas this additional header with the SetOptionHTTPHeader method.

curl -X PUT http://127.0.0.1:5984/appserials/f2f4e540bf8bb60f61cfcd4328001c59 -d ' { "type":"Product","description":"Application Serial","acronym":"AppSerial","dateAdded":"2011-03-21 14:57:36" } '

- Option -X PUT like above.

- Pass the URL again in OptionURL

- This time data is passed in command line for CURL. You'd put this data in the quotes into a string and make it available in the Read event. (See CURLS ftp upload example project)

13.0.98   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.

13.0.99   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".

13.0.100   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)

13.0.101   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.

13.0.102 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.

13.0.103 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.

13.0.104 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
End Sub
```

13.0.105   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 asyncron.

13.0.106   How to draw a dushed pattern line?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** You can try this code:
Example:

```
// call like this: DrawDushedPatternLine g,0,0,width,height,10

Sub DrawDushedPatternLine(g as graphics,x1 as Integer,y1 as Integer,x2 as Integer,y2 as Integer, partlen as Integer)
dim x,y,ox,oy as Double
dim dx,dy as Double
dim w,h,d as Double
dim b as Boolean

w=x2-x1
h=y2-y1

d=sqrt(w*w+h*h)

dx=w/d*partlen
dy=h/d*partlen

b=true
x=x1
while (x<x2) and (y<y2)
ox=x
oy=y

x=x+dx
y=y+dy

if b then
g.DrawLine ox,oy,x,y
end if

b=not b
wend


End Sub
```

Notes: It would be possible to add this to the plugin, but I think it's better if you do it in plain Realbasic code, so it even works on Windows.

13.0.107   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 althrough it's not perfect.
You need to set lc to the current color you use.
Example:

```
Sub drawLine(xs as Integer, ys as Integer, xe as Integer, ye as Integer, face as RGBSurface, lineColor as color)
dim intX, intY, count, n, xDiff, yDiff as Integer
dim v, v1, floatX, floatY, xx, yy, xStep, yStep as Double
dim c as color

const st=1.0

xDiff=xe-xs
yDiff=ye-ys
count=max(abs(xDiff), abs(yDiff))
xStep=xDiff/count
yStep=yDiff/count
xx=xs
yy=ys
for n=1 to count
intX=xx
intY=yy
floatX=xx-intX
floatY=yy-intY

v=(1-floatX)*(1-floatY)*st
v1=1-v
c=face.pixel(intX, intY)
face.pixel(intX, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*(1-floatY)*st
v1=1-v
c=face.pixel(intX+1, intY)
face.pixel(intX+1, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=(1-floatX)*floatY*st
v1=1-v
c=face.pixel(intX, intY+1)
face.pixel(intX, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*floatY*st
v1=1-v
c=face.pixel(intX+1, intY+1)
face.pixel(intX+1, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
```

xx=xx+xStep
yy=yy+yStep
next

End Sub

Notes: PS: st should be 1 and face should be a RGBSurface or a Graphics object.

13.0.108   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)

13.0.109   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

13.0.110   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.

13.0.111   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.

13.0.112   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.

13.0.113   How to extract text from HTML?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Use both Remove-HTMLTagsMBS 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 & auml; to .

13.0.114   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
```

13.0.115   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

13.0.116   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.

13.0.117 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".

13.0.118   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/

13.0.119   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.

13.0.120   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

13.0.121   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

13.0.122   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 CFGregorianDateMBS
g.Day = d.Day
g.Month = d.Month
g.Year = d.Year
g.Minute = d.Minute
g.Hour = d.Hour
g.Second = d.Second

dim at as CFAbsoluteTimeMBS = g.AbsoluteTime(t)
dim x as Double = at.Value

MsgBox str(x)
```

Notes:

As you see we need a timezone and put the date values in a gregorian date record.
Now we can query absolute time for the given timezone.

13.0.123   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
```

13.0.124 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.

13.0.125 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.

13.0.126   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.

13.0.127   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

13.0.128   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.

13.0.129 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.

13.0.130 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 requuire packages.
Notes:

You need CUPS as well as GTK packages. On 64 bit systems also the ia32-libs package.

Please note that you need a x86 compatible Linux. So no PPC, Power, ARM or other CPUs.

13.0.131   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" ...

13.0.132   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 ThreadCurrentStackSpace lib "Carbon" (threadid as Integer, byref size as Integer) as short

if GetCurrentThread(threadid)=0 then
if 0=ThreadCurrentStackSpace(threadid,size) then
MsgBox str(size)
end if
end if
End Sub
```

Notes: For Mac OS 9, use "ThreadLib" instead of "CarbonLib". You can use # if if you like for that.

13.0.133   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 CFTimeZoneMBS class.
Or code like below:
Example:

```
Function GMTOffsetInMinutes() as Integer
// Returns the offset of the current time to GMT in minutes.
// supports Mac OS and Windows, but not Linux yet (let me know if
// you have code for that, please)
//
// Note that the offset is not always an even multiple of 60, but
// there are also half hour offsets, even one 5:45h offset

// This version by Thomas Tempelmann (rb@tempel.org) on 25 Nov 2005
// with a fix that should also make it work with future Intel Mac targets.
//
// Using code from various authors found on the RB NUG mailing list

dim result, bias, dayLightbias as Integer
dim info as memoryBlock
dim offset as Integer

# if targetMacOS then

Declare Sub ReadLocation lib "Carbon" (location As ptr)
```

```
info = NewMemoryBlock(12)
ReadLocation info
if false then
// bad, because it does not work on Intel Macs:
'offset = info.short(9) * 256 + info.byte(11)
else
offset = BitwiseAnd (info.long(8), & hFFFFFF)
end

offset = info.short(9) * 256 + info.byte(11)
offset = offset \60
return offset

# endif

# if targetWin32 then

Declare Function GetTimeZoneInformation Lib "Kernel32" ( tzInfoPointer as Ptr ) as Integer
// returns one of
// TIME_ZONE_ID_UNKNOWN 0
// – Note: e.g. New Delhi (GMT+5:30) and Newfoundland (-3:30) return this value 0
// TIME_ZONE_ID_STANDARD 1
// TIME_ZONE_ID_DAYLIGHT 2

info = new MemoryBlock(172)
result = GetTimeZoneInformation(info)

bias = info.Long(0)
// note: the original code I found in the NUG archives used Long(84) and switched to Long(0)
// only for result=1 and result=2, but my tests found that Long(0) is also the right value for result=0

if result = 2 then
daylightBias = info.long(168)
end if
offset = - (bias + dayLightbias)
return offset

# endif

End Function
```

13.0.134   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 Accessibilty 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

13.0.135   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.

13.0.136   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.folderItemItem(i)

dateiname=f.name
```

```
// editfield1 with property "mulitline=true"!
editfield1.text=editfield1.text + dateiname + chr(13)
next
end if
```

13.0.137   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
```

13.0.138   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.

13.0.139   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.

13.0.140   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!

13.0.141 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

13.0.142 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.

13.0.143 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.

13.0.144 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.

13.0.145 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.

13.0.146   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
```

13.0.147   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).

13.0.148 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.

13.0.149 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.

13.0.150 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 underlaying NSTextViewMBS object via TextArea.NSTextViewMBS method.

13.0.151   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
```

13.0.152   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
```

13.0.153   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.

13.0.154 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.

13.0.155 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 than need that library to launch on Classic. To avoid this the MBS plugin checks if this library is available and return 1 if it's not available.

13.0.156   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 althrough 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!?

13.0.157   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.

13.0.158 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.

13.0.159 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.

13.0.160   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

13.0.161   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.

13.0.162   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.

13.0.163   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.

13.0.164   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

13.0.165   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

13.0.166   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.

13.0.167   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
```

13.0.168   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 GetDblTime Lib "Carbon" () as Integer
doubleClickTime = GetDblTime()
# endif

if targetWin32 then
Declare Function GetDoubleClickTime Lib "User32.DLL" () as Integer
doubleClickTime = GetDoubleClickTime()/60 // convert to ticks from milliseconds
# endif

currentClickTicks = ticks
//if the two clicks happened close enough together in time
if (currentClickTicks - lastClickTicks) <= doubleClickTime then
//if the two clicks occured close enough together in space
if abs(X - lastClickX) <= 5 and abs(Y - LastClickY) <= 5 then
DoubleClick //a double click has occured so call the event
end if
end if
lastClickTicks = currentClickTicks
lastClickX = X
lastClickY = Y

10. Now to test out your new DoubleClickCanvas, drag the class from the Project window to a window in your project to create an instance of it.

11. Double-click on the canvas you just added to your window to open the Code Editor. Notice that the canvas has a DoubleClick event handler. In this event handler, add the following code:
BEEP

13.0.169 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.

13.0.170   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?

13.0.171   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 OSType, size as Integer, data as ptr) as short

dim m as MemoryBlock

m=NewMemoryBlock(2)
m.UShort(0)=kControlSizeSmall

Title=str(SetControlData(CheckBox1.Handle, 0, kControlSizeTag, 2, m))
```

13.0.172   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.

13.0.173   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.

13.0.174   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)

13.0.175   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 RNTO with the new file name. To delete use DELE and the file path.

13.0.176   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.

13.0.177   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.

13.0.178   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

13.0.179 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.

13.0.180 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

13.0.181   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.

13.0.182   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 foot-
print.
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

13.0.183 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.

13.0.184 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 javscript.
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. Than we build the html to use the audio tag. As you see, we give it an ID for later use and have it preload automatically. If you add an autoplay tag, you can have the audio play right away. Inside the audio tag we have two sources so we provide audio for both Firefox (OGG) and Safari (MPEG4). Finally we have a text to display if HTML5 audio tag is not supported.

You can set the source in the EditSource event:

dim urlo as string = app.audioFileOGG.URL
dim urlm as string = app.audioFileM4V.URL
me.Source = "<audio id=""mymusic"" preload=""auto""><source src="""+urlo+""" type=""audio/ogg"" /><source src="""+urlm+""" type=""audio/mpeg"" />Your browser does not support the audio element.</audio>"

Next in the Play button we execute code to play the audio. This is a short javascript code which searches in the html document for the element with the ID "mymusic" which is the ID of our audio tag above. Once we got the object, we call it's play method to start playback.

me.ExecuteJavaScript("document.getElementById('mymusic').play();")

same for pause:

me.ExecuteJavaScript("document.getElementById('mymusic').pause();")

and finally for changing volume:

me.ExecuteJavaScript("document.getElementById('mymusic').volume="+str(me.Value/100.0)+";")

13.0.185   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

13.0.186 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.

13.0.187 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.

13.0.188   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.

13.0.189   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.

13.0.190 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.

13.0.191   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.

13.0.192   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
```

13.0.193   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 OptionResume-From is used. Store there (or in OptionResumeFromLarge) your start value.
Don't forget to implement the read event and return data there as requested.

13.0.194   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.

13.0.195   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
```

13.0.196 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.

13.0.197 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))
```

13.0.198 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.

13.0.199   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.ApplicationRtfd, "test.rtfd")

if f = nil then Return

dim a as NSAttributedStringMBS = textView.textStorage
dim w as NSFileWrapperMBS = a.RTFDFileWrapperFromRange(0, a.length, DocumentAttributes)

dim e as NSErrorMBS
if w.writeToFile(f, e) then

else
MsgBox e.LocalizedDescription
end if

Notes: For TextArea you can query the underlaying NSTextViewMBS object via TextArea.NSTextViewMBS
method.

13.0.200   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 ProportinalScaledWithMask(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.

13.0.201   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)

13.0.202   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.ScalingMBS does crossplatform scaling with several modes.

with pure REALbasic:
- make a new picture and draw the old one with new size inside.

13.0.203 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
```

13.0.204 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
```

13.0.205   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.

13.0.206   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

13.0.207   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

13.0.208   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/KeyboardViewerServer.app"

set POSIXPath to ((POSIX file thePath) as string)
tell application "System Events" to set isRunning to 0 <(count (application processes whose name is theApplication))
if isRunning then tell application POSIXPath to quit
delay 0.15

ignoring application responses
tell application POSIXPath to run
end ignoring

13.0.209   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.

13.0.210   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 immediataly: No document asked to be saved, all applications quitting without knowing).

```
Declare Sub ShutDwnPower Lib "Carbon" ()
ShutDwnPower
```

13.0.211   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
```

13.0.212   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.

13.0.213   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.

13.0.214   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""."

13.0.215   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

13.0.216   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 Preferencefolder.
People on the list have suggested that it would be better in
the ApplicationSupportFolder. How do I save the file called CWWPrefs
into that folder using MBS?

I have checked for examples and the docs but can't see how to apply it

//f = SpecialFolder.Preferences.child("CWWPrefs")
f = ApplicationSupportFolderMBS(-32768)
Example:

dim folder,file as FolderItem

folder = createApplicationSupportFolderMBS(-32763)

if folder=nil then
// Some very old Mac OS Versions may not support it
// or the plugin may fail for any reason
folder=SpecialFolder.Preferences
end if

file=folder.Child("CWWPrefs")

MsgBox file.UnixpathMBS

Notes: You may not be able to write there with a normal user account!

13.0.217   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 CFDictionaries
'* returned by IOPMCopyScheduledPowerEvents().
'*/
'/*!
'@define kIOPMAutoWake
'@abstract Value for scheduled wake from sleep.
'*/
'# define kIOPMAutoWake "wake"
'
'/*!
'@define kIOPMAutoPowerOn
'@abstract Value for scheduled power on from off state.
'*/
'# define kIOPMAutoPowerOn "poweron"
'
'/*!
'@define kIOPMAutoWakeOrPowerOn
'@abstract Value for scheduled wake from sleep, or power on. The system will either wake OR
'power on, whichever is necessary.
'*/
'
'# define kIOPMAutoWakeOrPowerOn "wakepoweron"
'/*!
'@define kIOPMAutoSleep
'@abstract Value for scheduled sleep.
'*/
'
'# define kIOPMAutoSleep "sleep"
'/*!
'@define kIOPMAutoShutdown
'@abstract Value for scheduled shutdown.
'*/
'
'# define kIOPMAutoShutdown "shutdown"

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMSchedulePowerEvent") then

m=NewMemoryBlock(12)
m.Long(0)=time_to_wake.handle
m.Long(4)=0 // nil
```

m.Long(8)=type.Handle

if s.CallFunction(3,m) then
Return s.Result
end if
end if
end if

End Function

Notes: Requires Mac OS X and to execute root rights.

13.0.218   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".

13.0.219   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.

13.0.220   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.

13.0.221   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 tempory files there, too. Otherwise you may have old DLLs on your hard disc which may disturb your application.

You can run into issues if you use your registration code on different places of your app. Please register only once in app.open (or app Constructor). If you have several codes, simply call them one after the other.

Also check that you only call RegisterMBSPlugin with valid serial number. If you later call RegisterMBSPlugin with Demo like in example code above, you remove the license.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

13.0.222   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=NewCFURLMBSCFStringMBS(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.

13.0.223   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 cliping and an offset which the plugin doesn't know about.

13.0.224   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.

13.0.225 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)

13.0.226 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.

13.0.227 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

13.0.228   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.

13.0.229   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
```

13.0.230 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
```

13.0.231 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

13.0.232 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)

13.0.233 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?

13.0.234   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.

13.0.235   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.

13.0.236   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 prefered to use 50 MB and for an application a 10 MB partition is a good way to start.

13.0.237   SQLDatabase not initialized error?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Before you can use SQLDatabaseMBS, it must be initialized.
Example:

dim d as new SQLDatabaseMBS

Notes:

This happens normally when you use "new SQLDatabaseMBS".
But if you just have a SQLConnectionMBS and get a recordset there, the initialization may not have happend, yet.
So please simply add a line "dim d as new SQLDatabaseMBS" to your app.open code after registration, so the plugin part can initialize and late provide recordsets.

13.0.238   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.

13.0.239 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 ->NSDate

Carbon CFTypeRef to Variant:

CFDictionaryRef ->Dictionary
CFStringRef ->String
CFDataRef ->String
CFURL ->String
CFNumber ->Integer/Double/Int64
CFArray ->Array
CFDate ->date
nil ->nil
CGColorSpace ->CGColorSpaceMBS
CGColor ->CGColorMBS
CGImage ->CGImageMBS
CF* ->CF*MBS

Variant to Carbon CFTypeRef:

Dictionary ->CFDictionaryRef
Boolean ->CFBooleanRef
Color ->CFNumberRef
Integer ->CFNumberRef
Int64 ->CFNumberRef
Single ->CFNumberRef
Double ->CFNumberRef
String ->CFStringRef
Color ->CGColorRef
Date ->CFDateRef
nil ->nil
Memoryblock ->CFDataRef
Folderitem ->CFURLRef
Dictionary ->CFDictionaryRef
Array of Variant/String/Date/Double/Single/Int64/Integer ->CFArray
CGRectMBS ->CGRect as CFDataRef
CGSizeMBS ->CGSize as CFDataRef
CGPointMBS ->CGPoint as CFDataRef
CGColorMBS ->CGColor
CGColorSpaceMBS ->CGColorSpace
CGImageMBS ->CGImage
CGDataConsumerMBS ->CGDataConsumer
CGDataProviderMBS ->CGDataProvider
CF*MBS ->CF*

Strings without encodings should be put into dictionaries as memoryblocks.

13.0.240   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.

13.0.241   What classes to use for hotkeys?

Plugin Version: all, Console & Web: No, Mac: Yes, Win: Yes, Linux: Yes. **Answer:** Please use Carbon-
HotKeyMBS class on Mac and WindowsKeyFilterMBS on Windows.
Notes: CarbonHotKeyMBS will also work fine in Cocoa apps.

13.0.242   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.

13.0.243   What does the NAN code mean?

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

13.0.244   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
fontStyle as Integer)
dim err as Integer
dim theFont, theFontSize, theFontStyle as MemoryBlock

const smSystemScript = -1

Declare Function GetThemeFont Lib "Carbon" (inFontID as Integer, inScript as Integer, outFontName
as Ptr, outFontSize as Ptr, outStyle as Ptr) as Integer

theFont = NewMemoryBlock(256) //Str255
theFontSize = NewMemoryBlock(2) //SInt16
theFontStyle = NewMemoryBlock(1) //Style

err = GetThemeFont(fontType, smSystemScript, theFont, theFontSize, theFontStyle)

if err = 0 then
fontName = theFont.PString(0)
fontSize = theFontSize.UShort(0)
fontStyle = theFontStyle.Byte(0)
else
fontName = ""
fontSize = 0
fontStyle = 0
end if
End Sub
```

13.0.245   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.

13.0.246 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.

13.0.247 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.

13.0.248 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.TOOL-BAR, 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, COR-REL, COS, COSH, COUNT, COUNTA, COUNTBLANK, COUNTIF, COVAR, CREATE.OBJECT, CRIT-BINOM, CUSTOM.REPEAT, CUSTOM.UNDO, DATE, DATEDIF, DATESTRING, DATEVALUE, DAV-ERAGE, DAY, DAYS360, DB, DBCS, DCOUNT, DCOUNTA, DDB, DEGREES, DELETE.BAR, DELETE.COM-MAND, 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, EVAL-UATE, 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.TOOL-BAR, GET.WINDOW, GET.WORKBOOK, GET.WORKSPACE, GETPIVOTDATA, GOTO, GROUP, GROWTH, HALT, HARMEAN, HELP, HLOOKUP, HOUR, HYPERLINK, HYPGEOMDIST, IF, IN-DEX, INDIRECT, INFO, INITIATE, INPUT, INT, INTERCEPT, IPMT, IRR, ISBLANK, ISERR, ISER-ROR, 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.COM-MAND, N, NA, NAMES, NEGBINOMDIST, NEXT, NORMDIST, NORMINV, NORMSDIST, NORM-SINV, NOT, NOTE, NOW, NPER, NPV, NUMBERSTRING, ODD, OFFSET, OPEN.DIALOG, OP-TIONS.LISTS.GET, OR, PAUSE, PEARSON, PERCENTILE, PERCENTRANK, PERMUT, PHONETIC, PI, PIVOT.ADD.DATA, PMT, POISSON, POKE, POWER, PPMT, PRESS.TOOL, PROB, PRODUCT, PROPER, PV, QUARTILE, RADIANS, RAND, RANK, RATE, REFTEXT, REGISTER, REGISTER.ID, RELREF, RENAME.COMMAND, REPLACE, REPLACEB, REPT, REQUEST, RESET.TOOLBAR, RESTART, RESULT, RESUME, RETURN, RIGHT, RIGHTB, ROMAN, ROUND, ROUNDBAHTDOWN, ROUND-BAHTUP, 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, STANDARD-IZE, STDEV, STDEVA, STDEVP, STDEVPA, STEP, STEYX, SUBSTITUTE, SUBTOTAL, SUM, SUMIF, SUMPRODUCT, SUMSQ, SUMX2MY2, SUMX2PY2, SUMXMY2, SYD, T, TAN, TANH, TDIST, TER-MINATE, TEXT, TEXT.BOX, TEXTREF, THAIDAYOFWEEK, THAIDIGIT, THAIMONTHOFYEAR, THAINUMSOUND, THAINUMSTRING, THAISTRINGLENGTH, THAIYEAR, TIME, TIMEVALUE, TINV, TODAY, TRANSPOSE, TREND, TRIM, TRIMMEAN, TRUE, TRUNC, TTEST, TYPE, UNREG-ISTER, UPPER, USDOLLAR, USERDEFINED, VALUE, VAR, VARA, VARP, VARPA, VDB, VIEW.GET, VLOOKUP, VOLATILE, WEEKDAY, WEIBULL, WHILE, WINDOW.TITLE, WINDOWS, YEAR and ZTEST.

13.0.249   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.

13.0.250   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.

13.0.251   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 NSExceptionMBS in order to catch this exception.
Notes:

You may also add code to write the stack of the exception into a log file for later locating the error source.

A NSImage has several image representations in memory. So basicly you pass in the base image and for whatever size an image is needed, the NSImage class will create a cache image representation of the requested size so on the next query it can use that cache for the same requested size.

13.0.252   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.

13.0.253   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 syncronized 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.

13.0.254   Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetActiveDisplayList.

13.0.255   Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetDisplaysWithPoint.

13.0.256   Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetDisplaysWithRect.

13.0.257   Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Console & Web: No, Mac: No, Win: Yes, Linux: No. **Answer:** This is now CGDisplayMBS.GetOnlineDisplayList.

13.0.258   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.

13.0.259 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 basicly it's not useful. If you want to check whether you have a network, than do a DNS resolve:
Example:

```
// two independend domain names
const domain1 = "www.google.com"
const domain2 = "www.macsw.de"

// resolve IPs
dim ip1 as string = DNSNameToAddressMBS(Domain1)
dim ip2 as string = DNSNameToAddressMBS(Domain2)

// if we got IPs and not the same IPs (error/login pages)
if len(ip1)=0 or len(ip2)=0 or ip1=ip2 then
MsgBox "no connection"
else
MsgBox "have connection"
end if
```

Notes: This way you can detect whether you got something from DNS. And you can make sure that a DNS redirection to a login page won't catch you.

13.0.260 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.

13.0.261 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: This classes have been removed XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

13.0.262   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

13.0.263   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

13.0.264   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.

13.0.265 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.

13.0.266 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.

13.0.267 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.

13.0.268 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.

13.0.269 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.

13.0.270   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.

13.0.271   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.

13.0.272   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.

13.0.273   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 Axis.setLabels on what is an enumerated axis), the first data point is 0, and the nth data point is (n-1).
xLabel	The bottom x-axis label of the data point.
x2Label	The top x-axis label of the data point.
value	The value of the data point.
accValue	The sum of values of all data points that are in the same x position and same data group as the current data point, and with data set number less than or equal to the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
totalValue	The sum of values of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
percent	The percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
accPercent	The accumulated percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
gpercent	The percentage of the data point based on the total value of all data points in a layer.
dataSet	The data set number to which the data point belongs. The first data set is 0. The nth data set is (n-1).
dataSetName	The name of the data set to which the data point belongs.
dataItem	The data point number within the data set. The first data point is 0. The nth data point is (n-1).
dataGroup	The data group number to which the data point belongs. The first data group is 0. The nth data group is (n-1).
dataGroupName	The name of the data group to which the data point belongs.
layerId	The layer number to which the data point belongs. The first layer is 0. The nth layer is (n-1).
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using Layer.addExtraField, Layer.addExtraField2, BaseChart.addExtraField or BaseChart.addExtraField2.

diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by data set number. The Pth data set corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth data set corresponds to the Pth element of the (N + Q)th extra field.

Parameter	Description
zx	The symbol scale in the x dimension. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.
zy	The symbol scale in the y dimension. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.
z	The symbol scale without distinguishing the dimension to use. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.

Parameter	Description
slope	The slope of the trend line.
intercept	The y-intercept of the trend line.
corr	The correlation coefficient in linear regression analysis.
stderr	The standard error in linear regression analysis.

Parameter	Description
top	The value of the top edge of the box-whisker symbol.
bottom	The value of the bottom edge of the box-whisker symbol.
max	The value of the maximum mark of the box-whisker symbol.
min	The value of the minimum mark of the box-whisker symbol.
med	The value of the median mark of the box-whisker symbol.

Parameter	Description
high	The high value.
low	The low value.
open	The open value.
close	The close value.

Parameter	Description
dir	The direction of the vector.
len	The length of the vector.

Parameter	Description
radius	The radial value of the data point.
value	Same as { radius } . See above.
angle	The angular value of the data point.
x	Same as { angle } . See above.
label	The angular label of the data point.
xLabel	Same as { label } . See above.
name	The name of the layer to which the data point belongs.
dataSetName	Same as { name } . See above.
i	The data point number. The first data point is 0. The nth data point is (n-1).
dataItem	Same as { i } . See above.
z	The symbol scale. Applicable for layers with symbol scales set by 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.

The negative sign character. Use '

[d]

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,,