

MBS MacCloud Plugin Documentation

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0.1 Introduction

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

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List of all modules

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Chapter 4

Files

4.1 class FolderItem

4.1.1 class FolderItem

Platforms: macOS, Linux, Windows, Targets: All.

Function: One of Xojo's base classes.

Notes: Handles access to files.

4.1.2 Methods

4.1.3 HasUnresolvedConflictsMBS as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the iCloud file properties.

Notes: A boolean that contains true if this item has conflicts outstanding, false otherwise. Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr9](#)

4.1.4 IsDownloadedMBS as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the iCloud file properties.

Notes: A boolean that contains true if a local copy of this item exists, false otherwise.

Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr9](#)

4.1.5 IsDownloadingMBS as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the iCloud file properties.

Notes: A boolean that contains true if a local copy of this item is currently being downloaded, false otherwise.

Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr9](#)

4.1.6 IsUbiquitousItemMBS as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the iCloud file properties.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.rtf")
MsgBox "IsUbiquitousItemMBS: "+str(f.IsUbiquitousItemMBS)
```

Notes: A boolean that contains true if this item is synchronized to cloud-based storage, false otherwise.

Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr9](#)

4.1.7 IsUploadedMBS as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the iCloud file properties.

Notes: A boolean that contains true if a copy of this item exists in cloud-based storage, false otherwise.

Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr9](#)

4.1.8 IsUploadingMBS as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the iCloud file properties.

Notes: A boolean that contains true if a local copy of this item is currently being uploaded, false otherwise. Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr9](#)

4.1.9 PercentDownloadedMBS as Double

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the iCloud file properties.

Notes: An Number in the range 0-100 that tells what percentage of the file has been downloaded. Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr9](#)

4.1.10 PercentUploadedMBS as Double

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the iCloud file properties.

Notes: An Number in the range 0-100 that tells what percentage of the file has been uploaded. Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr9](#)

Chapter 5

iCloud

5.1 class NSComparisonPredicateMBS

5.1.1 class NSComparisonPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: NSComparisonPredicateMBS is a subclass of NSPredicateMBS that you use to compare expressions.

Example:

```
dim n1 as NSExpressionMBS = NSExpressionMBS.expressionForConstantValue(4)
```

```
dim n2 as NSExpressionMBS = NSExpressionMBS.expressionForConstantValue(9)
```

```
dim modifier as Integer = NSComparisonPredicateMBS.NSDirectPredicateModifier
```

```
dim type as Integer = NSComparisonPredicateMBS.NSGreaterThanPredicateOperatorType
```

```
dim options as Integer = 0
```

```
dim c as new NSComparisonPredicateMBS(n1, n2, Modifier, type, options)
```

```
MsgBox c.predicateFormat
```

Notes: You use comparison predicates to compare the results of two expressions. You create a comparison predicate with an operator, a left expression, and a right expression. You represent the expressions using instances of the NSExpressionMBS class. When you evaluate the predicate, it returns as a BOOL value the result of invoking the operator with the results of evaluating the expressions.

Subclass of the NSPredicateMBS class.

Blog Entries

- [More notes](#)

- [MBS Real Studio Plugins, version 11.3pr10](#)

5.1.2 Methods

5.1.3 comparisonPredicateModifier as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the comparison predicate modifier for the receiver.

Notes: Available in Mac OS X v10.4 and later.

The default value is NSDirectPredicateModifier.

5.1.4 Constructor(LeftExpression as NSExpressionMBS, rightExpression as NSExpressionMBS, modifier as UInt32, type as UInt32, options as UInt32)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes a predicate to a given type formed by combining given left and right expressions using a given modifier and options.

Example:

```
dim n1 as NSExpressionMBS = NSExpressionMBS.expressionForConstantValue(4)
```

```
dim n2 as NSExpressionMBS = NSExpressionMBS.expressionForConstantValue(9)
```

```
dim modifier as Integer = NSComparisonPredicateMBS.NSDirectPredicateModifier
```

```
dim type as Integer = NSComparisonPredicateMBS.NSGreaterThanPredicateOperatorType
```

```
dim options as Integer = 0
```

```
dim c as new NSComparisonPredicateMBS(n1, n2, Modifier, type, options)
```

```
MsgBox c.predicateFormat
```

Notes: LeftExpression: The left hand expression.

rightExpression: The right hand expression.

modifier: The modifier to apply.

type: The predicate operator type.

options: The options to apply (see constants). For no options, pass 0.

The receiver, initialized to a predicate of type type formed by combining the left and right expressions using the modifier and options.

Available in Mac OS X v10.4 and later.

5.1.5 leftExpression as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the left expression for the receiver, or nil if there is none.

5.1.6 options as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the options that are set for the receiver.

5.1.7 predicate(LeftExpression as NSEExpressionMBS, rightExpression as NSEExpressionMBS, modifier as UInt32, type as UInt32, options as UInt32) as NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Creates and returns a predicate of a given type formed by combining given left and right expressions using a given modifier and options.

Notes: LeftExpression: The left hand expression.

rightExpression: The right hand expression.

modifier: The modifier to apply.

type: The predicate operator type.

options: The options to apply (see "NSComparisonPredicate Options"). For no options, pass 0.

Returns a new predicate of type type formed by combining the given left and right expressions using the modifier and options.

Available in Mac OS X v10.4 and later.

5.1.8 predicateOperatorType as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the predicate type for the receiver.

5.1.9 rightExpression as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the right expression for the receiver, or nil if there is none.

5.1.10 Constants

Modifier Type Constants

Constant	Value	Description
<code>NSAllPredicateModifier</code>	1	A predicate to compare all entries in the destination of a to-many relationship. The left hand side must be a collection. The corresponding predicate compares each value in the left hand side with the right hand side, and returns false when it finds the first mismatch—or true if all match. Available in Mac OS X v10.4 and later.
<code>NSAnyPredicateModifier</code>	2	A predicate to match with any entry in the destination of a to-many relationship. The left hand side must be a collection. The corresponding predicate compares each value in the left hand side against the right hand side and returns true when it finds the first match—or false if no match is found Available in Mac OS X v10.4 and later.
<code>NSDirectPredicateModifier</code>	0	A predicate to compare directly the left and right hand sides. Available in Mac OS X v10.4 and later.

Comparison Type Constants

Constant	Value	Description
NSBeginsWithPredicateOperatorType	8	A begins-with predicate. Available in Mac OS X v10.4 and later.
NSBetweenPredicateOperatorType	100	A predicate to determine if the right hand side lies at or between the bounds specified by the left hand side. Returns true if [lhs between rhs] ; the right hand side must be a collection in which the first element sets the lower bound and the second element sets the upper bound inclusive. Comparison is performed using compare: or the compare:to: method, whichever is equivalent. Available in Mac OS X v10.5 and later.
NSContainsPredicateOperatorType	99	A predicate to determine if the left hand side contains the right hand side. Returns true if [lhs contains rhs] ; the left hand side must be a collection object that evaluates to a collection Available in Mac OS X v10.5 and later.
NSCustomSelectorPredicateOperatorType	11	A predicate that uses a custom selector that takes a single argument and returns a BOOL value. The selector is invoked on the left hand side with the right hand side as the argument. Available in Mac OS X v10.4 and later.
NSEndsWithPredicateOperatorType	9	An ends-with predicate. Available in Mac OS X v10.4 and later.
NSEqualToPredicateOperatorType	4	An equal-to predicate. Available in Mac OS X v10.4 and later.
NSGreaterThanOrEqualToPredicateOperatorType	3	A greater-than-or-equal-to predicate. Available in Mac OS X v10.4 and later.
NSGreaterThanOrEqualPredicateOperatorType	2	A greater-than predicate. Available in Mac OS X v10.4 and later.
NSInPredicateOperatorType	10	A predicate to determine if the left hand side is in the right hand side. For strings, returns true if the left hand side is a substring of the right hand side. For collections, returns true if the left hand side is in the right hand side. Available in Mac OS X v10.4 and later.
NSLessThanOrEqualToPredicateOperatorType	1	A less-than-or-equal-to predicate. Available in Mac OS X v10.4 and later.
NSLessThanPredicateOperatorType	0	A less-than predicate. Available in Mac OS X v10.4 and later.
NSLikePredicateOperatorType	7	A simple subset of the MATCHES predicate, similar in behavior to the LIKE predicate. Available in Mac OS X v10.4 and later.
NSMatchesPredicateOperatorType	6	A full regular expression matching predicate. Available in Mac OS X v10.4 and later.
NSNotEqualToPredicateOperatorType	5	A not-equal-to predicate. Available in Mac OS X v10.4 and later.

String Comparison Types

Constant	Value	Description
NSCaseInsensitivePredicateOption	1	<p>A case-insensitive predicate.</p> <p>You represent this option in a predicate format string using a [c] following string operation (for example, "NeXT" like [c] "next").</p> <p>Available in Mac OS X v10.4 and later.</p> <p>These options are supported for LIKE as well as all of the equality/comparison operators.</p>
NSDiacriticInsensitivePredicateOption	2	<p>A diacritic-insensitive predicate.</p> <p>You represent this option in a predicate format string using a [d] following string operation (for example, "naïve" like [d] "naive").</p> <p>Available in Mac OS X v10.4 and later.</p> <p>These options are supported for LIKE as well as all of the equality/comparison operators.</p>
NSNormalizedPredicateOption	4	<p>Indicates that the strings to be compared have been preprocessed.</p> <p>This option supersedes NSCaseInsensitivePredicateOption and NSDiacriticInsensitivePredicateOption, and is intended as a performance optimization.</p> <p>You represent this option in a predicate format string using a [n] following string operation (for example, "WXYZlan" matches [n] ".lan").</p> <p>Available in Mac OS X v10.7 and later.</p> <p>These options are supported for LIKE as well as all of the equality/comparison operators.</p>

5.2 class NSCompoundPredicateMBS

5.2.1 class NSCompoundPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: NSCompoundPredicate is a subclass of NSPredicate used to represent logical "gate" operations (AND/OR/NOT) and comparison operations.

Example:

```
dim n1 as NSPredicateMBS = NSPredicateMBS.predicateWithValue(true)
```

```
dim n2 as NSPredicateMBS = NSPredicateMBS.predicateWithValue(false)
```

```
dim n as NSPredicateMBS = NSCompoundPredicateMBS.orPredicateWithSubpredicates(array(n1,n2))
MsgBox n.predicateFormat
```

Notes: Comparison operations are based on two expressions, as represented by instances of the NSExpression class. Expressions are created for constant values, key paths, and so on.

In Mac OS X v10.5 and later and in iOS, you can use NSCompoundPredicate to create an AND or OR compound predicate (but not a NOT compound predicate) using an array with 0, 1, or more elements:

- An AND predicate with no subpredicates evaluates to TRUE.
- An OR predicate with no subpredicates evaluates to FALSE.
- A compound predicate with one or more subpredicates evaluates to the truth of its subpredicates.

Subclass of the NSPredicateMBS class.

Blog Entries

- [More notes](#)
- [MBS Real Studio Plugins, version 11.3pr10](#)

5.2.2 Methods

5.2.3 andPredicateWithSubpredicates(predicates() as NSPredicateMBS) as NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new predicate formed by AND-ing the predicates in a given array.

Example:

```
dim n1 as NSPredicateMBS = NSPredicateMBS.predicateWithValue(true)
```

```
dim n2 as NSPredicateMBS = NSPredicateMBS.predicateWithValue(false)
```

```
dim n as NSPredicateMBS = NSCompoundPredicateMBS.andPredicateWithSubpredicates(array(n1,n2))
```

```
MsgBox n.predicateFormat
```

Notes: subpredicates: An array of NSPredicate objects.

Returns a new predicate formed by AND-ing the predicates specified by subpredicates.
An AND predicate with no subpredicates evaluates to TRUE.

5.2.4 compoundPredicateType as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the predicate type for the receiver.

5.2.5 Constructor(type as Integer, predicates() as NSPredicateMBS)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the receiver initialized to a given type using predicates from a given array.

Example:

```
dim n1 as NSPredicateMBS = NSPredicateMBS.predicateWithValue(true)
```

```
dim n2 as NSPredicateMBS = NSPredicateMBS.predicateWithValue(false)
```

```
dim n as NSPredicateMBS = new NSCompoundPredicateMBS(NSCompoundPredicateMBS.kAnd, array(n1,n2))
```

```
MsgBox n.predicateFormat
```

Notes: type: The type of the new predicate.
subpredicates: An array of NSPredicate objects.

5.2.6 notPredicateWithSubpredicate(predicate as NSPredicateMBS) as NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new predicate formed by NOT-ing a given predicate.

Notes: predicate: A predicate.

Returns a new predicate formed by NOT-ing the predicate specified by predicate.

5.2.7 orPredicateWithSubpredicates(predicates() as NSPredicateMBS) as NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new predicate formed by OR-ing the predicates in a given array.

Notes: subpredicates: An array of NSPredicate objects.

Returns a new predicate formed by OR-ing the predicates specified by subpredicates.

An OR predicate with no subpredicates evaluates to FALSE.

5.2.8 subpredicates as NSPredicateMBS()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the array of the receiver's subpredicates.

Example:

```
dim n1 as NSPredicateMBS = NSPredicateMBS.predicateWithValue(true)
```

```
dim n2 as NSPredicateMBS = NSPredicateMBS.predicateWithValue(false)
```

```
dim n as new NSCompoundPredicateMBS(NSCompoundPredicateMBS.kAnd, array(n1,n2))
```

```
for each x as NSPredicateMBS in n.subpredicates
```

```
MsgBox x.predicateFormat
```

```
next
```

5.2.9 Constants

Compound Predicate Types

Constant	Value	Description
kAnd	1	A logical AND predicate.
kNot	0	A logical NOT predicate.
kOR	2	A logical OR predicate.

5.3 class NSEXPRESSIONMBS

5.3.1 class NSEXPRESSIONMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: NSEXPRESSIONMBS is used to represent expressions in a predicate.

Notes: Comparison operations in an NSPREDICATE are based on two expressions, as represented by instances of the NSEXPRESSIONMBS class. Expressions are created for constant values, key paths, and so on.

Generally, anywhere in the NSEXPRESSIONMBS class hierarchy where there is composite API and subtypes that may only reasonably respond to a subset of that API, invoking a method that does not make sense for that subtype will cause an exception to be thrown.

See NSEXPRESSIONMBS class documentation on apple.com.

Blog Entries

- [More notes](#)
- [MBS Real Studio Plugins, version 11.3pr10](#)

5.3.2 Methods

5.3.3 arguments as Variant()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the arguments for the receiver.

Example:

```
dim args() as Variant
args.Append 5.0
dim n as NSEXPRESSIONMBS = NSEXPRESSIONMBS.expressionForFunction("abs:", args)

// query arguments
dim theargs() as Variant = n.arguments
MsgBox theargs(0)
```

Notes: Returns the arguments for the receiver—that is, the array of expressions that will be passed as parameters during invocation of the selector on the operand of a function expression.

This method raises an exception if it is not applicable to the receiver.

5.3.4 constantValue as Variant

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the constant value of the receiver.

Example:

```
dim n as NSEExpressionMBS = NSEExpressionMBS.expressionForConstantValue(5)
dim v as Variant = n.constantValue
MsgBox v.StringValue // shows 5
```

Notes: This method raises an exception if it is not applicable to the receiver.
Available in Mac OS X v10.4 and later.

5.3.5 Constructor(Type as Integer)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the receiver with the specified expression type.

Notes: Available in Mac OS X v10.4 and later.

5.3.6 expressionForAggregate(subexpressions() as NSEExpressionMBS) as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new aggregate expression for a given collection.

Notes: collection: A collection object that contains further expressions.

Returns a new expression that contains the expressions in collection.

5.3.7 expressionForConstantValue(value as Variant) as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new expression that represents a given constant value.

Example:

```
dim n as NSEExpressionMBS = NSEExpressionMBS.expressionForConstantValue(5)
dim v as Variant = n.constantValue
MsgBox v.StringValue // shows 5
```

Notes: obj: The constant value the new expression is to represent.

Returns a new expression that represents the constant value, obj.
Available in Mac OS X v10.4 and later.

5.3.8 expressionForEvaluatedObject as NSExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new expression that represents the object being evaluated.

Notes: Available in Mac OS X v10.4 and later.

5.3.9 expressionForFunction(FunctionName as string, arguments() as Variant) as NSExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new expression that will invoke one of the predefined functions.

Notes: name: The name of the function to invoke.

parameters: An array containing NSExpression objects that will be used as parameters during the invocation of selector.

For a selector taking no parameters, the array should be empty. For a selector taking one or more parameters, the array should contain one NSExpression object which will evaluate to an instance of the appropriate type for each parameter.

If there is a mismatch between the number of parameters expected and the number you provide during evaluation, an exception may be raised or missing parameters may simply be replaced by nil (which occurs depends on how many parameters are provided, and whether you have over- or underflow).

Returns a new expression that invokes the function name using the parameters in parameters.
The name parameter can be one of the following predefined functions.

See NSExpression class documentation on apple.com for details.

5.3.10 expressionForIntersectSet(LeftExpression as NSExpressionMBS, rightExpression as NSExpressionMBS) as NSExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new NSExpression object that represent the intersection of a given set and collection.

Notes: LeftExpression: An expression that evaluates to an NSSet object.

rightExpression: An expression that evaluates to a collection object (an instance of NSArray, NSSet, or

NSDictionary).

Returns a new NSExpression object that represents the intersection of left and right.
Available in Mac OS X v10.5 and later.

5.3.11 expressionForKeyPath(name as string) as NSExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new expression that invokes valueForKeyPath: with a given key path.

Notes: keyPath: The key path that the new expression should evaluate.

Returns a new expression that invokes valueForKeyPath: with keyPath.
Available in Mac OS X v10.4 and later.

5.3.12 expressionForMinusSet(LeftExpression as NSExpressionMBS, rightExpression as NSExpressionMBS) as NSExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new NSExpression object that represent the subtraction of a given collection from a given set.

Notes: LeftExpression: An expression that evaluates to an NSSet object.

rightExpression: An expression that evaluates to a collection object (an instance of NSArray, NSSet, or NSDictionary).

Returns a new NSExpression object that represents the subtraction of right from left.
Available in Mac OS X v10.5 and later.

5.3.13 expressionForUnionSet(LeftExpression as NSExpressionMBS, rightExpression as NSExpressionMBS) as NSExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new NSExpression object that represent the union of a given set and collection.

Notes: LeftExpression: An expression that evaluates to an NSSet object.

rightExpression: An expression that evaluates to a collection object (an instance of NSArray, NSSet, or NSDictionary).

Returns an new NSExpression object that represents the union of left and right.

Available in Mac OS X v10.5 and later.

5.3.14 expressionForVariable(name as string) as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a new expression that extracts a value from the variable bindings dictionary for a given key.

Notes: name: The key for the variable to extract from the variable bindings dictionary.

Returns a new expression that extracts from the variable bindings dictionary the value for the key string.
Available in Mac OS X v10.4 and later.

5.3.15 expressionType as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the expression type for the receiver.

Example:

```
dim n as NSEExpressionMBS = NSEExpressionMBS.expressionForVariable("hello")
MsgBox str(n.expressionType) // = NSVariableExpressionType
```

Notes: This method raises an exception if it is not applicable to the receiver.

5.3.16 expressionWithFormat(format as string) as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Creates an expression with the given format.

See also:

- 5.3.17 expressionWithFormat(format as string, arguments() as Variant) as NSEExpressionMBS 39

5.3.17 expressionWithFormat(format as string, arguments() as Variant) as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Creates an expression with the given format.

See also:

- 5.3.16 `expressionWithFormat(format as string) as NSEExpressionMBS`

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5.3.18 `functionName` as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the function for the receiver.

Example:

```
dim args() as Variant
args.Append "World"
args.Append 5.0
dim n as NSEExpressionMBS = NSEExpressionMBS.expressionForFunction("Hello", args)
```

```
MsgBox n.functionName
```

Notes: This method raises an exception if it is not applicable to the receiver.

5.3.19 `keyPath` as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the key path for the receiver.

Notes: This method raises an exception if it is not applicable to the receiver.
Available in Mac OS X v10.4 and later.

5.3.20 `leftExpression` as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the left expression of an aggregate expression.

Notes: This method raises an exception if it is not applicable to the receiver.
Available in Mac OS X v10.5 and later.

5.3.21 `operand` as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the operand for the receiver.

Notes: The operand for the receiver—that is, the object on which the selector will be invoked.
The object is the result of evaluating a key path or one of the defined functions. This method raises an

exception if it is not applicable to the receiver.
Available in Mac OS X v10.4 and later.

5.3.22 predicate as NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Return the predicate of a subquery expression.

Notes: This method raises an exception if it is not applicable to the receiver.
Available in Mac OS X v10.5 and later.

5.3.23 rightExpression as NSEExpressionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the right expression of an aggregate expression.

Notes: This method raises an exception if it is not applicable to the receiver.
Available in Mac OS X v10.5 and later.

5.3.24 variable as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the variable for the receiver.

Example:

```
dim n as NSEExpressionMBS = NSEExpressionMBS.expressionForVariable("hello")
MsgBox n.variable
```

Notes: This method raises an exception if it is not applicable to the receiver.
Available in Mac OS X v10.4 and later.

5.3.25 Properties

5.3.26 Handle as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The internal reference to the NSEExpression object.

Notes: (Read and Write property)

5.3.27 Constants

Expression Type Constants

Constant	Value	Description
<code>NSAggregateExpressionType</code>	14	An expression that defines an aggregate of <code>NSExpression</code> objects. Available in Mac OS X v10.5 and later.
<code>NSBlockExpressionType</code>	19	An expression that uses a <code>Block</code> . Available in Mac OS X v10.6 and later.
<code>NSConstantValueExpressionType</code>	0	An expression that always returns the same value. Available in Mac OS X v10.4 and later.
<code>NSEvaluatedObjectExpressionType</code>	1	An expression that always returns the parameter object itself. Available in Mac OS X v10.4 and later.
<code>NSFunctionExpressionType</code>	4	An expression that returns the result of evaluating a function. Available in Mac OS X v10.4 and later.
<code>NSIntersectSetExpressionType</code>	6	An expression that creates an intersection of the results of two nested expressions. Available in Mac OS X v10.5 and later.
<code>NSKeyPathExpressionType</code>	3	An expression that returns something that can be used as a key path. Available in Mac OS X v10.4 and later.
<code>NSMinusSetExpressionType</code>	7	An expression that combines two nested expression results by set subtraction. Available in Mac OS X v10.5 and later.
<code>NSSubqueryExpressionType</code>	13	An expression that filters a collection using a subpredicate. Available in Mac OS X v10.5 and later.
<code>NSUnionSetExpressionType</code>	5	An expression that creates a union of the results of two nested expressions. Available in Mac OS X v10.5 and later.
<code>NSVariableExpressionType</code>	2	An expression that always returns whatever value is associated with the key specified by <code>variable</code> in the bindings dictionary. Available in Mac OS X v10.4 and later.

5.4 class NSFileCoordinatorMBS

5.4.1 class NSFileCoordinatorMBS

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

Function: The class for file coordinating.

Notes: Please also check the documentation from Apple for the NSFileCoordinator class.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.2pr10](#)
- [MBS Real Studio Plugins, version 13.1pr9](#)
- [MBS Real Studio Plugins, version 11.3pr9](#)

5.4.2 Methods

5.4.3 addFilePresenter(filePresenter as NSFilePresenterMBS)

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

Function: Adds a new file presenter.

Notes: If you invoke addFilePresenter: you have to do a balancing invocation of removeFilePresenter before the file presenter is deallocated, even in a garbage-collected application.

If your application reads an item and then registers a file presenter for it there is a possible race condition in which between those two steps another process does coordinated reading or writing of the item, without any messages sent to your not-quite-registered file presenter. This can leave your file presenter ignorant of the fact that what it knows about the item it just read is already out of date, or under the misconception that just because it hasn't received a relinquish... method it owns the item. To avoid that race condition you can invoke addFilePresenter in the same block that you pass to coordinateReadingItemAtURL to read what the file presenter will present.

5.4.4 cancel

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

Function: Cancel all invocations of coordinate... and prepare... methods for the receiver.

Notes: Any current invocation of one of those methods will stop waiting and return immediately, unless it has already invoked the passed-in block, in which case it will return when the passed-in block returns. Subsequent invocations of those methods will not invoke the blocks passed into them at all. When an invocation of coordinate... or prepare... returns without invoking the passed-in block because this method was invoked it instead returns an error whose domain is NSCocoaErrorDomain and whose code is NSUserCancelledError. Messages that have already been sent to NSFilePresenters will not be cancelled but the file coordination

machinery will stop waiting for the replies.

This method this can be invoked from any thread. It always returns immediately, without waiting for anything. Cancellation is racy; you usually cannot assume that no block passed into a coordinate... or prepare... method is already being invoked, so the code inside those blocks typically still has to check for cancellation, whatever that means in your application.

5.4.5 Constructor(filePresenter as NSFilePresenterMBS = nil)

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

Function: The constructor.

Notes: The designated initializer. If an NSFilePresenter is provided then the receiver is considered to have been created by that NSFilePresenter, or on its behalf.

NSFileCoordinator is meant to be instantiated on a per-file-operation basis, where a file operation is something like the opening or saving of a document, or the copying or moving of a batch of folders and files. There is no benefit to keeping an instance of it alive in your application for much more time than it takes to actually perform the file operation. Doing so can be harmful, or at least wasteful of memory, because NSFileCoordinators may retain NSFilePresenters.

You pass an NSFilePresenter to this initializer when the operation whose file access is to be coordinated is being performed by that NSFilePresenter. Associating an NSFileCoordinator with an NSFilePresenter accomplishes a few important things:

- It prevents the NSFileCoordinator from sending messages to that NSFilePresenter, so the NSFilePresenter does not have to somehow filter out messages about its own file operations. The exception to this rule is that messages about versions of the presented item being added, remove, or resolved during coordinated writing are sent to every relevant NSFilePresenter, even the one passed to Constructor.
- It allows the file coordination mechanism to determine when coordinated writing is being done in response to an NSFilePresenter receiving a savePresentedItemChangesWithCompletionHandler message, and not deadlock. Usually coordinated writing done by one NSFileCoordinator must wait for coordinated reading of the same file or directory done by another NSFileCoordinator. But, for example, when coordinated reading is begun with one NSFileCoordinator, and that causes an NSFilePresenter to do coordinated writing using another NSFileCoordinator, the writing done with the second NSFileCoordinator should not wait for the completion of the first NSFileCoordinator's reading, it should instead happen while the first NSFileCoordinator is waiting to read.
- It allows the file coordination mechanism to handle a race condition that can occur when it has sent an NSFilePresenter a presentedItemDidMoveToURL message in the NSFilePresenter's operation queue but before that message is dequeued the NSFilePresenter enqueues, on a different queue, an operation using the old URL. For this to be effective however the NSFileCoordinator must be initialized in the same operation queue in which NSFilePresenter messages are received.
- It allows the file coordination mechanism to gracefully handle your application's registration of an NSFilePresenter that at first returns nil when sent presentedItemURL but can later return non-nil at the end of doing a coordinated write that creates the presented item in the file system for the very first time. AppKit

for example takes advantage of this by registering brand new untitled NSDocuments as NSFilePresenters immediately, instead of waiting until after the first time the user causes the document to be saved to a file, which would be more complicated.

For example, NSDocument creates a single NSFileCoordinator for all of the coordinated reading and writing it does during the saving of a document. It always creates the NSFileCoordinator in the main queue even when it is doing the actual coordinated reading and writing in a background queue to implement asynchronous saving.

5.4.6 `coordinateReadingItemAtURL`(File as folderitem, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initiates a read operation on a single file or directory using the specified options.

Notes: file: A URL identifying the file or directory to read. If other objects or processes are acting on the item at the URL, the actual URL passed to reader parameter may be different than the one in this parameter. The plugin converts the folderitem to an URL for you.

options: One of the reading options (see constants). If you pass 0 for this parameter, the `savePresentedItem-ChangesWithCompletionHandler` method of relevant file presenters is called before your block executes.

Error: If a file presenter encounters an error while preparing for this read operation, that error is returned in this parameter and the block in the reader parameter is not executed. If you cancel this operation before the reader block is executed, this parameter contains an error object on output.

The `coordinateReadingItemAtURL` event performs the file operations in a coordinated manner. This block receives an url and folderitem of the item and returns no value. Always use the URL/folderitem passed into the event instead of the value in the url parameter.

You use this method to perform read-related operations on a file or directory in a coordinated manner. This method executes synchronously, blocking the current thread until the reader event finishes executing. Before executing that event, though, the file coordinator waits until other relevant file presenter objects finish in-progress actions. Similarly, your read operation may cause pending actions for other file presenters to wait until your operations are complete. Whether or not the file coordinator waits depends on whether the item being read is a file or directory and also depends on other related operations.

If the url parameter specifies a file:

- This method waits for other writers of the exact same file to finish in-progress actions.
- This method waits if the file is a file package and other writers are writing to items in the package directory.
- This method does not wait for other readers of the file.

- This method does not wait for writers that are manipulating the parent directory of the file, unless one of those writers specified the `NSFileCoordinatorWritingForDeleting` or `NSFileCoordinatorWritingForMoving` option.

If the `url` parameter specifies a directory:

- This method waits if other write operations are occurring on the exact same directory.
- This method does not wait if write operations are occurring on items inside the directory (but not on the directory itself).
- This method does not wait for other readers of the directory.
- This method does not wait for writers that are manipulating the parent directory of the directory, unless one of those writers specified the `NSFileCoordinatorWritingForDeleting` or `NSFileCoordinatorWritingForMoving` option.

This method calls the `relinquishPresentedItemToReader` method of any relevant file presenters. This method is called both for file presenters in the current process and in other processes. Depending on the options you specify, other methods of the file presenters may also be called. When reading a file package directory, file presenter objects that are currently reading the contents of that file package also receive these notifications. All of the called methods must return successfully before the file coordinator executes your block. If multiple file presenters are operating on the item, the order in which those presenters are notified is undefined.

Do not nest calls to file coordinator methods inside the event. If you call this method or any of the other file coordination methods from inside your event, the file coordinator object throws an exception. If you want to perform a write operation from inside a read block, use the `coordinateWritingItemAtURL` method instead. If you want to perform a batch read operation on multiple files, use the `prepareForReadingItemsAtURLs` method.

Available in Mac OS X v10.7 and later.

See also:

- 5.4.22 `coordinateReadingItemAtURL(url as string, file as folderitem, tag as Variant)` 57
- 5.4.7 `coordinateReadingItemAtURL(URL as string, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 46

5.4.7 `coordinateReadingItemAtURL(URL as string, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initiates a read operation on a single file or directory using the specified options.

Notes: `url`: A URL identifying the file or directory to read. If other objects or processes are acting on the item at the URL, the actual URL passed to reader parameter may be different than the one in this

parameter.

options: One of the reading options (see constants). If you pass 0 for this parameter, the `savePresentedItemChangesWithCompletionHandler` method of relevant file presenters is called before your block executes.

Error: If a file presenter encounters an error while preparing for this read operation, that error is returned in this parameter and the block in the reader parameter is not executed. If you cancel this operation before the reader block is executed, this parameter contains an error object on output.

The `coordinateReadingItemAtURL` event performs the file operations in a coordinated manner. This block receives an url and folderitem of the item and returns no value. Always use the URL/folderitem passed into the event instead of the value in the url parameter.

You use this method to perform read-related operations on a file or directory in a coordinated manner. This method executes synchronously, blocking the current thread until the reader event finishes executing. Before executing that event, though, the file coordinator waits until other relevant file presenter objects finish in-progress actions. Similarly, your read operation may cause pending actions for other file presenters to wait until your operations are complete. Whether or not the file coordinator waits depends on whether the item being read is a file or directory and also depends on other related operations.

If the url parameter specifies a file:

- This method waits for other writers of the exact same file to finish in-progress actions.
- This method waits if the file is a file package and other writers are writing to items in the package directory.
- This method does not wait for other readers of the file.
- This method does not wait for writers that are manipulating the parent directory of the file, unless one of those writers specified the `NSFileCoordinatorWritingForDeleting` or `NSFileCoordinatorWritingForMoving` option.

If the url parameter specifies a directory:

- This method waits if other write operations are occurring on the exact same directory.
- This method does not wait if write operations are occurring on items inside the directory (but not on the directory itself).
- This method does not wait for other readers of the directory.
- This method does not wait for writers that are manipulating the parent directory of the directory, unless one of those writers specified the `NSFileCoordinatorWritingForDeleting` or `NSFileCoordinatorWritingForMoving` option.

This method calls the `relinquishPresentedItemToReader` method of any relevant file presenters. This method is called both for file presenters in the current process and in other processes. Depending on the options

you specify, other methods of the file presenters may also be called. When reading a file package directory, file presenter objects that are currently reading the contents of that file package also receive these notifications. All of the called methods must return successfully before the file coordinator executes your block. If multiple file presenters are operating on the item, the order in which those presenters are notified is undefined.

Do not nest calls to file coordinator methods inside the event. If you call this method or any of the other file coordination methods from inside your event, the file coordinator object throws an exception. If you want to perform a write operation from inside a read block, use the `coordinateWritingItemAtURL` method instead. If you want to perform a batch read operation on multiple files, use the `prepareForReadingItemsAtURLs` method.

Available in Mac OS X v10.7 and later.

See also:

- 5.4.6 `coordinateReadingItemAtURL`(File as folderitem, options as Integer, byref error as NSErrorMBS, tag as Variant = nil) 45
- 5.4.22 `coordinateReadingItemAtURL`(url as string, file as folderitem, tag as Variant) 57

5.4.8 `coordinateReadingItemAtURLwritingItemAtURL`(readingFile as folderitem, readingOptions as Integer, writingItemAtFile as folderitem, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initiates a read operation that contains a follow-up write operation.

Notes: `readingFile`: A URL identifying the file or directory to read. If other objects or processes are acting on the item at the URL, the actual URL passed to the block in the `readerWriter` parameter may be different than the one in this parameter.

`readingOptions`: One of the reading options (see constants). If you pass 0 for this parameter, the `savePresentedItemChangesWithCompletionHandler`: method of relevant file presenters is called before your block executes.

`writingItemAtFile`: A URL identifying the file or directory to write. If other objects or processes are acting on the item at the URL, the actual URL passed to the block in the `readerWriter` parameter may be different than the one in this parameter.

`writingOptions`: One of the writing options (see constants). The options you specify partially determine how file presenters are notified and how this file coordinator object waits to execute your block.

Error: If a file presenter encounters an error while preparing for this operation, that error is returned in this parameter and the event is not executed. If you cancel this operation before the `readerWriter` event is executed, this parameter contains an error object on output.

The `coordinateReadingItemAtURLwritingItemAtURL` event performs the read and write operations in a coordinated manner. This event receives URLs of the items to read and write and returns no value. Always use the URLs passed into the block instead of the values in the `readingURL` and `writingURL` parameters.

You use this method to perform a read operation that might also contain a write operation that needs to be coordinated. This method executes synchronously, blocking the current thread until the readerWriter event finishes executing. When performing the write operation, you may call the `coordinateWritingItemAtURL` method from your readerWriter block. This method does the canonical lock ordering that is required to prevent a potential deadlock of the file operations.

This method makes the same calls to file presenters, and has the same general wait behavior as the `coordinateReadingItemAtURL` method.

Available in Mac OS X v10.7 and later.

See also:

- 5.4.23 `coordinateReadingItemAtURLwritingItemAtURL(readingURL as string, readingFile as folderitem, writingURL as string, writingFile as folderitem, tag as Variant)` 57
- 5.4.9 `coordinateReadingItemAtURLwritingItemAtURL(readingURL as string, readingOptions as Integer, writingItemAtURL as string, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 49

5.4.9 `coordinateReadingItemAtURLwritingItemAtURL(readingURL as string, readingOptions as Integer, writingItemAtURL as string, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initiates a read operation that contains a follow-up write operation.

Notes: `readingURL`: A URL identifying the file or directory to read. If other objects or processes are acting on the item at the URL, the actual URL passed to the block in the `readerWriter` parameter may be different than the one in this parameter.

`readingOptions`: One of the reading options (see constants). If you pass 0 for this parameter, the `savePresentedItemChangesWithCompletionHandler`: method of relevant file presenters is called before your block executes.

`writingItemAtURL`: A URL identifying the file or directory to write. If other objects or processes are acting on the item at the URL, the actual URL passed to the block in the `readerWriter` parameter may be different than the one in this parameter.

`writingOptions`: One of the writing options (see constants). The options you specify partially determine how file presenters are notified and how this file coordinator object waits to execute your block.

Error: If a file presenter encounters an error while preparing for this operation, that error is returned in this parameter and the event is not executed. If you cancel this operation before the `readerWriter` event is executed, this parameter contains an error object on output.

The `coordinateReadingItemAtURLwritingItemAtURL` event performs the read and write operations in a coordinated manner. This event receives URLs of the items to read and write and returns no value. Always use the URLs passed into the block instead of the values in the `readingURL` and `writingURL` parameters.

You use this method to perform a read operation that might also contain a write operation that needs to be coordinated. This method executes synchronously, blocking the current thread until the `readerWriter` event finishes executing. When performing the write operation, you may call the `coordinateWritingItemAtURL` method from your `readerWriter` block. This method does the canonical lock ordering that is required to prevent a potential deadlock of the file operations.

This method makes the same calls to file presenters, and has the same general wait behavior as the `coordinateReadingItemAtURL` method.

Available in Mac OS X v10.7 and later.

See also:

- 5.4.8 `coordinateReadingItemAtURLwritingItemAtURL`(readingFile as folderitem, readingOptions as Integer, writingItemAtFile as folderitem, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil) 48
- 5.4.23 `coordinateReadingItemAtURLwritingItemAtURL`(readingURL as string, readingFile as folderitem, writingURL as string, writingFile as folderitem, tag as Variant) 57

5.4.10 `coordinateWritingItemAtURL`(File as folderitem, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initiates a write operation on a single file or directory using the specified options.

Notes: File: A URL identifying the file or directory to write. If other objects or processes are acting on the item at the URL, the actual URL passed to writer parameter may be different than the one in this parameter. (plugin converts from folderitem to URL for you)

options: One of the writing options (see constants). The options you specify partially determine how file presenters are notified and how this file coordinator object waits to execute your `coordinateWritingItemAtURL` event.

error: If a file presenter encounters an error while preparing for this write operation, that error is returned in this parameter and the event in the writer parameter is not executed. If you cancel this operation before the writer event is executed, this parameter contains an error object on output.

The `coordinateWritingItemAtURL` event performs the file operations in a coordinated manner. This event receives the file reference containing the URL of the item and returns no value. Always use the UR passed into the block instead of the value in the url parameter.

You use this method to perform write-related operations on a file or directory in a coordinated manner. This method executes synchronously, blocking the current thread until the writer block finishes executing. Before executing the block, though, the file coordinator waits until other relevant file presenter objects finish in-progress actions. Similarly, your write operation may cause pending actions for other file presenters to wait until your operations are complete. Whether or not the file coordinator waits depends on whether the item being written is a file or directory and also depends on other related operations.

If the url parameter specifies a file:

- This method waits for other readers and writers of the exact same file to finish in-progress actions.
- This method waits if the file is a file package and other writers are reading or writing items in the package directory.
- This method does not wait for readers or writers that are manipulating the parent directory of the file, unless one of those writers specified the `NSFileCoordinatorWritingForDeleting` or `NSFileCoordinatorWritingForMoving` option.

If the url parameter specifies a directory:

- This method waits if other read or write operations are occurring on the exact same directory.
- This method does not wait if read or write operations are occurring on items inside the directory (but not on the directory itself).
- This method does not wait for readers or writers that are manipulating the parent directory of the directory, unless one of those writers specified the `NSFileCoordinatorWritingForDeleting` or `NSFileCoordinatorWritingForMoving` option.

This method calls the `relinquishPresentedItemToWriter` method of any relevant file presenters. This method is called both for file presenters in the current process and in other processes. Depending on the options you specify, other methods of the file presenters may also be called. When writing a file package directory, file presenter objects that are currently reading or writing the contents of that file package also receive these notifications. All of the called methods must return successfully before the file coordinator executes your block. If multiple file presenters are operating on the item, the order in which those presenters are notified is undefined.

Note: When deleting an item inside a file package using the `NSFileCoordinatorWritingForDeleting` option, the file coordinator does not call the `accommodatePresentedItemDeletionWithCompletionHandler` method of any file presenters monitoring the file package directory itself. Instead, the delete operation is treated as a write operation on the file package.

With one exception, do not nest calls to file coordinator methods inside the block you pass to this method. You may call the `coordinateReadingItemAtURL` method to read the file if you discover through modification-date checking that the contents of the file have changed. However, if you call this method from inside your block, the file coordinator object throws an exception.

Available in Mac OS X v10.7 and later.

See also:

- 5.4.24 `coordinateWritingItemAtURL(url as string, file as folderitem, tag as Variant)` 58
- 5.4.11 `coordinateWritingItemAtURL(URL as string, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 52

5.4.11 `coordinateWritingItemAtURL(URL as string, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initiates a write operation on a single file or directory using the specified options.

Notes: `url`: A URL identifying the file or directory to write. If other objects or processes are acting on the item at the URL, the actual URL passed to `writer` parameter may be different than the one in this parameter.

`options`: One of the writing options (see constants). The options you specify partially determine how file presenters are notified and how this file coordinator object waits to execute your `coordinateWritingItemAtURL` event.

`error`: If a file presenter encounters an error while preparing for this write operation, that error is returned in this parameter and the event in the `writer` parameter is not executed. If you cancel this operation before the `writer` event is executed, this parameter contains an error object on output.

The `coordinateWritingItemAtURL` event performs the file operations in a coordinated manner. This event receives the file reference containing the URL of the item and returns no value. Always use the UR passed into the block instead of the value in the `url` parameter.

You use this method to perform write-related operations on a file or directory in a coordinated manner. This method executes synchronously, blocking the current thread until the `writer` block finishes executing. Before executing the block, though, the file coordinator waits until other relevant file presenter objects finish in-progress actions. Similarly, your write operation may cause pending actions for other file presenters to wait until your operations are complete. Whether or not the file coordinator waits depends on whether the item being written is a file or directory and also depends on other related operations.

If the `url` parameter specifies a file:

- This method waits for other readers and writers of the exact same file to finish in-progress actions.
- This method waits if the file is a file package and other writers are reading or writing items in the package directory.
- This method does not wait for readers or writers that are manipulating the parent directory of the file, unless one of those writers specified the `NSFileCoordinatorWritingForDeleting` or `NSFileCoordinatorWritingForMoving` option.

If the `url` parameter specifies a directory:

- This method waits if other read or write operations are occurring on the exact same directory.
- This method does not wait if read or write operations are occurring on items inside the directory (but not on the directory itself).

- This method does not wait for readers or writers that are manipulating the parent directory of the directory, unless one of those writers specified the `NSFileCoordinatorWritingForDeleting` or `NSFileCoordinatorWritingForMoving` option.

This method calls the `relinquishPresentedItemToWriter` method of any relevant file presenters. This method is called both for file presenters in the current process and in other processes. Depending on the options you specify, other methods of the file presenters may also be called. When writing a file package directory, file presenter objects that are currently reading or writing the contents of that file package also receive these notifications. All of the called methods must return successfully before the file coordinator executes your block. If multiple file presenters are operating on the item, the order in which those presenters are notified is undefined.

Note: When deleting an item inside a file package using the `NSFileCoordinatorWritingForDeleting` option, the file coordinator does not call the `accommodatePresentedItemDeletionWithCompletionHandler` method of any file presenters monitoring the file package directory itself. Instead, the delete operation is treated as a write operation on the file package.

With one exception, do not nest calls to file coordinator methods inside the block you pass to this method. You may call the `coordinateReadingItemAtURL` method to read the file if you discover through modification-date checking that the contents of the file have changed. However, if you call this method from inside your block, the file coordinator object throws an exception.

Available in Mac OS X v10.7 and later.

See also:

- 5.4.10 `coordinateWritingItemAtURL`(File as folderitem, options as Integer, byref error as NSErrorMBS, tag as Variant = nil) 50
- 5.4.24 `coordinateWritingItemAtURL`(url as string, file as folderitem, tag as Variant) 58

5.4.12 filePresenters as NSFilePresenterMBS()

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

Function: The process' file presenters.

5.4.13 FileURL(file as folderitem) as string

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

Function: Convenience method to give you an URL for a folderitem.

5.4.14 `itemAtURLdidMoveToURL(oldURL as string, newURL as string)`

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

Function: Announce that the item located by a URL is now located by another URL.

Notes: This triggers the sending of messages to `NSFilePresenters` that implement the corresponding optional methods, even those in other processes, except the one specified when `-initWithFilePresenter:` was invoked:

- `presentedItemDidMoveToURL:` is sent to `NSFilePresenters` of the item.
- If the item is a directory then `presentedItemDidMoveToURL` is sent to `NSFilePresenters` of each item contained by it.
- `presentedSubitemAtURL` is sent to `NSFilePresenters` of each directory that contains the item, unless that method is not implemented but `presentedItemDidChange` is, and the directory is actually a file package, in which case `presentedItemDidChange` is sent instead.

Useless invocations of this method are harmless, so you don't have to write code that compares `NSURLs` for equality, which is not straightforward. This method must be invoked from within the block passed to an invocation of `coordinateWritingItemAtURL`.

5.4.15 `itemAtURLwillMoveToURL(oldURL as string, newURL as string)`

Plugin Version: 13.1, Platform: macOS, Targets: All.

Function: Announce that the item located by a URL is going to be located by another URL.

Notes: Support for App Sandbox on OS X. Some applications can rename files while saving them. For example, when a user adds attachments to a rich text document, `TextEdit` changes the document's extension from `.rtf` to `.rtfd`. A sandboxed application like `TextEdit` must ordinarily prompt the user for approval before renaming a document. You can invoke this method to make your process declare its intent to rename a document without user approval. After the renaming succeeds you must invoke `itemAtURLdidMoveToURL`, with the same arguments, for the process to keep access to the file with its new name and to give up access to any file that appears with the old name. If the renaming fails you should probably not invoke `itemAtURLwillMoveToURL`.

There is no reason to invoke this method from applications that do not use App Sandbox. Invoking it does nothing on iOS.

5.4.16 `prepareForReadingItemsAtURLs(readingFiles() as folderitem, readingOptions as Integer, writingItemsAtFiles() as folderitem, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Prepare to read or write from multiple files in a single batch operation.

Notes: `readingFiles`: An array of folderitems identifying the items you want to read.

`readingOptions`: One of the reading options (see constants). If you pass 0 for this parameter, the `savePresentedItemChangesWithCompletionHandler` method of relevant file presenters is called before the `prepareComplete` event executes.

`writingItemsAtFiles`: An array of folderitems identifying the items you want to write.

`writingOptions`: One of the writing options (see constants). The options you specify partially determine how file presenters are notified and how this file coordinator object waits to execute your block.

Error: If a file presenter encounters an error while preparing for this operation, that error is returned in this parameter and the block in the `writer` parameter is not executed. If you cancel this operation before the `batchAccessor` block is executed, this parameter contains an error object on output.

The `prepareComplete` event is called and receives a completion handler that it must execute when it has finished its read and write calls.

You use this method to prepare the file coordinator for multiple read and write operations. This method executes synchronously, blocking the current thread until the `prepareComplete` event finishes executing. The event does not perform the actual operations itself but calls the `coordinateReadingItemAtURL` and `coordinateWritingItemAtURL` methods to perform them. The reason to call this method first is to improve performance when reading and writing large numbers of files or directories.

Because file coordination requires interprocess communication, it is much more efficient to batch changes to large numbers of files and directories than to change each item individually. The file coordinator uses the values in the `readingURLs` and `writingURLs` parameters together with reading and writing options to prepare any relevant file presenters for the upcoming operations. Specifically, it uses these parameters in the same way as the `coordinateReadingItemAtURL` and `coordinateWritingItemAtURL` methods to determine which file presenter methods to call.

Available in Mac OS X v10.7 and later.

See also:

- 5.4.17 `prepareForReadingItemsAtURLs(readingURLs() as string, readingOptions as Integer, writingItemsAtURLs() as string, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 55

5.4.17 `prepareForReadingItemsAtURLs(readingURLs() as string, readingOptions as Integer, writingItemsAtURLs() as string, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil)`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Prepare to read or write from multiple files in a single batch operation.

Notes: `readingURLs`: An array of url strings identifying the items you want to read.

`readingOptions`: One of the reading options (see constants). If you pass 0 for this parameter, the `savePre-`

sentedItemChangesWithCompletionHandler method of relevant file presenters is called before the prepareComplete event executes.

writingItemsAtURLs: An array of url strings identifying the items you want to write.

writingOptions: One of the writing options (see constants). The options you specify partially determine how file presenters are notified and how this file coordinator object waits to execute your block.

Error: If a file presenter encounters an error while preparing for this operation, that error is returned in this parameter and the block in the writer parameter is not executed. If you cancel this operation before the batchAccessor block is executed, this parameter contains an error object on output.

The prepareComplete event is called and receives a completion handler that it must execute when it has finished its read and write calls.

You use this method to prepare the file coordinator for multiple read and write operations. This method executes synchronously, blocking the current thread until the prepareComplete event finishes executing. The event does not perform the actual operations itself but calls the coordinateReadingItemAtURL and coordinateWritingItemAtURL methods to perform them. The reason to call this method first is to improve performance when reading and writing large numbers of files or directories.

Because file coordination requires interprocess communication, it is much more efficient to batch changes to large numbers of files and directories than to change each item individually. The file coordinator uses the values in the readingURLs and writingURLs parameters together with reading and writing options to prepare any relevant file presenters for the upcoming operations. Specifically, it uses these parameters in the same way as the coordinateReadingItemAtURL and coordinateWritingItemAtURL methods to determine which file presenter methods to call.

Available in Mac OS X v10.7 and later.

See also:

- 5.4.16 prepareForReadingItemsAtURLs(readingFiles() as folderitem, readingOptions as Integer, writingItemsAtFiles() as folderitem, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil) 54

5.4.18 removeFilePresenter(filePresenter as NSFilePresenterMBS)

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

Function: Removes the file presenter.

5.4.19 Properties

5.4.20 Handle as Integer

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

Function: The internal reference to the NSFileCoordinator object.

Notes: (Read and Write property)

5.4.21 Events

5.4.22 `coordinateReadingItemAtURL(url as string, file as folderitem, tag as Variant)`

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: The event called from `coordinateReadingItemAtURL` method.

Notes: The plugin provides the URL and for your convenience a folderitem.

See also:

- 5.4.6 `coordinateReadingItemAtURL(File as folderitem, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 45
- 5.4.7 `coordinateReadingItemAtURL(URL as string, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 46

5.4.23 `coordinateReadingItemAtURLwritingItemAtURL(readingURL as string, readingFile as folderitem, writingURL as string, writingFile as folderitem, tag as Variant)`

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: The event called from `coordinateReadingItemAtURLwritingItemAtURL` method.

Notes: The plugin provides the URLs and for your convenience also folderitems.

See also:

- 5.4.8 `coordinateReadingItemAtURLwritingItemAtURL(readingFile as folderitem, readingOptions as Integer, writingItemAtFile as folderitem, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 48
- 5.4.9 `coordinateReadingItemAtURLwritingItemAtURL(readingURL as string, readingOptions as Integer, writingItemAtURL as string, writingOptions as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 49

5.4.24 `coordinateWritingItemAtURL(url as string, file as folderitem, tag as Variant)`

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: The event called from `coordinateWritingItemAtURL` method.

Notes: The plugin provides the URL and for your convenience a folderitem.

See also:

- 5.4.10 `coordinateWritingItemAtURL(File as folderitem, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 50
- 5.4.11 `coordinateWritingItemAtURL(URL as string, options as Integer, byref error as NSErrorMBS, tag as Variant = nil)` 52

5.4.25 `prepareComplete(Complete as NSFilePresenterHandlerMBS, tag as Variant)`

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: This event is called by `prepareForReadingItemsAtURLs`.

Notes: You must call the complete handler when you are done.

5.4.26 Constants

Reading flag constants.

Constant	Value	Description
<code>NSFileCoordinatorReadingResolvesSymbolicLink</code>	2	Whether reading of an item that might be a symbolic link file will attempt resolution of the link if it is. This affects the URL passed to the handler in an invocation of one of the <code>coordinateReadingItemAtURL...</code> methods. This is not a valid option to use with <code>prepareForReadingItemsAtURLs</code> .
<code>NSFileCoordinatorReadingWithoutChanges</code>	1	Whether reading does <code>_not_</code> trigger sending of <code>savePresentedItemChangesWithoutHandler</code> to certain <code>NSFilePresenters</code> and waiting for those <code>NSFilePresenters</code> to respond. The default behavior of coordinated reading is to send <code>savePresentedItemChangesWithoutHandler</code> to <code>NSFilePresenters</code> .

Writing flag constants.

Constant	Value	Description
<code>NSFileCoordinatorWritingForDeleting</code>	1	Whether the writing to be done is actually the deletion of the item. This affects how the writing waits for previously scheduled coordinated reading and writing, how the writing causes subsequently scheduled reading and writing to wait, and what <code>NSFilePresenter</code> messaging is done. See the comment in the Single File Coordination section below. This option is how you accommodate sending of <code>accommodatePresentedItemDeletionWithCompletionHandler</code> and <code>accommodatePresentedSubitemDeletionAtURL</code> messages to <code>NSFilePresenters</code> . For example, Finder uses this when it's emptying the trash to give <code>NSFilePresenters</code> a chance to close documents before their files disappear, or to disappear if the files weren't still open.
<code>NSFileCoordinatorWritingForMerging</code>	4	Whether coordinated writing triggers sending of <code>savePresentedChangesWithCompletionHandler</code> to certain <code>NSFilePresenters</code> in the system and waiting for those <code>NSFilePresenters</code> to respond.
<code>NSFileCoordinatorWritingForMoving</code>	2	Whether the writing to be done is actually the moving or renaming of the item. This affects how the writing waits for previously scheduled coordinated reading and writing, how the writing causes subsequently scheduled reading and writing to wait, and what <code>NSFilePresenter</code> messaging is done. See the comment in the Single File Coordination section below. This option has no effect when the item being moved is a plain file so you can use it in code that moves file items without checking whether the items are files or directories. An explicit check would invite a race condition anyway. For example, Finder uses this when it's moving items that the user has created and dropped so as not to yank files contained by moved folders out from underneath applications that are reading or writing those files.
<code>NSFileCoordinatorWritingForReplacing</code>	8	Whether the writing to be done is actually the replacement of the item with a different item. It causes the same behavior as <code>NSFileCoordinatorWritingForDeleting</code> except that when the item being written to is renamed or deleted while the writer is being made to wait the item is considered to have become a different item, so the writer is not passed an updated URL to reflect the change in writing or moving. Use this when the moving or creation of an item will replace any item that gets in its way. To avoid a race condition use it regardless of whether there is actually an item in the way before the writing begins. Use this when simply updating the contents of a file, even if the way to do that is writing the contents to another file and renaming it into place. This is not a valid option to use with <code>prepareForReadingItemsAtURLs</code> . For example, <code>NSDocument</code> uses this for <code>NSSaveAsOperation</code> and <code>NSSaveOperation</code> to announce that it is possibly overwriting an item with a new file or file package. This gives any <code>NSFilePresenter</code> of the overwriting item, including perhaps a different instance of <code>NSDocument</code> , perhaps from the same application, a chance to close itself before the item is overwritten. For another example, the most accurate and safe way to coordinate a move is to invoke <code>coordinateWritingItemAtURL</code> using the <code>NSFileCoordinatorWritingForMoving</code> option with the source URL and <code>NSFileCoordinatorWritingForReplacing</code> with the destination URL.

5.5 class NSFilePresenterHandlerMBS

5.5.1 class NSFilePresenterHandlerMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The class for a callback.

Notes: Some iCloud related functions in NSFileCoordinatorMBS or NSFilePresenterMBS require that you call a function to notify the caller that you are finished doing some work.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr9](#)

5.5.2 Methods

5.5.3 Destructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Cleans up.

5.5.4 Run(errorOrNil as NSErrorMBS = nil)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Calls the callback.

Notes: As some callbacks ask for an error object in case of an error, you can pass one. Other callbacks don't take a parameter.

5.6 class NSFilePresenterMBS

5.6.1 class NSFilePresenterMBS

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

Function: The plugin class to implement the NSFilePresenter protocol.

Notes: A protocol to be implemented by objects that present the contents of files or directories to the user for viewing or editing. The objects can take an active role in operations that access those files or directories, even operations performed by other processes in the system. For an NSFilePresenter to be aware of such file access it must be "coordinated" file access. Starting in version 10.7 many components of Mac OS X use NSFileCoordinatorMBS, including AppKit, Finder, and various applications. NSDocument conforms to the NSFilePresenter protocol and has useful implementations of all of its methods. You are unlikely to have to implement NSFilePresenter yourself in an NSDocument-based application.

See the comments for NSFileCoordinator.Constructor for information about how an NSFilePresenter can avoid receiving messages about its own reading and writing.

You can consider "item" in method names in this header file to be an abbreviation of "fileOrDirectory." As always, a directory might actually be a file package.

Please also check the documentation from Apple for the NSFilePresenter protocol.

Blog Entries

- [MBS Real Studio Plugins, version 13.1pr9](#)
- [MBS Real Studio Plugins, version 11.3pr9](#)

5.6.2 Methods

5.6.3 Constructor

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

Function: The constructor.

5.6.4 Destructor

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

Function: The destructor.

5.6.5 Properties

5.6.6 Handle as Integer

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

Function: The internal reference to the NSFilePresenter object.

Notes: (Read and Write property)

5.6.7 Events

5.6.8 accommodatePresentedItemDeletionWithCompletionHandler(Complete as NSFilePresenterHandlerMBS)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Tells your object that its presented item is about to be deleted.

Notes: Complete: The complete handler object to call after updating your data structures. Pass nil to the run method's errorOrNil parameter if you were able to successfully prepare for the deletion of the item. Pass an error object if your object could not prepare itself properly.

A file coordinator calls this method when your object's presented item is about to be deleted. You can use this method to perform any actions that are needed to prepare for the deletion. For example, document objects typically use this method to close the document.

Important: If you implement this method, you must execute the run method in the complete parameter at the end of your implementation. The system waits for you to execute that method before allowing the other object to delete the file or directory. Therefore, failure to execute the method could stall threads in your application or other processes.

Available in Mac OS X v10.7 and later.

5.6.9 accommodatePresentedSubitemDeletionAtURL(URL as string, file as FolderItem, Complete as NSFilePresenterHandlerMBS)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Tells the delegate that some entity wants to delete an item that is inside of a presented directory. (required)

Notes: url: The URL of the item being deleted from the presented directory. The item need not be at the top level of the presented directory but may itself be inside a nested subdirectory.

file: URL as folderitem.

complete: The complete handler object to call after updating your data structures. Pass nil to the run method's errorOrNil parameter if you were able to successfully prepare for the deletion of the item. Pass an error object if your object could not prepare itself properly.

This method is relevant for applications that present directories. This might occur if the delegate manages the contents of a directory or manages a file that is implemented as a file package. When called, your implementation of this method should take whatever actions needed to update your application to handle the deletion of the specified file.

Important: If you implement this method, you must execute the run method in the Complete parameter at the end of your implementation. The system waits for you to execute that method before allowing the other object to delete the item at the specified URL. Therefore, failure to execute the method could stall threads in your application or in other processes.

Available in Mac OS X v10.7 and later.

5.6.10 presentedItemDidChange

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

Function: This event is called when the item changed.

Notes: Be notified that the file or file package's contents or attributes have been written to. Because this method may be invoked when the attributes have changed but the contents have not, implementations that read the contents must use modification date checking to avoid needless rereading. They should check that the modification date has changed since the receiver most recently read from or wrote to the item. To avoid race conditions, getting the modification date should typically be done within invocations of one of the NSFileCoordinatorMBS.coordinate... methods.

For example, NSDocument implements this method to react to both contents changes (like the user overwriting the document file with another application) and attribute changes (like the user toggling the "Hide extension" checkbox in a Finder info panel). It uses modification date checking as described above.

Not all programs use file coordination. Your NSFileProvider may be sent this message without being sent relinquishPresentedItemToWriter first. Make your application do the best it can in that case.

5.6.11 presentedItemDidGainVersion(version as NSFileVersionMBS)

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

Function: Be notified that something in the system has added a version of the file or file package.

5.6.12 `presentedItemDidLoseVersion(version as NSFileVersionMBS)`

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

Function: Be notified that something in the system has removed a version of the file or file package.

5.6.13 `presentedItemDidMoveToURL(url as string, file as folderitem)`

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

Function: Be notified that the file or directory has been moved or renamed, or a directory containing it has been moved or renamed.

Notes: A typical implementation of this method will cause subsequent invocations of `presentedItemURL` to return the new URL.

The new URL may have a different file name extension than the current value of the `presentedItemURL` property.

For example, `NSDocument` implements this method to handle document file moving and renaming. A shoe-box application would only implement this method to be robust against surprising things like the user moving its data directory while the application is running.

Not all programs use file coordination. Your `NSFileProvider` may be sent this message without being sent `relinquishPresentedItemToWriter` first. Make your application do the best it can in that case.

5.6.14 `presentedItemDidResolveConflictVersion(version as NSFileVersionMBS)`

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

Function: Be notified that something in the system has resolved a version of the file or file package.

5.6.15 `presentedItemURL as string`

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

Function: The URL that locates the file or directory that the receiver is presenting to the user.

Notes: Implementations of this method must be prepared to be invoked by Cocoa in any queue, at any time, including from within invocations of `NSFileCoordinator` methods. A `nil` value is valid and means that the presented item does not exist yet. An `NSFilePresenter` with a `nil` `presentedItemURL` will be asked for its `presentedItemURL` again when coordinated file access on behalf of that `NSFilePresenter` completes, in case the presented item was just created.

For example, `NSDocument` has a `-presentedItemURL` method that usually returns `self.fileURL`. In a shoebox application that stores the user's data in files somewhere on the user's computer you can implement this method to specify the directory that contains those files.

5.6.16 `presentedSubitemAtURLdidGainVersion(URL as string, file as FolderItem, version as NSFileVersionMBS)`

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Tells the delegate that the item inside the presented directory gained a new version. (required)

Notes: `url`: The URL of the item inside the presented directory that gained a new version. The item need not be at the top level of the presented directory but may itself be inside a nested subdirectory.

`file`: `url` as `folderitem`.

`version`: The file version object containing information about the new file version.

Your delegate can use this method to determine how to incorporate data from the new version of the item. This might involve incorporating the version silently or asking the user about how to proceed.

Available in Mac OS X v10.7 and later.

5.6.17 `presentedSubitemAtURLdidLoseVersion(URL as string, file as FolderItem, version as NSFileVersionMBS)`

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Tells the delegate that the item inside the presented directory lost an existing version. (required)

Notes: `url`: The URL of the item inside the presented directory that lost a version. The item need not be at the top level of the presented directory but may itself be inside a nested subdirectory.

`file`: URL as `folderitem`.

`version`: The file version object containing information about the version that was removed.

Your delegate can use this method to determine how to handle the loss of the specified file version. For an old version, you might not have to do anything. However, if your application is currently using the lost version, you would need to update your application's user interface or prompt the user about how to proceed.

Available in Mac OS X v10.7 and later.

5.6.18 `presentedSubitemAtURLdidMoveToURL`(oldURL as string, newURL as string, oldFile as folderitem, newFile as folderitem)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Tells the delegate that an item in the presented directory moved to a new location. (required)
Notes: oldURL: The original URL of the item inside the presented directory. The item need not be at the top level of the presented directory but may itself be inside a nested subdirectory.
 newURL: The new URL for the item. This URL may or may not be located inside the presented directory.
 oldFile: oldURL as folderitem.
 newFile: newURL as folderitem.

This method is relevant for applications that present directories. This might occur if the delegate manages the contents of a directory or manages a file that is implemented as a file package. Your implementation of this method should take whatever actions necessary to handle the change in location of the specified item. For example, you might update references to the item in your application's data structures and refresh your user interface.

If the presented directory is a file package, the system calls the `presentedItemDidChange` method if your delegate does not implement this method.

Available in Mac OS X v10.7 and later.

5.6.19 `presentedSubitemAtURLdidResolveConflictVersion`(URL as string, file as FolderItem, version as NSFileVersionMBS)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Tells the delegate that the item inside the presented directory had a version conflict resolved by an outside entity. (required)
Notes: url: The URL of the item inside the presented directory that was in conflict. The item need not be at the top level of the presented directory but may itself be inside a nested subdirectory.
 file: URL as folderitem.
 version: The version object containing the conflicting change.

Your delegate can use this method to respond to the resolution of a version conflict by a different file presenter. This might occur if a version of your application running on another device resolves the conflict first. You might then use this method to update your user interface to indicate that there is no longer a conflict.

Available in Mac OS X v10.7 and later.

5.6.20 presentedSubitemDidAppearAtURL(URL as string, file as FolderItem)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Tells the delegate that an item was added to the presented directory. (required)

Notes: url: The URL of the item being added to the presented directory. The item need not be at the top level of the presented directory but may itself be inside a nested subdirectory.

file: URL as a folderitem.

This method is relevant for applications that present directories. This might occur if the delegate manages the contents of a directory or manages a file that is implemented as a file package. Your implementation of this method should take whatever actions necessary to incorporate the new file or directory into the presented content. For example, you might add the new item to your application's data structures and refresh your user interface.

If the presented directory is a file package, the system calls the presentedItemDidChange method if your delegate does not implement this method.

Available in Mac OS X v10.7 and later.

5.6.21 presentedSubitemDidChangeAtURL(URL as string, file as FolderItem)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Tells the delegate that the contents or attributes of the specified item changed. (required)

Notes: url: The URL of the item in the presented directory that changed. The item need not be at the top level of the presented directory but may itself be inside a nested subdirectory.

This method is relevant for applications that present directories. This might occur if the delegate manages the contents of a directory or manages a file that is implemented as a file package. Your implementation of this method should take whatever actions necessary to handle the change in content or attributes of the specified item.

If the presented directory is a file package, the system calls the presentedItemDidChange method if your delegate does not implement this method.

Available in Mac OS X v10.7 and later.

5.6.22 primaryPresentedItemURL as string

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

Function: The URL of a secondary item’s primary presented file or directory. (read-only)

Notes: This property supports App Sandbox in OS X.

Some apps require access to secondary files or directories with names that are related to the primary, user-selected file. For example, a subtitle file, by convention, has the same name as its corresponding movie file, but with a different filename extension. If a movie player is sandboxed, an `NSOpenPanel` object will grant access only to the user-selected movie file (the primary item) and not its associated subtitle file (the secondary item).

To gain access to a secondary item, first register an `NSFilePresenter` object for it. At any point in its existence, a secondary item must be able to return an `NSURL` object to its primary item. This is done by using this property. When done accessing the secondary item, unregister the file presenter object.

Available in OS X v10.8 and later.

5.6.23 reacquirer

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: The reacquirer event.

Notes: Called when you can reacquire an object.

e.g. called by `relinquishPresentedItemToReader` method.

5.6.24 relinquishPresentedItemToReader(reader as NSFilePresenterHandlerMBS)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Notifies your object that another object or process wants to read the presented file or directory.

Notes: reader: A handler object. The reacquirer event is called to notify when the reader is done. If your object does not need to be notified, it can pass `nil` for the reacquirer block.

You use this method to provide an appropriate response when another object wants to read from your presented URL. For example, when this method is called, you might temporarily stop making changes to the file or directory. After taking any appropriate steps, you must execute the block in the reader parameter to let the waiting object know that it may now proceed with its task. If you want to be notified when the reader has completed its task, pass your own block to the reader and use that block to reacquire the file or URL for your own uses.

Important: If you implement this method, you must execute the `run` method in the reader parameter as part of your implementation. The system waits for you to execute that method before allowing the reader to operate on the file. Therefore, failure to execute the method could stall threads in your application or

other processes until the user takes corrective actions.

Your implementation of this method is executed using the queue in the `presentedItemOperationQueue` property. Your reacquirer event is executed on the queue associated with the reader.

Available in Mac OS X v10.7 and later.

5.6.25 `relinquishPresentedItemToWriter(writer as NSFilePresenterHandlerMBS)`

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Notifies your object that another object or process wants to write to the presented file or directory.

Notes: `writer`: A complete handler object. The reacquirer event is called so that your object can be notified when the writer is done.

You use this method to provide an appropriate response when another object wants to write to your presented URL. For example, when this method is called, you would likely stop making changes to the file or directory. After taking any appropriate steps, you must execute the `run` method in the `writer` parameter to let the waiting object know that it may now proceed with its task.

Important: If you implement this method, you must execute the `run` method in the `writer` parameter at the end of your implementation. The system waits for you to execute that block before allowing the writer to operate on the file. Therefore, failure to execute the `run` method could stall threads in your application or other processes.

If the writer changes the file or directory, you do not need to incorporate those changes in your reacquirer block. Instead, implement the `presentedItemDidChange` method and use it to detect when a writer actually wrote its changes to disk.

Your implementation of this method is executed using the queue in the `presentedItemOperationQueue` property. Your reacquirer event is executed on the queue associated with the writer.

Available in Mac OS X v10.7 and later.

5.6.26 `savePresentedItemChangesWithCompletionHandler(Complete as NSFilePresenterHandlerMBS)`

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Tells your object to save any unsaved changes for the presented item.

Notes: `Complete`: The handler object to call after you save your changes. If you saved your changes suc-

cessfully, pass nil for the run's errorOrNil parameter; otherwise, pass an error object indicating why the changes could not be saved.

The file coordinator calls this method to ensure that all objects trying to access the file or directory see the same contents. Implement this method if your object can change the presented item in a way that requires you to write those changes back to disk. If your presenter object does not make changes that need to be saved, you do not need to implement this method.

Important: If you implement this method, you must execute the run method in the Complete parameter at the end of your implementation. The system waits for you to execute that block before allowing other objects to operate on the file. Therefore, failure to execute the run method could stall threads in your application or other processes.

Available in Mac OS X v10.7 and later.

5.7 class NSFileVersionMBS

5.7.1 class NSFileVersionMBS

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

Function: The class for different file versions on Mac OS X 10.7.

Notes: Instances of NSFileVersionMBS for the same version of the same file are equal, and instances of NSFileVersionMBS for different versions of the same file are not equal, but the equality of NSFileVersionMBSs for different files is undefined. Repeated invocations of the methods that return NSFileVersionMBSs do not necessarily return the exact same instance of NSFileVersionMBS.

An NSFileVersion object represents a snapshot of a file at a specific point in time. You use the NSFileVersion class to access and create and manage file revisions in your application. Each instance of this class contains meta information about a single revision, such as the location of the file containing the revision data, the modification date of the revision, and whether the revision is discardable.

In Mac OS X applications, you can use file version objects to track changes to a local file over time and to prevent the loss of data during editing. When managing local versions, the document architecture creates versions at specific points in the lifetime of your application. Your application can also create versions explicitly at times that your application designates as appropriate.

In addition to managing local files, the system also uses this class to manage cloud-based files. For files in the cloud, there is usually only one version of the file at any given time. However, additional file versions may be created in cases where two different computers attempt to save the file to the cloud at the same time. In that case, one file is chosen as the current version and any other versions are tagged as being in conflict with the original. Conflict versions are reported to the appropriate file presenter objects and should be resolved as soon as possible so that the corresponding files can be removed from the cloud.

Available on Mac OS X 10.7 or later.

Please also check the documentation from Apple for the NSFileVersion class.

Works also well with files in backup (Time Machine) to find older versions.

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

Blog Entries

- [Lion features for Real Studio](#)

5.7.2 Methods

5.7.3 `addVersionOfItemAtURL(url as string, withContentsOfURL as string, options as Integer, byref error as NSErrorMBS) as NSFileVersionMBS`

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Add a new version of the file located by a URL, with the contents coming from a file located by either the same or a different URL, and return a new instance that represents the version if successful.

Notes: If not successful, return false after setting Error to an NSErrorMBS that encapsulates why not.

You can add versions only on Mac OS X.

When adding or removing versions of a file you should do it as part of a "coordinated" write to the file. see NSFileCoordinatorMBS class. Using it properly ensures that NSFilePresenters of the file, or directories that contain the file, receive accurate notifications about versions being added or removed. For example, use NSFileCoordinatorMBS.coordinateWritingItemAtURL when the file URL and the contents url are the same. (NSFileVersion doesn't simply use NSFileCoordinator itself because that would be insufficient when the adding or removing of versions is part of a larger operation that should be treated as one coordinated file access.)

5.7.4 `Conflict as boolean`

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

Function: Whether the version was created as a result of the discovery of a conflict between two writers of the versioned file.

Notes: When two or more versions of a file are written at the same time, perhaps because the file is saved in the cloud and one or more of the writers were offline when they were writing, the system attempts to resolve the conflict automatically. It does this by picking one of the file versions to be the current file and setting this property to true for the other file version that are in conflict.

5.7.5 `Constructor`

Plugin Version: 13.1, Platform: macOS, Targets: All.

Function: The private constructor.

5.7.6 `currentVersionOfItemAtURL(file as folderitem) as NSFileVersionMBS`

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

Function: Convenience variant of `currentVersionOfItemAtURL` which takes `folderitem`.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("Notes.rtf")
dim n as NSFileVersionMBS = NSFileVersionMBS.currentVersionOfItemAtURL(f)
```

```
MsgBox n.localizedName
```

See also:

- 5.7.7 `currentVersionOfItemAtURL(url as string) as NSFileVersionMBS` 73

5.7.7 `currentVersionOfItemAtURL(url as string) as NSFileVersionMBS`

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

Function: Return an `NSFileVersionMBS` that represents the contents of the file located by a URL, or `nil` if there is no such file.

See also:

- 5.7.6 `currentVersionOfItemAtURL(file as folderitem) as NSFileVersionMBS` 72

5.7.8 File as folderitem

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

Function: The location of the receiver's storage.

Notes: Or possibly `nil` if the receiver's storage has been deleted. The storage is read-only. The URL will have an arcane path. You must not derive user-presentable text from it.

If the URL does not represent a `folderitem`, this function gives `nil`.

5.7.9 `FileURL(file as folderitem) as string`

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

Function: Returns URL for a `folderitem`.

Notes: Call `is method` in case you need to provide an URL for a `folderitem`.

5.7.10 `localizedName as string`

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

Function: The user-presentable name of the version, or possibly "" if the receiver's storage has been deleted.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("Notes.rtf")
dim n as NSFileVersionMBS = NSFileVersionMBS.currentVersionOfItemAtURL(f)
MsgBox n.localizedName
```

Notes: This will be different from the user-presentable name of the versioned file if, for example, the file has been renamed since the version was added.

5.7.11 localizedNameOfSavingComputer as string

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

Function: The user-presentable name of the computer on which the version was saved, or possibly "" if the receiver's storage has been deleted, or "" if no computer name was recorded.

Notes: The computer name is guaranteed to have been recorded only if the version is a conflict version. This will be different from that computer's current name if the computer's name has been changed since the version was retrieved from that computer.

5.7.12 modificationDate as date

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: The modification date of the version, or possibly nil if the receiver's storage has been deleted.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("Notes.rtf")
dim n as NSFileVersionMBS = NSFileVersionMBS.currentVersionOfItemAtURL(f)
```

```
MsgBox n.modificationDate.SQLiteDateTime
```

5.7.13 modificationDateTime as dateTime

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

Function: The modification date of the version, or possibly nil if the receiver's storage has been deleted.

5.7.14 otherVersionsOfItemAtURL(file as folderitem) as NSFileVersionMBS()

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

Function: Convenience variant of otherVersionsOfItemAtURL taking a folderitem.

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("Notes.rtf")
dim n() as NSFileVersionMBS = NSFileVersionMBS.otherVersionsOfItemAtURL(f)

// shows all time stamps of this file.
dim lines() as string
for each x as NSFileVersionMBS in n
lines.Append x.modificationDate.SQLiteDateTime
next
MsgBox Join(lines,EndOfLine)
```

See also:

- 5.7.15 otherVersionsOfItemAtURL(url as string) as NSFileVersionMBS()

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5.7.15 otherVersionsOfItemAtURL(url as string) as NSFileVersionMBS()

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

Function: Return an array of NSFileVersionMBS objects associated with the file located by a URL, or an empty array if there is no such file.

Notes: The array never contains an NSFileVersionMBS equal to what currentVersionOfItemAtURL would return.

See also:

- 5.7.14 otherVersionsOfItemAtURL(file as folderitem) as NSFileVersionMBS()

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5.7.16 persistentIdentifier as Memoryblock

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The identifier for this version of the file. (read-only)

Example:

```
// get a file version
dim f as FolderItem = SpecialFolder.Desktop.Child("Notes.rtf")
dim n as NSFileVersionMBS = NSFileVersionMBS.currentVersionOfItemAtURL(f)

// get persistent identifier
dim m as MemoryBlock = n.persistentIdentifier
```

```
// later find version again
dim x as NSFileVersionMBS = NSFileVersionMBS.versionOfItemAtURLforPersistentIdentifier(f, m)

// and show something
MsgBox x.localizedName
```

Notes: You can save the value of this property persistently and use it to recreate the version object later. When recreating the version object using the `versionOfItemAtURLforPersistentIdentifier` method, the version object returned is equivalent to the current object.

The plugin encodes the identifier for you into a memoryblock, so you can store it somewhere in your preferences.

5.7.17 `removeAndReturnError(byref error as NSErrorMBS) as boolean`

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

Function: Delete the receiver’s storage, and return true if successful.

Notes: If not successful, return false after setting `Error` to an `NSErrorMBS` that encapsulates why not. Subsequent invocations of `versionsOfItemAtURL` won’t include an `NSFileVersion` for a successfully removed version.

You cannot use this method to delete the versioned file itself. This method always throws an exception when sent to the result of invoking `currentVersionOfItemAtURL`. Use `NSFileManagerMBS.removeItemAtURL` for that instead.

When removing versions of a file you should do it as part of a coordinated write to the file. The advice about this for `addVersionOfItemAtURL` applies here too.

5.7.18 `removeOtherVersionsOfItemAtURL(file as folderitem, byref error as NSErrorMBS) as boolean`

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

Function: Convenience variant of `removeOtherVersionsOfItemAtURL` which takes `folderitem`.

See also:

- 5.7.19 `removeOtherVersionsOfItemAtURL(url as string, byref error as NSErrorMBS) as boolean` 77

5.7.19 removeOtherVersionsOfItemAtURL(url as string, byref error as NSErrorMBS) as boolean

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

Function: Delete all of the versions associated with the file located by a URL, except for the current one, and return true if successful.

Notes: If not successful, return false after setting error to an NSErrorMBS that encapsulates why not.

When removing versions of a file you should do it as part of a coordinated write to the file. The advice about this for addVersionOfItemAtURL applies here too.

See also:

- 5.7.18 removeOtherVersionsOfItemAtURL(file as folderitem, byref error as NSErrorMBS) as boolean 76

5.7.20 replaceItemAtURL(file as folderitem, options as Integer, byref error as NSErrorMBS) as string

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

Function: Convenience variant of replaceItemAtURL which takes a folderitem.

See also:

- 5.7.21 replaceItemAtURL(url as string, options as Integer, byref error as NSErrorMBS) as string 77

5.7.21 replaceItemAtURL(url as string, options as Integer, byref error as NSErrorMBS) as string

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

Function: If the passed-in URL locates a file, replace the file with a file whose contents are taken from the version but whose display name is taken from the file.

Notes: If the passed-in URL does not locate a file then simply write one. If successful, return a URL that locates the resulting file; it may be different from the passed-in URL. The one exception to taking the display name from an existing file is if the version is of a different type than the overwritten file. In that case the file name extension will be taken from the version. (When file name extensions are being hidden in a user-friendly way this is not actually an exception.) If not successful, return false after setting *outError to an NSError that encapsulates why not.

When you use NSFileVersionReplacingByMoving you remove a version of the file, and should do it as part of a coordinated write to the file. The advice about this for addVersionOfItemAtURL applies here too. When you use it to promote a version to a separate file you actually write to two files, and should do it as part of a coordinated write to two files, using NSFileCoordinatorMBS.coordinateWritingItemAtURL, most likely

using `NSFileCoordinatorWritingForReplacing` for the file you're promoting the version to.

See also:

- 5.7.20 `replaceItemAtURL(file as folderitem, options as Integer, byref error as NSErrorMBS) as string` 77

5.7.22 `temporaryDirectoryURLForNewVersionOfItemAtURL(url as string) as string`

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Given a URL, create a new directory that is suitable for using as the container of a new temporary file that you will create and use with `NSFileVersionAddingByMoving`.

Notes: This is useful when you want to create a new version of a file out of something other than the file's current contents, for example, the contents in memory of a document that has not yet been saved to its file. You must remove this directory when you are done with it, using `NSFileManagerMBS.removeItemAtURL` for example.

5.7.23 `unresolvedConflictVersionsOfItemAtURL(file as folderitem) as NSFileVersionMBS()`

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

Function: Return an array of `NSFileVersions` that represent unresolved conflicts for the file located by a URL, or nil if there is no such file.

See also:

- 5.7.24 `unresolvedConflictVersionsOfItemAtURL(url as string) as NSFileVersionMBS()` 78

5.7.24 `unresolvedConflictVersionsOfItemAtURL(url as string) as NSFileVersionMBS()`

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

Function: Return an array of `NSFileVersions` that represent unresolved conflicts for the file located by a URL, or nil if there is no such file.

See also:

- 5.7.23 `unresolvedConflictVersionsOfItemAtURL(file as folderitem) as NSFileVersionMBS()` 78

5.7.25 URL as string

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

Function: The location of the receiver's storage.

Notes: Or possibly "" if the receiver's storage has been deleted. The storage is read-only. The URL will have an arcane path. You must not derive user-presentable text from it.

5.7.26 versionOfItemAtURLforPersistentIdentifier(file as folderitem, PersistentIdentifier as Memoryblock) as NSFileVersionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the version of the file that has the specified persistent ID.

Notes: url: The URL of the file whose version you want.

persistentIdentifier: The persistent ID of the NSFileVersion object you want. The plugin decodes it for you from the memoryblock.

Returns the file version object with the specified ID or nil if no such version object exists.

See also:

- 5.7.27 versionOfItemAtURLforPersistentIdentifier(URL as string, PersistentIdentifier as Memoryblock) as NSFileVersionMBS 79

5.7.27 versionOfItemAtURLforPersistentIdentifier(URL as string, PersistentIdentifier as Memoryblock) as NSFileVersionMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the version of the file that has the specified persistent ID.

Notes: url: The URL of the file whose version you want.

persistentIdentifier: The persistent ID of the NSFileVersion object you want. The plugin decodes it for you from the memoryblock.

Returns the file version object with the specified ID or nil if no such version object exists.

See also:

- 5.7.26 versionOfItemAtURLforPersistentIdentifier(file as folderitem, PersistentIdentifier as Memoryblock) as NSFileVersionMBS 79

5.7.28 Properties

5.7.29 Handle as Integer

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

Function: The internal reference to the `NSFileVersion` object.

Notes: (Read and Write property)

5.7.30 Discardable as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop, Console & Web.

Function: Whether the system is allowed to automatically delete the receiver's storage in the future, at an unpredictable time.

Notes: Setting this to true can fail so you must not depend on discarding for correct operation.

Once you have indicated that a version is discardable you cannot make it undiscardable again. Setting this to false causes an exception to be thrown.

You cannot make the versioned file itself discardable. Setting the value of this property always throws an exception when sent to the result of invoking `currentVersionOfItemAtURL`.

Versions can be discardable only on Mac OS X.

(Read and Write computed property)

5.7.31 Resolved as boolean

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

Function: If the version is a conflict version, whether the conflict has been resolved.

Notes: If the version is not a conflict version, simply true.

The operating system's reaction to your setting this to true is complicated and subject to change in future releases. One result however is that the version won't appear in arrays returned by `unresolvedConflictVersionsOfItemAtURL` anymore, unless setting fails.

Once you have indicated that a conflict has been resolved you cannot make it unresolved again. Setting this to false causes an exception to be thrown.

(Read and Write computed property)

5.7.32 Constants

Constants

Constant	Value	Description
NSFileVersionAddingByMoving	1	One of the constants for <code>addVersionOfItemAtURL</code> . Whether <code>addVersionOfItemAtURL</code> can move the new version contents file into the version store instead of copying it. Moving is much faster. See the comment for <code>temporaryDirectoryURLForNewVersionOfItemAtURL</code> for an example of when this is useful.
NSFileVersionReplacingByMoving	1	One of the constants for <code>replaceItemAtURL</code> . Whether <code>replaceItemAtURL</code> must move the version's contents out of the version store instead of copying it. This is useful when you want to promote a version's contents to a separate file. You wouldn't use this to restore a version of a file.

5.8 class NSMetadataItemMBS

5.8.1 class NSMetadataItemMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The NSMetadataItem class represents the metadata associated with a file, providing a simple interface to retrieve the available attribute names and values.

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

Blog Entries

- [More notes](#)
- [MBS Real Studio Plugins, version 11.3pr9](#)

5.8.2 Methods

5.8.3 attributeKeys as string()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns an array containing the attribute names of the receiver's values.

5.8.4 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Private constructor.

5.8.5 DisplayName as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The display name of the item, which may be different than the file system name.

Notes: Available in Mac OS X v10.7 and later.

5.8.6 File as folderitem

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The file reference.

Notes: Available in Mac OS X v10.7 and later.

5.8.7 FileContentChangeDate as date

Plugin Version: 11.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The date and time that the file contents last changed.

Notes: Available in Mac OS X v10.7 and later.

5.8.8 FileContentChangeDateTime as dateTime

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

Function: The date and time that the file contents last changed.

Notes: Available in Mac OS X v10.7 and later.

5.8.9 FileCreationDate as date

Plugin Version: 11.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The date and time that the file was created.

Notes: Available in Mac OS X v10.7 and later.

5.8.10 FileCreationDateTime as dateTime

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

Function: The date and time that the file was created.

Notes: Available in Mac OS X v10.7 and later.

5.8.11 FileName as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The name of the item as seen in the file system.

Notes: Available in Mac OS X v10.7 and later.

5.8.12 FileSize as UInt64

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The size (in bytes) of the file on disk.

Notes: Available in Mac OS X v10.7 and later.

5.8.13 IsUbiquitous as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Whether the item is stored in the cloud.

Notes: Available in Mac OS X v10.7 and later.

5.8.14 NSMetadataItemDisplayNameKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that may be associated with an item.

Notes: The value is a string with the display name of the item, which may be different then the file system name.

Available in Mac OS X v10.7 and later.

5.8.15 NSMetadataItemFSCContentChangeDateKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that may be associated with an item.

Notes: The value is a date object that contains the date and time that the file contents last changed.

Available in Mac OS X v10.7 and later.

5.8.16 NSMetadataItemFSCreationDateKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that may be associated with an item.

Notes: The value is a date object that contains the date and time that the file was created.

Available in Mac OS X v10.7 and later.

5.8.17 NSMetadataItemFSNameKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that may be associated with an item.

Notes: The value is a string with the name of the item as seen in the file system.
Available in Mac OS X v10.7 and later.

5.8.18 NSMetadataItemFSSizeKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that may be associated with an item.

Notes: The value is a number that indicates the size (in bytes) of the file on disk.
Available in Mac OS X v10.7 and later.

5.8.19 NSMetadataItemIsUbiquitousKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that describe cloud-related information about the item.

Notes: The value is a boolean indicating whether the item is stored in the cloud.
Available in Mac OS X v10.7 and later.

5.8.20 NSMetadataItemPathKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that may be associated with an item.

Notes: The value is a string object that contains the full path to the file.
Available in Mac OS X v10.7 and later.

5.8.21 NSMetadataItemURLKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that may be associated with an item.

Notes: The value is an URL string that you can use to open the file.
Available in Mac OS X v10.7 and later.

5.8.22 NSMetadataUbiquitousItemHasUnresolvedConflictsKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that describe cloud-related information about the item.

Notes: The value is a Boolean indicating whether the item is currently in conflict with another version of the file somewhere else.

Available in Mac OS X v10.7 and later.

5.8.23 NSMetadataUbiquitousItemIsDownloadedKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that describe cloud-related information about the item.

Notes: The value is a Boolean indicating whether the current version of the item has been downloaded and is available locally.

Available in Mac OS X v10.7 and later.

5.8.24 NSMetadataUbiquitousItemIsDownloadingKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that describe cloud-related information about the item.

Notes: The value is a Boolean indicating whether the item is currently being downloaded to the local device.

Available in Mac OS X v10.7 and later.

5.8.25 NSMetadataUbiquitousItemIsUploadedKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that describe cloud-related information about the item.

Notes: The value is a Boolean indicating whether the item has been uploaded to the cloud.

Available in Mac OS X v10.7 and later.

5.8.26 NSMetadataUbiquitousItemIsUploadingKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that describe cloud-related information about the item.

Notes: The value is a Boolean indicating whether the current version of the item is currently being uploaded to the cloud.

Available in Mac OS X v10.7 and later.

5.8.27 NSMetadataUbiquitousItemPercentDownloadedKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that describe cloud-related information about the item.

Notes: The value is a number that contains the percentage of the file that has already been downloaded from the cloud. The value is a double in the range 0.0 to 100.0.

Available in Mac OS X v10.7 and later.

5.8.28 NSMetadataUbiquitousItemPercentUploadedKey as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the possible attribute keys that describe cloud-related information about the item.

Notes: The value is a number that contains the percentage of the file that has already been uploaded to the cloud. The value is a double in the range 0.0 to 100.0.

Available in Mac OS X v10.7 and later.

5.8.29 Path as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The file path.

Notes: Available in Mac OS X v10.7 and later.

5.8.30 UbiquitousItemHasUnresolvedConflicts as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Whether the item is currently in conflict with another version of the file somewhere else.

Notes: Available in Mac OS X v10.7 and later.

5.8.31 UbiquitousItemIsDownloaded as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Whether the current version of the item has been downloaded and is available locally.

Notes: Available in Mac OS X v10.7 and later.

5.8.32 UbiquitousItemIsDownloading as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Whether the item is currently being downloaded to the local device.

Notes: Available in Mac OS X v10.7 and later.

5.8.33 UbiquitousItemIsUploaded as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Whether the item has been uploaded to the cloud.

Notes: Available in Mac OS X v10.7 and later.

5.8.34 UbiquitousItemIsUploading as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Whether the current version of the item is currently being uploaded to the cloud.

Notes: Available in Mac OS X v10.7 and later.

5.8.35 UbiquitousItemPercentDownloaded as Double

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The percentage of the file that has already been downloaded from the cloud. The value is a double in the range 0.0 to 100.0.

Notes: Available in Mac OS X v10.7 and later.

5.8.36 UbiquitousItemPercentUploaded as Double

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The percentage of the file that has already been uploaded to the cloud. The value is a double in the range 0.0 to 100.0.

Notes: Available in Mac OS X v10.7 and later.

5.8.37 URL as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The file URL.

Notes: Available in Mac OS X v10.7 and later.

5.8.38 valueForKey(key as string) as Variant

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the receiver's metadata attribute name specified by a given key.

Notes: key: The name of a metadata attribute.

Returns value as Variant.

5.8.39 valuesForAttributes(keys() as string) as dictionary

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a dictionary containing the key-value pairs for the attribute names specified by a given array of keys.

Notes: keys: An array containing strings that specify the names of a metadata attributes.

A dictionary containing the key-value pairs for the attribute names specified by keys.

5.8.40 Properties

5.8.41 Handle as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The internal reference to the metadata item.

Notes: Available in Mac OS X v10.7 and later.

(Read and Write property)

5.9 class NSMetadataQueryMBS

5.9.1 class NSMetadataQueryMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The NSMetadataQuery class encapsulates the functionality provided by the MDQuery opaque type for querying the Spotlight metadata.

Notes: You may prefer MDQueryMBS class from our plugins. NSMetadataQueryMBS exists as it supports iCloud search.

NSMetadataQuery objects provide metadata query results in several ways:

- As individual attribute values for requested attributes.
- As value lists that contain the distinct values for given attributes in the query results.
- A result array proxy, containing all the query results. This is suitable for use with Cocoa bindings.
- As a hierarchical collection of results, grouping together items with the same values for specified grouping attributes. This is also suitable for use with Cocoa bindings.

Queries have two phases: the initial gathering phase that collects all currently matching results and a second live-update phase.

By default the receiver has no limitation on its search scope. Use setSearchScopes to customize.

By default, notification of updated results occurs at 1.0 seconds. Use setNotificationBatchingInterval to customize.

You must set a predicate with the setPredicate method before starting a query.

Blog Entries

- [More notes](#)
- [MBS Real Studio Plugins, version 11.3pr9](#)

5.9.2 Methods

5.9.3 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Initializes the NSMetadataQuery object.

5.9.4 Destructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The destructor.

5.9.5 disableUpdates

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Disables updates to the query results.

Notes: You should invoke this method before iterating over query results that could change due to live updates.

5.9.6 enableUpdates

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Enables updates to the query results.

Notes: You should invoke this method after you're done iterating over the query results.

5.9.7 groupedResults as NSMetadataQueryResultGroupMBS()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns an array containing hierarchical groups of query results based on the receiver's grouping attributes.

5.9.8 groupingAttributes as string()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the receiver's grouping attributes.

5.9.9 indexOfResult(item as NSMetadataItemMBS) as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the index of a query result object in the receiver's results array.

5.9.10 isGathering as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a Boolean value that indicates whether the receiver is in the initial gathering phase of the query.

Notes: Returns true when the query is in the initial gathering phase; false otherwise.

5.9.11 isStarted as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a Boolean value that indicates whether the receiver has started the query.

Notes: Returns true when the receiver has executed the startQuery method; false otherwise.

5.9.12 isStopped as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns a Boolean value that indicates whether the receiver has stopped the query.

Notes: Returns true when the receiver has stopped the query, false otherwise.

5.9.13 NSMetadataQueryDidFinishGatheringNotification as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the query notification names.

Notes: Posted when the receiver has finished with the initial result-gathering phase of the query.

5.9.14 NSMetadataQueryDidStartGatheringNotification as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the query notification names.

Notes: Posted when the receiver begins with the initial result-gathering phase of the query.

5.9.15 NSMetadataQueryDidUpdateNotification as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the query notification names.

Notes: Posted when the receiver's results have changed during the live-update phase of the query.

5.9.16 NSMetadataQueryGatheringProgressNotification as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the query notification names.

Notes: Posted as the receiver's is collecting results during the initial result-gathering phase of the query.

5.9.17 NSMetadataQueryLocalComputerScope as string

Plugin Version: 11.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the scope constants you can use with setSearchScopes.

5.9.18 NSMetadataQueryNetworkScope as string

Plugin Version: 11.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the scope constants you can use with setSearchScopes.

Notes: Search all user-mounted remote volumes.

5.9.19 NSMetadataQueryResultContentRelevanceAttribute as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: In addition to the requested metadata attributes, a query result also includes content relevance, accessed with this key.

Notes: Key used to retrieve a number with a floating point value between 0.0 and 1.0 inclusive. The relevance value indicates the relevance of the content of a result object. The relevance is computed based on the value of the result itself, not on its relevance to the other results returned by the query. If the value is not computed, it is treated as an attribute on the item that does not exist.

Available in Mac OS X v10.4 and later.

5.9.20 NSMetadataQueryUbiquitousDataScope as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the scope constants you can use with `setSearchScopes`.

Notes: Search all files not in the Documents directories of the application's iCloud container directories. Available in Mac OS X v10.7 and later.

5.9.21 `NSMetadataQueryUbiquitousDocumentsScope` as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: One of the scope constants you can use with `setSearchScopes`.

Notes: Search all files in the Documents directories of the application's iCloud container directories. Available in Mac OS X v10.7 and later.

5.9.22 `NSMetadataQueryUserHomeScope` as string

Plugin Version: 11.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: One of the scope constants you can use with `setSearchScopes`.

Notes: Search all local mounted volumes, including the user home directory. The user's home directory is searched even if it is a remote volume.

5.9.23 `resultAtIndex(index as Integer)` as `NSMetadataItemMBS`

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the query result at a specific index.

Notes: `index`: Index of the desired result in the query result array.

Returns query result at the position specified by `index`.

For performance reasons, you should use this method when retrieving a specific result, rather than the array returned by `results`.

5.9.24 `resultCount` as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the number of results returned by the receiver.

Notes: For performance reasons, you should use this method, rather than invoking `count` on `results` array.

5.9.25 results as NSMetadataItemMBS()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns an array containing the result objects for the receiver.

Notes: The results array is a proxy object that is primarily intended for use with Cocoa bindings. While it is possible to copy the proxy array and receive a "snapshot" of the complete current query results, it is generally not recommended due to performance and memory issues. To access individual result array elements you should instead use the resultCount and resultAtIndex methods.

5.9.26 searchScopes as string()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns an array containing the receiver's search scopes.

Notes: The array can contain strings that represent file system directories or the search scopes specified in Constants. An empty array indicates that there is no limitation on where the receiver searches.

5.9.27 setGroupingAttributes(attributeNames() as string)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Sets the receiver's grouping attributes to specific attribute names.

Notes: Invoking this method on a receiver while it's running a query, stops the query and discards current results, and immediately starts a new query.

Available in Mac OS X v10.4 and later.

5.9.28 setSearchScopes(folders() as folderitem)

Plugin Version: 12.1, Platform: macOS, Targets: All.

Function: Restrict the search scope of the receiver.

Notes: You can pass paths as folderitem.

See also:

- 5.9.29 setSearchScopes(paths() as string) 95
- 5.9.30 setSearchScopes(paths() as string, folders() as folderitem) 96

5.9.29 setSearchScopes(paths() as string)

Plugin Version: 12.1, Platform: macOS, Targets: All.

Function: Restrict the search scope of the receiver.

Notes: You can pass paths as strings and with the string array also the special scope strings from this class. See also:

- 5.9.28 setSearchScopes(folders() as folderitem) 95
- 5.9.30 setSearchScopes(paths() as string, folders() as folderitem) 96

5.9.30 setSearchScopes(paths() as string, folders() as folderitem)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Restrict the search scope of the receiver.

Example:

```
dim m as new NSMetadataQueryMBS
dim paths() as string
dim folders() as FolderItem
```

```
// you can specify where to search either by path or by FolderItem
'paths.Append "/Applications"
folders.Append SpecialFolder.Applications
```

```
m.setSearchScopes paths, folders
```

Notes: You can pass paths as strings, paths as folderitem and with the string array also the special scope strings from this class.

See also:

- 5.9.28 setSearchScopes(folders() as folderitem) 95
- 5.9.29 setSearchScopes(paths() as string) 95

5.9.31 setSortDescriptor(sortDescriptor as NSSortDescriptorMBS)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Sets the sort descriptors to be used by the receiver.

Example:

```
dim m as new NSMetadataQueryMBS
m.setSortDescriptor NSSortDescriptorMBS.sortDescriptorWithKey(NSMetadataItemMBS.NSMetadataItemDisplay-
>NameKey, true)
```

Notes: Invoking this method on the receiver running a query causes the existing query to stop, all current results are discarded, and a new query is started immediately.

5.9.32 setSortDescriptors(sortDescriptors() as NSSortDescriptorMBS)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Sets the sort descriptors to be used by the receiver.

Notes: Invoking this method on the receiver running a query causes the existing query to stop, all current results are discarded, and a new query is started immediately.

5.9.33 sortDescriptors as NSSortDescriptorMBS()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns an array containing the receiver's sort descriptors.

Notes: Available in Mac OS X v10.4 and later.

5.9.34 startQuery as boolean

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Attempts to start the query.

Notes: Returns true when successful; false otherwise.

A query can't be started if the receiver is already running a query or no predicate has been specified.

5.9.35 stopQuery

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Stops the receiver's current query from gathering any further results.

Notes: The receiver first completes gathering any unprocessed results. If a query is stopped before the gathering phase finishes, it will not post an NSMetadataQueryDidStartGatheringNotification notification.

You would call this function to stop a query that is generating too many results to be useful but still want to access the available results. If the receiver is sent a startQuery message after performing this method, the existing results are discarded.

5.9.36 Properties

5.9.37 Handle as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The internal reference to the NSMetadataQuery object.

Notes: (Read and Write property)

5.9.38 notificationBatchingInterval as Double

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The interval that the receiver provides notification of updated query results.

Notes: in seconds.

(Read and Write computed property)

5.9.39 predicate as NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The predicate used by the receiver to filter the query results.

Example:

```
dim m as new NSMetadataQueryMBS
m.predicate = NSPredicateMBS.predicateWithFormat("kMDItemContentType=""com.apple.application-bundle""")
```

Notes: Setting the predicate on a receiver running a query causes the existing query to stop, all current results are discarded, and a new query is started immediately.

(Read and Write computed property)

5.9.40 Events

5.9.41 DidFinishGathering(n as NSNotificationMBS)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Called as the query has finished with the initial result-gathering phase of the query.

5.9.42 DidStartGathering(n as NSNotificationMBS)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Called as the query begins with the initial result-gathering phase of the query.

5.9.43 DidUpdate(n as NSNotificationMBS)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Called as the query's results have changed during the live-update phase of the query.

5.9.44 GatheringProgress(n as NSNotificationMBS)

Plugin Version: 11.3, Platform: macOS, Targets: .

Function: Called as the query is collecting results during the initial result-gathering phase of the query.

5.10 class NSMetadataQueryResultGroupMBS

5.10.1 class NSMetadataQueryResultGroupMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The NSMetadataQueryResultGroupMBS class represents a collection of grouped attribute results returned by an NSMetadataQueryMBS object.

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

Blog Entries

- [More notes](#)
- [MBS Real Studio Plugins, version 11.3pr10](#)

5.10.2 Methods

5.10.3 attributeName as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the attribute name for the receiver's result group.

5.10.4 Constructor

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The private constructor.

5.10.5 resultAtIndex(index as Integer) as NSMetadataItemMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the query result at a specific index.

Notes: index: The index of the desired result.

For performance reasons, you should use this method when retrieving a specific result, rather than they array returned by results.

5.10.6 resultCount as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the number of results returned by the receiver.

Notes: For performance reasons, you should use this method, rather than invoking count on results.

5.10.7 results as NSMetadataItemMBS()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns an array containing the result objects for the receiver.

Notes: The results array is a proxy object that is primarily intended for use with Cocoa bindings. While it is possible to copy the proxy array to get a "snapshot" of the complete current query results, it is generally not recommended due to performance and memory issues. To access individual result array elements you should instead use the resultCount and resultAtIndex methods.

5.10.8 subgroups as NSMetadataQueryResultGroupMBS()

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns an array containing the subgroups of the receiver.

5.10.9 value as Variant

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the value of the attribute name for the receiver.

5.10.10 Properties

5.10.11 Handle as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The internal handle to the NSMetadataQueryResultGroup object.

Notes: (Read and Write property)

5.11 class NSPredicateMBS

5.11.1 class NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The NSPredicate class is used to define logical conditions used to constrain a search either for a fetch or for in-memory filtering.

Notes: You use predicates to represent logical conditions, used for describing objects in persistent stores and in-memory filtering of objects. Although it is common to create predicates directly from instances of NSComparisonPredicate, NSCompoundPredicate, and NSEExpression, you often create predicates from a format string which is parsed by the class methods on NSPredicate. Examples of predicate format strings include:

- Simple comparisons, such as `grade == "7"` or `firstName like "Shaffiq"`
- Case and diacritic insensitive lookups, such as `name contains [cd] "itroen"`
- Logical operations, such as `(firstName like "Mark") OR (lastName like "Adderley")`
- In Mac OS X v10.5 and later, you can create `NSDate` predicates such as `date between { $ YESTERDAY, $ TOMORROW }`.

You can create predicates for relationships, such as:

- `group.name like "work*"`
- `ALL children.age >12`
- `ANY children.age >12`

You can create predicates for operations, such as `@sum.items.price <1000`. For a complete syntax reference, refer to the Predicate Programming Guide:

http://developer.apple.com/library/mac/#documentation/Cocoa/Conceptual/Predicates/predicates.html#//apple_ref/doc/uid/TP40001789

Blog Entries

- [MBS Real Studio Plugins, version 12.1pr5](#)
- [More notes](#)
- [MBS Real Studio Plugins, version 11.3pr10](#)

5.11.2 Methods

5.11.3 Constructor(predicateFormat as string)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Creates and returns a new predicate by substituting the values in a given array into a format string and parsing the result.

Example:

```
dim n as new NSPredicateMBS("kMDItemContentType="com.apple.application-bundle")
MsgBox n.predicateFormat
```

Notes: predicateFormat: The format string for the new predicate.

arguments: Optional, the arguments to substitute into predicateFormat. Values are substituted into predicateFormat in the order they appear in the array.

You get a new predicate by substituting the values in arguments into predicateFormat, and parsing the result.

For details of the format of the format string and of limitations on variable substitution, see Predicate Format String Syntax:

http://developer.apple.com/library/mac/documentation/Cocoa/Conceptual/Predicates/Articles/pSyntax.html#//apple_ref/doc/uid/TP40001795

Available in Mac OS X v10.4 and later.

See also:

- 5.11.4 Constructor(predicateFormat as string, arguments() as Variant) 103
- 5.11.5 Constructor(value as boolean) 104

5.11.4 Constructor(predicateFormat as string, arguments() as Variant)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Creates and returns a new predicate by substituting the values in a given array into a format string and parsing the result.

Example:

```
// we use one parameter here
dim s() as Variant
s.Append "com.apple.application-bundle"

dim n as new NSPredicateMBS("kMDItemContentType=%@", s)

// shows final string
```

MsgBox n.predicateFormat

Notes: predicateFormat: The format string for the new predicate.

arguments: Optional, the arguments to substitute into predicateFormat. Values are substituted into predicateFormat in the order they appear in the array.

You get a new predicate by substituting the values in arguments into predicateFormat, and parsing the result.

For details of the format of the format string and of limitations on variable substitution, see Predicate Format String Syntax:

http://developer.apple.com/library/mac/documentation/Cocoa/Conceptual/Predicates/Articles/pSyntax.html#//apple_ref/doc/uid/TP40001795

Available in Mac OS X v10.4 and later.

See also:

- 5.11.3 Constructor(predicateFormat as string) 103
- 5.11.5 Constructor(value as boolean) 104

5.11.5 Constructor(value as boolean)

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Creates and returns a predicate that always evaluates to a given value.

Example:

```
dim n as new NSPredicateMBS(true)
```

```
MsgBox n.predicateFormat
```

See also:

- 5.11.3 Constructor(predicateFormat as string) 103
- 5.11.4 Constructor(predicateFormat as string, arguments() as Variant) 103

5.11.6 description as string

Plugin Version: 12.1, Platform: macOS, Targets: All.

Function: The descriptor for this event.

Example:

```

dim args() as Variant
args.Append NSMetadataItemMBS.NSMetadataItemFSNameKey
dim pred as NSPredicateMBS = NSPredicateMBS.predicateWithFormat("%K LIKE '*'", args)
MsgBox pred.description

```

Notes: This is a text representation for debugging.

5.11.7 predicateFormat as string

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Returns the receiver's format string.

Notes: The string returned by this method is not guaranteed to be the same as a string used to create the predicate.

5.11.8 predicateWithFormat(predicateFormat as string) as NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Creates and returns a new predicate by substituting the values in a given array into a format string and parsing the result.

Example:

```

dim n as NSPredicateMBS
n = NSPredicateMBS.predicateWithFormat("kMDItemContentType='\"com.apple.application-bundle\"'")
MsgBox n.predicateFormat

```

Notes: predicateFormat: The format string for the new predicate.

arguments: Optional, the arguments to substitute into predicateFormat. Values are substituted into predicateFormat in the order they appear in the array.

Returns a new predicate by substituting the values in arguments into predicateFormat, and parsing the result.

For details of the format of the format string and of limitations on variable substitution, see Predicate Format String Syntax:

http://developer.apple.com/library/mac/documentation/Cocoa/Conceptual/Predicates/Articles/pSyntax.html#//apple_ref/doc/uid/TP40001795

Available in Mac OS X v10.4 and later.

See also:

- 5.11.9 predicateWithFormat(predicateFormat as string, arguments() as Variant) as NSPredicateMBS
106

5.11.9 predicateWithFormat(predicateFormat as string, arguments() as Variant) as NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Creates and returns a new predicate by substituting the values in a given array into a format string and parsing the result.

Example:

```
dim args() as Variant
args.Append NSMetadataItemMBS.NSMetadataItemFSNameKey
dim pred as NSPredicateMBS = NSPredicateMBS.predicateWithFormat("%K LIKE '*'", args)
MsgBox pred.description
```

Notes: predicateFormat: The format string for the new predicate.

arguments: Optional, the arguments to substitute into predicateFormat. Values are substituted into predicateFormat in the order they appear in the array.

Returns a new predicate by substituting the values in arguments into predicateFormat, and parsing the result.

For details of the format of the format string and of limitations on variable substitution, see Predicate Format String Syntax:

http://developer.apple.com/library/mac/documentation/Cocoa/Conceptual/Predicates/Articles/pSyntax.html#//apple_ref/doc/uid/TP40001795

Available in Mac OS X v10.4 and later.

See also:

- 5.11.8 predicateWithFormat(predicateFormat as string) as NSPredicateMBS 105

5.11.10 predicateWithValue(value as boolean) as NSPredicateMBS

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: Creates and returns a predicate that always evaluates to a given value.

Example:

```
dim p as NSPredicateMBS = NSPredicateMBS.predicateWithValue(true)
MsgBox p.predicateFormat
```

5.11.11 Print

Plugin Version: 12.1, Platform: macOS, Targets: All.

Function: Writes description for this event descriptor to the console.

Notes: You can see result in Console.app.

5.11.12 Properties

5.11.13 Handle as Integer

Plugin Version: 11.3, Platform: macOS, Targets: All.

Function: The internal handle to the NSPredicate object.

Notes: (Read and Write property)

5.12 class NSUbiquitousKeyValueStoreMBS

5.12.1 class NSUbiquitousKeyValueStoreMBS

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

Function: The iCloud class to store key value data.

Notes: Size of data is limited to 64 KB per application and 4 KB per value.

Do not store data here. Better store some configuration data, bookmarks or highscores.

Please also check the documentation from Apple for the NSUbiquitousKeyValueStore class. Seems like you need your app to be signed with iCloud Storage Entitlements.

Blog Entries

- [Lion features for Real Studio](#)
- [Lion arrived](#)

5.12.2 Methods

5.12.3 ArrayValue(key as string) as Variant()

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

Function: Get the value for this key as a variant.

Example:

```
dim values() as Variant

values.Append "Hello"
values.Append "World"

dim u as new NSUbiquitousKeyValueStoreMBS

u.ArrayValue("key")=values

// later read back
dim nvalues() as Variant = u.ArrayValue("key")
```

See also:

- 5.12.4 ArrayValue(key as string, assigns values() as Variant)

5.12.4 ArrayValue(key as string, assigns values() as Variant)

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

Function: Set the value for this key as a variant.

Example:

```
dim u as new NSUbiquitousKeyValueStoreMBS
dim nvalues() as Variant = u.ArrayValue("key")
```

See also:

- 5.12.3 ArrayValue(key as string) as Variant()

108

5.12.5 available as boolean

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

Function: Whether this class is available.

Example:

```
msgbox "iCloud Key Value Store available: "+str(NSUbiquitousKeyValueStoreMBS.available)
```

Notes: This does not tell you whether Apple switched on their servers.

5.12.6 Constructor

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

Function: The constructor.

5.12.7 defaultStore as NSUbiquitousKeyValueStoreMBS

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

Function: Returns a reference to the default key store.

5.12.8 Destructor

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

Function: The destructor.

5.12.9 dictionaryRepresentation as dictionary

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

Function: The key value store as a dictionary.

5.12.10 NSUbiquitousKeyValueStoreChangedKeysKey as string

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

Function: A key name for the userinfo dictionary when you receive the NSUbiquitousKeyValueStoreDidChangeExternallyNotification notification.

Notes: Value for this key in the dictionary in an array of strings.

5.12.11 NSUbiquitousKeyValueStoreChangeReasonKey as string

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

Function: A key name for the userinfo dictionary when you receive the NSUbiquitousKeyValueStoreDidChangeExternallyNotification notification.

Notes: Value for this key in the dictionary in an integer.

5.12.12 NSUbiquitousKeyValueStoreDidChangeExternallyNotification as string

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

Function: The notification name for the notification sent when the .

Notes: You can observe this notification with the NSNotificationCenterObserverMBS class or simply subclass NSUbiquitousKeyValueStoreMBS and use the DidChangeExternally event.

5.12.13 removeObjectForKey(key as string)

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

Function: Removes the value for the key.

5.12.14 synchronize as boolean

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

Function: Synchronizes the key value store.

Example:

```
dim u as NSUbiquitousKeyValueStoreMBS = NSUbiquitousKeyValueStoreMBS.defaultStore

// safe something
u.StringValue("Font") = "Times"

if u.synchronize then
  MsgBox "OK"
else
  MsgBox "Failed"
end if
```

Notes: Returns true on success.

5.12.15 Properties

5.12.16 Handle as Integer

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

Function: The internal reference for this object.

Notes: (Read and Write property)

5.12.17 BooleanValue(key as string) as Boolean

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

Function: Get or set the value for this key as a boolean.

Notes: (Read and Write computed property)

5.12.18 DataValue(key as string) as memoryblock

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

Function: Get or set the value for this key as a memoryblock.

Notes: (Read and Write computed property)

5.12.19 DictionaryValue(key as string) as Dictionary

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

Function: Get or set the value for this key as a dictionary.

Notes: (Read and Write computed property)

5.12.20 DoubleValue(key as string) as Double

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

Function: Get or set the value for this key as a double.

Example:

```
dim u as new NSUbiquitousKeyValueStoreMBS
```

```
u.DoubleValue("HighScore") = 3456
```

Notes: (Read and Write computed property)

5.12.21 IntegerValue(key as string) as Int64

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

Function: Get or set the value for this key as an integer.

Example:

```
dim u as new NSUbiquitousKeyValueStoreMBS
```

```
// query highscore value  
MsgBox str(u.IntegerValue("HighScore"))
```

Notes: (Read and Write computed property)

5.12.22 StringValue(key as string) as string

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

Function: Get or set the string value for the given key.

Example:

```
dim u as NSUbiquitousKeyValueStoreMBS = NSUbiquitousKeyValueStoreMBS.defaultStore
```

```
// safe something
u.StringValue("Font") = "Times"
```

Notes: (Read and Write computed property)

5.12.23 VariantValue(key as string) as Variant

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

Function: Get or set the value for this key as a variant.

Notes: (Read and Write computed property)

5.12.24 Events

5.12.25 DidChangeExternally(ChangeReason as Integer, ChangedKeys() as string, notification as Variant)

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

Function: This event is called when the ubiquitous key value store changed.

Notes: ChangeReason gives the reason.

Can be NSUbiquitousKeyValueStoreServerChange, NSUbiquitousKeyValueStoreInitialSyncChange or NSUbiquitousKeyValueStoreQuotaViolationChange.

5.12.26 Constants

Change Reason Constants

Constant	Value	Description
NSUbiquitousKeyValueStoreInitialSyncChange	1	
NSUbiquitousKeyValueStoreQuotaViolationChange	2	
NSUbiquitousKeyValueStoreServerChange	0	

Chapter 6

StoreKit

6.1 class AppReceiptIAPMBS

6.1.1 class AppReceiptIAPMBS

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The class to represent an in-app purchase in the app receipt.

Example:

```
// open a receipt
dim f as FolderItem = SpecialFolder.Desktop.Child("receipt")
dim r as AppReceiptMBS = AppReceiptMBS.receiptForFile(f)

// show purchases
dim inAppPurchases() as AppReceiptIAPMBS = r.inAppPurchases
for each p as AppReceiptIAPMBS in inAppPurchases
MsgBox str(p.quantity)+"x "+p.productIdentifier+" "+p.purchaseDate.AbbreviatedDate
next
```

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

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.3pr8](#)
- [Validating Receipts of Mac App Store Purchases including In-App Purchases](#)

6.1.2 Methods

6.1.3 Constructor

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The private constructor.

6.1.4 `isActiveAutoRenewableSubscriptionForDate(d as Date)` as boolean

Plugin Version: 14.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns whether the auto renewable subscription is active for the given date.

Notes: `date`: The date in which the auto-renewable subscription should be active. If you are using the current date, you might not want to take it from the device in case the user has changed it.

Returns true if the auto-renewable subscription is active for the given date, false otherwise.

Auto-renewable subscription lapses are possible. If you are checking against the current date, you might want to deduct some time as tolerance.

If this method fails Apple recommends to refresh the receipt and try again once.

See also:

- 6.1.5 `isActiveAutoRenewableSubscriptionForDate(d as DateTime)` as boolean 116

6.1.5 `isActiveAutoRenewableSubscriptionForDate(d as DateTime)` as boolean

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

Function: Returns whether the auto renewable subscription is active for the given date.

Notes: `date`: The date in which the auto-renewable subscription should be active. If you are using the current date, you might not want to take it from the device in case the user has changed it.

Returns true if the auto-renewable subscription is active for the given date, false otherwise.

Auto-renewable subscription lapses are possible. If you are checking against the current date, you might want to deduct some time as tolerance.

If this method fails Apple recommends to refresh the receipt and try again once.

See also:

- 6.1.4 `isActiveAutoRenewableSubscriptionForDate(d as Date)` as boolean 116

6.1.6 Properties

6.1.7 cancellationDate as Date

Plugin Version: 14.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: For a transaction that was canceled by Apple customer support, the date of the cancellation.

Notes: (Read only property)

6.1.8 cancellationDateTime as DateTime

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

Function: For a transaction that was canceled by Apple customer support, the date of the cancellation.

Notes: (Read only property)

6.1.9 originalPurchaseDate as Date

Plugin Version: 14.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: For a transaction that restores a previous transaction, the date of the original transaction.

Notes: This value corresponds to the original transaction's transactionDate property.

In an auto-renewable subscription receipt, this indicates the beginning of the subscription period, even if the subscription has been renewed.

(Read only property)

6.1.10 originalPurchaseDateTime as DateTime

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

Function: For a transaction that restores a previous transaction, the date of the original transaction.

Notes: This value corresponds to the original transaction's transactionDate property.

In an auto-renewable subscription receipt, this indicates the beginning of the subscription period, even if the subscription has been renewed.

(Read only property)

6.1.11 originalTransactionIdentifier as String

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: For a transaction that restores a previous transaction, the transaction identifier of the original

transaction.

Notes: Otherwise, identical to the transaction identifier.

This value corresponds to the original transaction's transactionIdentifier property.

All receipts in a chain of renewals for an auto-renewable subscription have the same value for this field.
(Read only property)

6.1.12 productIdentifier as String

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The product identifier of the item that was purchased.

Example:

```
// open a receipt
dim f as FolderItem = SpecialFolder.Desktop.Child("receipt")
dim r as AppReceiptMBS = AppReceiptMBS.receiptForFile(f)

// show purchases
dim inAppPurchases() as AppReceiptIAPMBS = r.inAppPurchases
for each p as AppReceiptIAPMBS in inAppPurchases
MsgBox str(p.quantity)+"x "+p.productIdentifier+" "+p.purchaseDate.AbbreviatedDate
next
```

Notes: This value corresponds to the productIdentifier property of the SKPayment object stored in the transaction,Ãs payment property.

(Read only property)

6.1.13 purchaseDate as Date

Plugin Version: 14.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The date and time that the item was purchased.

Notes: This value corresponds to the transaction,Ãs transactionDate property.

For a transaction that restores a previous transaction, the purchase date is the date of the restoration. Use originalPurchaseDate to get the date of the original transaction.

In an auto-renewable subscription receipt, this is always the date when the subscription was purchased or renewed, regardless of whether the transaction has been restored.

(Read only property)

6.1.14 purchaseDateTime as DateTime

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

Function: The date and time that the item was purchased.

Notes: (Read only property)

6.1.15 quantity as Integer

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The number of items purchased.

Example:

```
// open a receipt
dim f as FolderItem = SpecialFolder.Desktop.Child("receipt")
dim r as AppReceiptMBS = AppReceiptMBS.receiptForFile(f)

// show purchases
dim inAppPurchases() as AppReceiptIAPMBS = r.inAppPurchases
for each p as AppReceiptIAPMBS in inAppPurchases
MsgBox str(p.quantity)+"x "+p.productIdentifier+" "+p.purchaseDate.AbbreviatedDate
next
```

Notes: This value corresponds to the quantity property of the SKPayment object stored in the transaction's payment property.

(Read only property)

6.1.16 subscriptionExpirationDate as Date

Plugin Version: 14.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The expiration date for the subscription.

Notes: Only present for auto-renewable subscription receipts.

(Read only property)

6.1.17 subscriptionExpirationDateTime as DateTime

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

Function: The expiration date for the subscription.

Notes: Only present for auto-renewable subscription receipts.

(Read only property)

6.1.18 `transactionIdentifier` as String

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The transaction identifier of the item that was purchased.

Notes: This value corresponds to the transaction's `transactionIdentifier` property.

(Read only property)

6.1.19 `webOrderLineItemID` as Integer

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The primary key for identifying subscription purchases.

Notes: (Read only property)

6.2 class AppReceiptMBS

6.2.1 class AppReceiptMBS

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The class for an app receipt.

Example:

```
// open a receipt
dim f as FolderItem = SpecialFolder.Desktop.Child("receipt")
dim r as AppReceiptMBS = AppReceiptMBS.receiptForFile(f)

// show value
MsgBox r.bundleIdentifier
```

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

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 14.3pr10](#)
- [MBS Xojo / Real Studio Plugins, version 14.3pr8](#)
- [Validating Receipts of Mac App Store Purchases including In-App Purchases](#)

6.2.2 Methods

6.2.3 bundleReceipt as AppReceiptMBS

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Returns the app receipt contained in the bundle, if any and valid.

Notes: Extracts the receipt in ASN1 from the PKCS #7 container, and then parses the ASN1 data into a AppReceiptMBS instance. If an Apple Root certificate is available, it will also verify that the signature of the receipt is valid.

Returns the app receipt contained in the bundle, or nil if there is no receipt or if it is invalid.

6.2.4 Constructor

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The private constructor.

6.2.5 `containsActiveAutoRenewableSubscriptionOfProductIdentifier(productIdentifier as string, d as date)` as boolean

Plugin Version: 14.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Returns whether the receipt contains an active auto-renewable subscription for the given product identifier and for the given date.

Notes: `productIdentifier`: The identifier of the auto-renewable subscription.

`date`: The date in which the latest auto-renewable subscription should be active. If you are using the current date, you might not want to take it from the device in case the user has changed it.

Returns true if the latest auto-renewable subscription is active for the given date, false otherwise.

Auto-renewable subscription lapses are possible. If you are checking against the current date, you might want to deduct some time as tolerance.

If this method fails Apple recommends to refresh the receipt and try again once.

See also:

- 6.2.6 `containsActiveAutoRenewableSubscriptionOfProductIdentifier(productIdentifier as string, d as dateTime)` as boolean 122

6.2.6 `containsActiveAutoRenewableSubscriptionOfProductIdentifier(productIdentifier as string, d as dateTime)` as boolean

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

Function: Returns whether the receipt contains an active auto-renewable subscription for the given product identifier and for the given date.

Notes: `productIdentifier`: The identifier of the auto-renewable subscription.

`date`: The date in which the latest auto-renewable subscription should be active. If you are using the current date, you might not want to take it from the device in case the user has changed it.

Returns true if the latest auto-renewable subscription is active for the given date, false otherwise.

Auto-renewable subscription lapses are possible. If you are checking against the current date, you might want to deduct some time as tolerance.

If this method fails Apple recommends to refresh the receipt and try again once.

See also:

- 6.2.5 `containsActiveAutoRenewableSubscriptionOfProductIdentifier(productIdentifier as string, d as date)` as boolean 122

6.2.7 `containsInAppPurchaseOfProductIdentifier(productIdentifier as string)` as boolean

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Returns whether there is an in-app purchase in the receipt for the given product.

Notes: productIdentifier: The identifier of the product.

True if there is an in-app purchase for the given product, false otherwise.

6.2.8 inAppPurchases as AppReceiptIAPMBS()

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Array of in-app purchases contained in the receipt.

6.2.9 receiptForFile(file as folderitem) as AppReceiptMBS

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Returns the app receipt contained in the given file, if any and valid.

Example:

```
dim a as new AppReceiptVerificatorMBS
dim f as FolderItem = SpecialFolder.Desktop.Child("receipt")
dim r as AppReceiptMBS = AppReceiptMBS.receiptForFile(f)
```

```
// testing with receipt from current Dash app
a.bundleIdentifier = "com.kapeli.dash"
a.bundleVersion = "2.1.2"
```

```
if a.verifyReceipt(r) then
MsgBox "My receipt is valid"
else
MsgBox "My receipt is invalid."
end if
```

Notes: Extracts the receipt in ASN1 from the PKCS #7 container, and then parses the ASN1 data into a AppReceiptMBS instance. If an Apple Root certificate is available, it will also verify that the signature of the receipt is valid.

Returns the receipt contained in the given file, or nil if there is no receipt or if it is invalid.

6.2.10 setAppleRootCertificate(Data as Memoryblock)

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Sets the certificate data of the Apple Root certificate that will be used to verify the signature of the bundle receipt.

Notes: If none is provided, the resource `AppleIncRootCertificate.cer` will be used. If no certificate is available, no signature verification will be performed.

`data:` The contents of the Apple Root certificate file to use.

See also:

- 6.2.11 `setAppleRootCertificate(File as FolderItem)` 124

6.2.11 `setAppleRootCertificate(File as FolderItem)`

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Sets the file of the Apple Root certificate that will be used to verify the signature of the bundle receipt.

Notes: If none is provided, the resource `AppleIncRootCertificate.cer` will be used. If no certificate is available, no signature verification will be performed.

`file:` The folderitem of the Apple Root certificate.

See also:

- 6.2.10 `setAppleRootCertificate(Data as Memoryblock)` 123

6.2.12 `verifyReceiptHash as boolean`

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Returns wheter the receipt hash corresponds to the device's GUID by calcuting the expected hash using the GUID, `bundleIdentifierData` and `opaqueValue`.

Notes: Returns true if the hash contained in the receipt corresponds to the device's GUID, false otherwise.

6.2.13 Properties

6.2.14 `appVersion as String`

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The app's version number.

Example:

```
// open a receipt
dim f as FolderItem = SpecialFolder.Desktop.Child("receipt")
dim r as AppReceiptMBS = AppReceiptMBS.receiptForFile(f)
```

```
// show value
MsgBox r.appVersion
```

Notes: This corresponds to the value of `CFBundleVersion` (in iOS) or `CFBundleShortVersionString` (in OS X) in the Info.plist.
(Read only property)

6.2.15 bundleIdentifier as String

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The bundle identifier.

Example:

```
// open a receipt
dim f as FolderItem = SpecialFolder.Desktop.Child("receipt")
dim r as AppReceiptMBS = AppReceiptMBS.receiptForFile(f)

// show value
MsgBox r.bundleIdentifier
```

Notes: This corresponds to the value of `CFBundleIdentifier` in the Info.plist file.
(Read only property)

6.2.16 bundleIdentifierData as Memoryblock

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The bundle identifier as data.

Notes: The bundle identifier as data, as contained in the receipt. Used to verify the receipt's hash.
(Read only property)

6.2.17 creationDate as Date

Plugin Version: 15.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The creation date of the receipt.

Notes: (Read only property)

6.2.18 creationDateTime as DateTime

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

Function: The creation date of the receipt.

Notes: (Read only property)

6.2.19 expirationDate as Date

Plugin Version: 14.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: The date that the app receipt expires.

Notes: Only for apps purchased through the Volume Purchase Program. If nil, the receipt does not expire. When validating a receipt, compare this date to the current date to determine whether the receipt is expired. Do not try to use this date to calculate any other information, such as the time remaining before expiration. (Read only property)

6.2.20 expirationDateTime as DateTime

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

Function: The date that the app receipt expires.

Notes: Only for apps purchased through the Volume Purchase Program. If nil, the receipt does not expire. When validating a receipt, compare this date to the current date to determine whether the receipt is expired. Do not try to use this date to calculate any other information, such as the time remaining before expiration. (Read only property)

6.2.21 opaqueValue as Memoryblock

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: An opaque value used as part of the SHA-1 hash.

Notes: (Read only property)

6.2.22 originalAppVersion as String

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The version of the app that was originally purchased.

Example:

```
// open a receipt
dim f as FolderItem = SpecialFolder.Desktop.Child("receipt")
dim r as AppReceiptMBS = AppReceiptMBS.receiptForFile(f)

// show value
```

MsgBox r.originalAppVersion

Notes: This corresponds to the value of `CFBundleVersion` (in iOS) or `CFBundleShortVersionString` (in OS X) in the `Info.plist` file when the purchase was originally made. In the sandbox environment, the value of this field is always "1.0".

(Read only property)

6.2.23 purchaseDate as Date

Plugin Version: 15.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Another date.

Notes: Digging in a receipt we found this field and assume it is the original purchase date.

(Read only property)

6.2.24 purchaseDateTime as DateTime

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

Function: Another date.

Notes: Digging in a receipt we found this field and assume it is the original purchase date.

(Read only property)

6.2.25 receiptHash as Memoryblock

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: A SHA-1 hash, used to validate the receipt.

Notes: (Read only property)

6.2.26 transactionDate as Date

Plugin Version: 15.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Another date.

Notes: Digging in a receipt we found this field and assume it is the transaction date.

(Read only property)

6.2.27 transactionDateTime as DateTime

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

Function: Another date.

Notes: Digging in a receipt we found this field and assume it is the transaction date.
(Read only property)

6.3 class AppReceiptVerifierMBS

6.3.1 class AppReceiptVerifierMBS

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Reference implementation of an app receipt verifier.

Example:

```
dim a as new AppReceiptVerifierMBS
```

```
if a.verifyAppReceipt then  
MsgBox "My receipt is valid"  
else  
MsgBox "My receipt is invalid."  
end if
```

Notes: If security is a concern you might want to avoid using a verifier whose code is open source.

Blog Entries

- [MonkeyBread Software Releases the MBS Xojo Plugins in version 18.0](#)
- [MBS Xojo Plugins, version 17.6pr4](#)
- [MBS Xojo / Real Studio Plugins, version 16.0pr7](#)
- [MBS Xojo / Real Studio Plugins, version 14.3pr8](#)
- [Validating Receipts of Mac App Store Purchases including In-App Purchases](#)

6.3.2 Methods

6.3.3 Constructor

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The constructor.

6.3.4 ExitApp(code as Integer = 173)

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Quits the application directly.

Example:

AppReceiptVerificatorMBS.ExitApp 173

Notes: This does not call the destructors and CancelClose events. The app is quit right away. If you use code 173 the Finder will show error message that app needs to be downloaded again from Mac App Store.

6.3.5 GUID as string

Plugin Version: 14.3, Platform: macOS, Targets: Desktop, Console & Web.

Function: Reads the GUID of the Mac.

Example:

```
dim g as String = AppReceiptVerificatorMBS.GUID
MsgBox EncodeHex(g)
```

Notes: This is normally build from the MAC ID of the ethernet card.

6.3.6 verifyAppReceipt as boolean

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Verifies the app's receipt file.

Example:

```
dim a as new AppReceiptVerificatorMBS

if a.verifyAppReceipt then
MsgBox "My receipt is valid"
else
MsgBox "My receipt is invalid."
end if
```

Notes: Verifies the receipt by checking the integrity of the receipt, comparing its bundle identifier and bundle version to the values returned by the corresponding properties and verifying the receipt hash.

Returns true if the receipt is verified, false otherwise.

If validation fails, Apple recommends to refresh the receipt and try again.

If you set `bundleVersion` and/or `bundleIdentifier` properties, we use those values. Else we pick them from the `info.plist` of the app.

6.3.7 `verifyReceipt(Receipt as AppReceiptMBS) as boolean`

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: Verifies the given receipt file.

Example:

```
dim a as new AppReceiptVerificatorMBS
dim f as FolderItem = SpecialFolder.Desktop.Child("receipt")
dim r as AppReceiptMBS = AppReceiptMBS.receiptForFile(f)

// testing with receipt from current Dash app
a.bundleIdentifier = "com.kapeli.dash"
a.bundleVersion = "2.1.2"

if a.verifyReceipt(r) then
  MsgBox "My receipt is valid"
else
  MsgBox "My receipt is invalid."
end if
```

Notes: Verifies the receipt by checking the integrity of the receipt, comparing its bundle identifier and bundle version to the values returned by the corresponding properties and verifying the receipt hash.

Returns true if the receipt is verified, false otherwise.
If validation fails, Apple recommends to refresh the receipt and try again.

6.3.8 Properties

6.3.9 `bundleIdentifier as String`

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The value that will be used to validate the bundle identifier included in the app receipt.

Notes: Given that it is possible to modify the app bundle in jailbroken devices, setting this value from a hardcoded string might provide better protection.

Returns the given value, or the app's bundle identifier by default.
(Read and Write property)

6.3.10 bundleVersion as String

Plugin Version: 14.3, Platform: macOS, Targets: All.

Function: The value that will be used to validate the bundle version included in the app receipt.

Notes: Given that it is possible to modify the app bundle in jailbroken devices, setting this value from a hardcoded string might provide better protection.

Returns the given value, or the app's bundle version by default.

(Read and Write property)

6.3.11 FailReason as String

Plugin Version: 16.0, Platform: macOS, Targets: All.

Function: The reason for a failure.

Notes: This is for debugging and to help you to find the reason for why a verification fails.

(Read only property)

6.3.12 MACAddress as MemoryBlock

Plugin Version: 18.0, Platform: macOS, Targets: All.

Function: The MAC Address to use.

Example:

```
// get the one of this Mac
dim m as MemoryBlock = AppReceiptVerificatorMBS.MACAddress

// now set a fake one
dim x as MemoryBlock = DecodeHex("12347890ABCD")
AppReceiptVerificatorMBS.MACAddress = x

// and display
MsgBox EncodeHex(m)+EndOfLine+EncodeHex(AppReceiptVerificatorMBS.MACAddress)
```

Notes: Can be queried to automatically get the one we detect.

Or set to use a custom one for testing.

(Read and Write property)

6.4 class SKDownloadMBS

6.4.1 class SKDownloadMBS

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Deprecated: This item is deprecated and should no longer be used. **Function:** This storeKit class gives you information about the download status of a content file.

Notes: Available in Mac OS X 10.8 and newer.

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

Blog Entries

- [MBS Xojo Plugins, version 22.5pr1](#)

6.4.2 Methods

6.4.3 Constructor

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.

6.4.4 contentURLForProductID(productID as string) as string

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

Function: Queries content URL for a product.

6.4.5 deleteContentForProductID(productID as string)

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

Function: Deletes the content for that identifier from disk.

6.4.6 Properties

6.4.7 contentIdentifier as string

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Product identifier entered in iTunesConnect.

Notes: (Read only property)

6.4.8 `contentLength` as `Int64`

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

Function: Filesize of the asset.

Notes: (Read only property)

6.4.9 `contentURL` as `string`

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Content URL.

Notes: (Read only property)

6.4.10 `contentVersion` as `string`

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Version string of the product.

Notes: (Read only property)

6.4.11 `error` as `NSErrorMBS`

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Last error, can be nil.

Notes: (Read only property)

6.4.12 `Handle` as `Integer`

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: The internal object reference.

Notes: (Read and Write property)

6.4.13 progress as Double

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Download progress.

Notes: (Read only property)

6.4.14 state as Integer

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Download state.

Notes: (Read only property)

6.4.15 timeRemaining as Double

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Estimated number of seconds remaining in the download.

Notes: (Read only property)

6.4.16 Transaction as SKPaymentTransactionMBS

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The transaction associated with the downloadable file

Notes: Available in MacOS 10.11 or newer.

(Read only property)

6.4.17 Constants

Download State Constants

Constant	Value	Description
kStateActive	1	Active
kStateCancelled	5	Cancelled
kStateFailed	4	Failed
kStateFinished	3	Finished
kStatePaused	2	Paused
kStateWaiting	0	Waiting

6.5 class SKMutablePaymentMBS

6.5.1 class SKMutablePaymentMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The mutable class for SKPaymentMBS.

Notes: The SKMutablePayment class defines a request to the Apple App Store to process payment for additional functionality offered by your application. A payment encapsulates a string that identifies a particular product and the quantity of that item the user would like to purchase.

When a mutable payment is added to the payment queue, the payment queue copies the contents into an immutable request before queuing the request. Your application can safely change the contents of the mutable payment object.

Please also check the documentation from Apple for the SKMutablePayment class.

Subclass of the SKPaymentMBS class.

Blog Entries

- [MBS Real Studio Plugins, version 11.3pr1](#)

6.5.2 Methods

6.5.3 Constructor(payment as SKPaymentMBS)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a mutable copy of the given payment.

See also:

- 6.5.4 Constructor(product as SKProductMBS)

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6.5.4 Constructor(product as SKProductMBS)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a new payment for the specified product.

Example:

```
dim product as SKProductMBS // your product
dim queue as SKPaymentQueueMBS // your queue
```

```
dim payment as new SKMutablePaymentMBS(product)
payment.quantity = 5
```

```
MsgBox str(payment.quantity)+" units of "+product.localizedTitle
queue.addPayment payment
```

See also:

- 6.5.3 Constructor(payment as SKPaymentMBS)

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6.5.5 paymentWithProduct(product as SKProductMBS) as SKMutablePaymentMBS

Plugin Version: 11.3, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a new payment for the specified product with the given quantity.

Example:

```
dim product as SKProductMBS // your product
dim payment as SKMutablePaymentMBS = SKMutablePaymentMBS.paymentWithProduct(product)
```

```
MsgBox str(payment.quantity)+" units of "+product.localizedTitle
```

Notes: product: The product the user wishes to purchase.
quantity: Optional quantity. If you don't pass it, we default to 1.

This factory Method in Cocoa Core Competencies uses the productIdentifier property obtained from the product parameter to create and return a new payment with that identifier.

Available in Mac OS X v10.7 and later.

See also:

- 6.5.6 paymentWithProduct(product as SKProductMBS, quantity as Integer) as SKMutablePaymentMBS
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6.5.6 paymentWithProduct(product as SKProductMBS, quantity as Integer) as SKMutablePaymentMBS

Plugin Version: 11.3, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a new payment for the specified product with the given quantity.

Example:

```
dim product as SKProductMBS // your product
dim payment as SKMutablePaymentMBS = SKMutablePaymentMBS.paymentWithProduct(product, 5)
```

```
MsgBox str(payment.quantity)+" units of "+product.localizedTitle
```

Notes: product: The product the user wishes to purchase.
 quantity: Optional quantity. If you don't pass it, we default to 1.

This factory Method in Cocoa Core Competencies uses the productIdentifier property obtained from the product parameter to create and return a new payment with that identifier.

Available in Mac OS X v10.7 and later.
 See also:

- 6.5.5 paymentWithProduct(product as SKProductMBS) as SKMutablePaymentMBS 137

6.5.7 Properties

6.5.8 applicationUsername as String

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: Application-specific user identifier. Optional.

Notes: (Read and Write property)

6.5.9 productIdentifier as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: A string that identifies a product that can be purchased from within your application.

Notes: The product identifier is a string previously agreed on between your application and the Apple App Store.

Available in Mac OS X v10.7 and later.
 (Read and Write property)

6.5.10 quantity as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The number of items the user wants to purchase.

Notes: The quantity property must be greater than 0.

Available in Mac OS X v10.7 and later.

(Read and Write property)

6.5.11 requestData as Memoryblock

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Reserved for future use.

Notes: The default value is nil. If requestData is not nil, your payment will be rejected by the Apple App Store.

Available in Mac OS X v10.7 and later.

(Read and Write property)

6.5.12 simulatesAskToBuyInSandbox as Boolean

Plugin Version: 19.1, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value that produces an „Ask to buy“ flow for this payment in the sandbox.

Notes: Available on MacOS 10.14 or newer.

(Read and Write property)

6.6 class SKPaymentMBS

6.6.1 class SKPaymentMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The class for a payment in the App Store.

Notes: The SKPayment class defines a request to the Apple App Store to process payment for additional functionality offered by your application. A payment encapsulates a string that identifies a particular product and the quantity of those items the user would like to purchase.

Please also check the documentation from Apple for the SKPayment class.
Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Xojo Plugins, version 19.1pr6](#)
- [MBS Real Studio Plugins, version 11.3pr1](#)

6.6.2 Methods

6.6.3 Constructor(product as SKProductMBS)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a new payment for the specified product.

Example:

```
dim product as SKProductMBS // your product
dim queue as SKPaymentQueueMBS // your queue

dim payment as new SKPaymentMBS(product)
MsgBox str(payment.quantity)+" units of "+product.localizedTitle

queue.addPayment payment
```

6.6.4 copy as SKPaymentMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a copy of the object.

6.6.5 mutableCopy as SKMutablePaymentMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a mutable copy of the object.

6.6.6 paymentWithProduct(product as SKProductMBS) as SKPaymentMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Returns a new payment for the specified product.

Example:

```
dim product as SKProductMBS // your product
dim queue as SKPaymentQueueMBS // your queue

dim payment as SKPaymentMBS = SKPaymentMBS.paymentWithProduct(product)
MsgBox str(payment.quantity)+" units of "+product.localizedTitle

queue.addPayment payment
```

Notes: product: The product the user wishes to purchase.

This factory Method in Cocoa Core Competencies uses the productIdentifier property obtained from the product parameter to create and return a new payment with that identifier. The quantity property defaults to 1.

To create a SKPaymentMBS object with a quantity greater than 1, create a SKMutablePaymentMBS object, adjust its quantity property and then add it to the payment queue.

Available in Mac OS X v10.7 and later.

6.6.7 Properties

6.6.8 applicationUsername as String

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: Application-specific user identifier. Optional.

Notes: (Read only property)

6.6.9 Handle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The internal reference to the SKPayment object.

Notes: (Read and Write property)

6.6.10 productIdentifier as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: A string used to identify a product that can be purchased from within your application. (read-only)

Notes: The product identifier is a string previously agreed on between your application and the Apple App Store.

Available in Mac OS X v10.7 and later.

(Read only property)

6.6.11 quantity as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The number of items the user wants to purchase. (read-only)

Notes: Default value is 1.

Available in Mac OS X v10.7 and later.

(Read only property)

6.6.12 requestData as Memoryblock

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Reserved for future use. (read-only)

Notes: The default value is nil. If requestData is not nil, your payment will be rejected by the Apple App Store.

Available in Mac OS X v10.7 and later.

(Read only property)

6.6.13 `simulatesAskToBuyInSandbox` as Boolean

Plugin Version: 19.1, Platform: macOS, Targets: Desktop & iOS.

Function: A Boolean value that produces an „ask to buy“ flow for this payment in the sandbox.

Notes: Available on MacOS 10.14 or newer.

(Read only property)

6.7 class SKPaymentQueueMBS

6.7.1 class SKPaymentQueueMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The SKPaymentQueue class defines a queue of payment transactions to send to the Apple App Store.

Notes: To use the payment queue, you add one or more payments. When payments are added to the queue, Store Kit connects to the Apple App Store and presents a user interface so that the user can authorize payment. As payments are fulfilled, the payment queue updates transactions and delivers them through events.

Available in Mac OS X v10.7 and later.

Please also check the documentation from Apple for the SKPaymentQueue class.

The plugin installs a transaction observer for you.

Blog Entries

- [MBS Xojo Plugins, version 19.1pr6](#)
- [MBS Xojo Plugins, version 18.1pr3](#)

6.7.2 Methods

6.7.3 addPayment(payment as SKPaymentMBS)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Adds a payment request to the queue.

Notes: payment: A payment request.

The payment request must have a product identifier registered with the Apple App Store and a quantity greater than 0. If either property is invalid, addPayment throws an exception.

When a payment request is added to the queue, the payment queue processes that request with the Apple App Store and arranges for payment from the user. When that transaction is complete or if a failure occurs, the payment queue sends the SKPaymentTransaction object that encapsulates the request to all transaction observers.

6.7.4 cancelDownload(download as SKDownloadMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Cancel one download.

Notes: Available in Mac OS X 10.8 and newer.

6.7.5 cancelDownloads(downloads() as SKDownloadMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Cancel a few downloads.

Notes: Available in Mac OS X 10.8 and newer.

6.7.6 canMakePayments as boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Returns whether the user is allowed to make payments.

Example:

```
if SKPaymentQueueMBS.canMakePayments then
  MsgBox "can make payments"
else
  MsgBox "not available"
end if
```

Notes: A Mac can be restricted from accessing the Apple App Store. For example, parents can restrict their children's ability to purchase additional content. Your application should confirm that the user is allowed to authorize payments before adding a payment to the queue. Your application may also want to alter its behavior or appearance when the user is not allowed to authorize payments.

6.7.7 Constructor

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Creates a new SKPaymentQueueMBS object.

Notes: Please make a subclass of this class to fill code into the events.
And please only have one instance of this class.

6.7.8 Destructor

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

6.7.9 finishTransaction(transaction as SKPaymentTransactionMBS)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Completes a pending transaction.

Notes: transaction: The transaction to finish.

Your application should call this method from a transaction observer that received a notification from the payment queue. Calling finishTransaction on a transaction removes it from the queue. Your application should call finishTransaction only after it has successfully processed the transaction and unlocked the functionality purchased by the user.

Calling finishTransaction on a transaction that is in the SKPaymentTransactionMBS.StatePurchasing state throws an exception.

6.7.10 pauseDownload(download as SKDownloadMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Pauses one download.

Notes: Available in Mac OS X 10.8 and newer.

6.7.11 pauseDownloads(downloads() as SKDownloadMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Pauses a few downloads.

Notes: Available in Mac OS X 10.8 and newer.

6.7.12 restoreCompletedTransactions

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Asks the payment queue to restore previously completed purchases.

Notes: Your application calls this method to restore transactions that were previously finished so that you can process them again. For example, your application would use this to allow a user to unlock previously purchased content onto a new device.

When you create a new product to be sold in your store, you choose whether that product can be restored or not. See the In App Purchase Programming Guide for more information.

The payment queue will deliver a new transaction for each previously completed transaction that can be restored. Each transaction includes a copy of the original transaction.

After the transactions are delivered, the payment queue calls the observer's `paymentQueueRestoreCompletedTransactionsFinished` event. If an error occurred while restoring transactions, the observer will be notified through its `paymentQueue:restoreCompletedTransactionsFailedWithError` event.

6.7.13 `restoreCompletedTransactionsWithApplicationUsername(username as String)`

Plugin Version: 19.1, Platform: macOS, Targets: Desktop & iOS.

Function: Asks the payment queue to restore previously completed purchases, providing an opaque identifier for the user, 's account.

Notes: `username`: An opaque identifier for the user, 's account on your system.

6.7.14 `resumeDownload(download as SKDownloadMBS)`

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Resumes one download.

Notes: Available in Mac OS X 10.8 and newer.

6.7.15 `resumeDownloads(downloads() as SKDownloadMBS)`

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Resumes a few downloads.

Notes: Available in Mac OS X 10.8 and newer.

6.7.16 `startDownload(download as SKDownloadMBS)`

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Start one download.

Notes: Available in Mac OS X 10.8 and newer.

6.7.17 startDownloads(downloads()) as SKDownloadMBS)

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Starts a few downloads.

Notes: Available in Mac OS X 10.8 and newer.

6.7.18 transactions as SKPaymentTransactionMBS()

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Returns an array of pending transactions.

Notes: The value of this property is undefined when there are no observers attached to the payment queue.

6.7.19 Properties

6.7.20 Handle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The internal reference.

Notes: (Read and Write property)

6.7.21 Events

6.7.22 paymentQueueRestoreCompletedTransactionsFinished

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

Function: Tells the observer that the payment queue has finished sending restored transactions.

Notes: This method is called after all restorable transactions have been processed by the payment queue. Your application is not required to do anything in this method.

6.7.23 removedTransactions(transactions()) as SKPaymentTransactionMBS)

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

Function: Tells an observer that one or more transactions have been removed from the queue.

Notes: transactions: An array of the transactions that were removed.

Your application does not typically need to implement this event but might implement it to update its own user interface to reflect that a transaction has been completed.

6.7.24 `restoreCompletedTransactionsFailedWithError(Error as NSErrorMBS)`

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

Function: Tells the observer that an error occurred while restoring transactions.

6.7.25 `updatedDownloads(downloads()) as SKDownloadMBS)`

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

Function: Sent when the download state has changed.

Notes: Available in Mac OS X 10.8 and newer.

6.7.26 `updatedTransactions(transactions()) as SKPaymentTransactionMBS)`

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

Function: Tells an observer that one or more transactions have been updated.

Notes: transactions: An array of the transactions that were updated.

The application should process each transaction by examining the transaction's `transactionState` property. If `transactionState` is `SKPaymentTransactionStatePurchased`, payment was successfully received for the desired functionality. The application should make the functionality available to the user. If `transactionState` is `SKPaymentTransactionStateFailed`, the application can read the transaction's `error` property to return a meaningful error to the user.

Once a transaction is processed, it should be removed from the payment queue by calling the payment queue's `finishTransaction:` method, passing the transaction as a parameter.

Important: Once the transaction is finished, Store Kit can not tell you that this item is already purchased. It is important that applications process the transaction completely before calling `finishTransaction:`.

6.8 class SKPaymentTransactionMBS

6.8.1 class SKPaymentTransactionMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The SKPaymentTransactionMBS class defines objects residing in the payment queue.

Notes: A payment transaction is created whenever a payment is added to the payment queue. Transactions are delivered to your application when the App Store has finished processing the payment. Completed transactions provide a receipt and transaction identifier that your application can use to save a permanent record of the processed payment.

Please also check the documentation from Apple for the SKPaymentTransaction class.

Available in Mac OS X v10.7 and later.

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

6.8.2 Methods

6.8.3 Constructor

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.

6.8.4 downloads as SKDownloadMBS()

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Returns the downloads for this transaction.

Notes: Available in Mac OS X 10.8 and newer.

6.8.5 Properties

6.8.6 error as NSErrorMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: An object describing the error that occurred while processing the transaction.

Notes: The error property is undefined except when transactionState is set to StateFailed. Your application can read the error property to determine why the transaction failed.

(Read only property)

6.8.7 Handle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The internal reference to the SKPaymentTransaction object.

Notes: (Read and Write property)

6.8.8 originalTransaction as SKPaymentTransactionMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The transaction that was restored by the App Store.

Notes: The contents of this property are undefined except when transactionState is set to StateRestored. When a transaction is restored, the current transaction holds a new transaction identifier, receipt, and so on. Your application will read this property to retrieve the restored transaction.

(Read only property)

6.8.9 payment as SKPaymentMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The payment for the transaction.

Notes: Each payment transaction is created in response to a payment that your application added to the payment queue.

(Read only property)

6.8.10 transactionDate as date

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

Function: The date the transaction was added to the App Store's payment queue.

Notes: The contents of this property are undefined except when transactionState is set to StatePurchased or StateRestored.

(Read only property)

6.8.11 `transactionDateTime` as `DateTime`

Plugin Version: 20.5, Platform: macOS, Targets: Desktop & iOS.

Function: The date the transaction was added to the App Store’s payment queue.

Notes: The contents of this property are undefined except when `transactionState` is set to `StatePurchased` or `StateRestored`.

(Read only property)

6.8.12 `transactionIdentifier` as `string`

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: A string that uniquely identifies a successful payment transaction.

Notes: The contents of this property are undefined except when `transactionState` is set to `StatePurchased` or `StateRestored`. The `transactionIdentifier` is a string that uniquely identifies the processed payment. Your application may wish to record this string as part of an audit trail for App Store purchases. See In App Purchase Programming Guide for more information.

(Read only property)

6.8.13 `transactionState` as `Integer`

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The current state of the transaction.

Notes: see `State*` constants.

(Read only property)

6.8.14 Constants

Transaction State Constants

Constant	Value	Description
<code>StateDeferred</code>	4	Transaction is neither purchased nor failed, yet.
<code>StateFailed</code>	2	The transaction failed. Check the error property to determine what happened.
<code>StatePurchased</code>	1	The App Store successfully processed payment. Your application should provide the content the user purchased.
<code>StatePurchasing</code>	0	The transaction is being processed by the App Store.
<code>StateRestored</code>	3	This transaction restores content previously purchased by the user. Read the <code>originalTransaction</code> property to obtain information about the original purchase.

6.9 class SKProductDiscountMBS

6.9.1 class SKProductDiscountMBS

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The class for product discounts.

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

6.9.2 Methods

6.9.3 Constructor

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.

6.9.4 Properties

6.9.5 Handle as Integer

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The internal object reference.

Notes: (Read and Write property)

6.9.6 NumberOfPeriods as Integer

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The number of periods this price is valid.

Notes: (Read only property)

6.9.7 PaymentMode as Integer

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The payment mode.

Notes: (Read only property)

6.9.8 Price as Double

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The price of the product.

Notes: (Read only property)

6.9.9 priceLocale as NSLocaleMBS

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The price locale.

Notes: (Read only property)

6.9.10 PriceString as String

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The price as formatted string.

Notes: (Read only property)

6.9.11 subscriptionPeriod as SKProductSubscriptionPeriodMBS

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The subscription period.

Notes: (Read only property)

6.9.12 Constants

Payment Modes

Constant	Value	Description
kPaymentModeFreeTrial	2	Free trial
kPaymentModePayAsYouGo	0	Pay as you go
kPaymentModePayUpFront	1	Pay Upfront

6.10 class SKProductMBS

6.10.1 class SKProductMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The App Store class for a product.

Notes: SKProductMBS objects are returned as part of an `didReceiveResponse` event in `SKProductsRequestMBS` class and are used to provide information about a product previously registered with the Apple App Store.

Please also check the documentation from Apple for the `SKProduct` class.

Available in Mac OS X v10.7 and later.

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

Blog Entries

- [MBS Xojo Plugins, version 19.1pr6](#)

6.10.2 Methods

6.10.3 Constructor

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.

6.10.4 `contentLengths as Int64()`

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

Function: Array with file sizes of the assets.

Notes: Available in Mac OS X 10.8 and newer.

6.10.5 `downloadContentLengths as Int64()`

Plugin Version: 19.1, Platform: macOS, Targets: Desktop only.

Function: The lengths of the downloadable files available for this product.

Notes: The array holds `Int64` values that is the size of one of the downloadable files (in bytes).

For MacOS 10.14 or newer.

Falls back to `downloadLengths` for older OS versions.

6.10.6 Properties

6.10.7 `contentLength` as `Int64`

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

Function: Total filesize of the assets.

Notes: Available in Mac OS X 10.8 and newer.

(Read only property)

6.10.8 `contentVersion` as `string`

Plugin Version: 12.3, Platform: macOS, Targets: Desktop & iOS.

Function: Version string of the product.

Notes: Available in Mac OS X 10.8 and newer.

(Read only property)

6.10.9 `downloadable` as `boolean`

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

Function: Whether this is a download item.

Notes: Available in Mac OS X 10.8 and newer.

(Read only property)

6.10.10 `downloadContentLength` as `Int64`

Plugin Version: 19.1, Platform: macOS, Targets: Desktop only.

Function: The length of the downloadable files available for this product.

Notes: For MacOS 10.14 or newer.

Falls back to `downloadLength` for older OS versions.

(Read only property)

6.10.11 `downloadContentVersion` as `String`

Plugin Version: 19.1, Platform: macOS, Targets: Desktop & iOS.

Function: A string that identifies which version of the content is available for download.

Notes: The version string is formatted as a series of integers separated by periods.

For MacOS 10.14 or newer.

Falls back to ContentVersion for older OS versions.

(Read only property)

6.10.12 Handle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The internal reference to the SKProduct object.

Notes: (Read and Write property)

6.10.13 introductoryPrice as SKProductDiscountMBS

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: Introductory Price.

Notes: Available on MacOS 10.13.2 or later.

Value is nil on older systems.

(Read only property)

6.10.14 localizedDescription as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: A description of the product.

Notes: The description is localized based on the currentLocale property.

(Read only property)

6.10.15 localizedTitle as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The name of the product.

Notes: The description is localized based on the currentLocale property.

(Read only property)

6.10.16 price as Double

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The cost of the product in the local currency.

Notes: Use PriceString to get a localized formatted price.
(Read only property)

6.10.17 priceLocale as NSLocaleMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The locale used to format the price of the product.

Notes: (Read only property)

6.10.18 priceString as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The cost of the product in the local currency.

Notes: We format the price in the locale currency format.
(Read only property)

6.10.19 productIdentifier as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The string that identifies the product to the Apple App Store.

Notes: (Read only property)

6.10.20 subscriptionGroupIdentifier as String

Plugin Version: 19.1, Platform: macOS, Targets: Desktop & iOS.

Function: The identifier of the subscription group to which the subscription belongs.

Notes: All auto-renewable subscriptions must be a part of a group. You create the group identifiers in App Store Connect.

Available on MacOS 10.14 or newer.

(Read only property)

6.10.21 subscriptionPeriod as SKProductSubscriptionPeriodMBS

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: Subscription period.

Notes: Available on MacOS 10.13.2 or later.

Value is nil on older systems.

(Read only property)

6.11 class SKProductsRequestMBS

6.11.1 class SKProductsRequestMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: An SKProductsRequestMBS object is used to retrieve localized information about a list of products from the Apple App Store.

Notes: Your application uses this request to present localized prices and other information to the user without having to maintain that list itself.

To use an SKProductsRequest object, you initialize it with a list of product identifier strings, attach a delegate, and then call the request's start method. When the request completes, you receive the didReceiveResponse event.

Please also check the documentation from Apple for the SKProductsRequest class.

Available in Mac OS X v10.7 and later.

Blog Entries

- [MBS Xojo Plugins, version 19.0pr6](#)
- [MBS Xojo Plugins, version 17.4pr2](#)

6.11.2 Methods

6.11.3 cancel

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Cancels a previously started request.

Notes: When you cancel a request, the events are not called with an error.

6.11.4 Constructor(productIdentifiers() as string)

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Initializes the request with the set of product identifiers.

Notes: productIdentifiers: The list of product identifiers for the products you wish to retrieve descriptions of.

6.11.5 Destructor

Plugin Version: 17.4, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

6.11.6 start

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Sends the request to the Apple App Store.

Notes: The results for a request are sent to the events.

6.11.7 Properties

6.11.8 Handle as Integer

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The internal reference to the SKProductsRequest object.

Notes: (Read and Write property)

6.11.9 Events

6.11.10 didFailWithError(error as NSErrorMBS)

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

Function: Called if the request failed to execute.

Notes: error: The error that caused the request to fail.

When the request fails, your application should release the request. The requestDidFinish event is not called after this method is called.

6.11.11 didFinish

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

Function: Called when the request has completed.

Notes: This method is called after all processing of the request has been completed.

6.11.12 `didReceiveResponse(products() as SKProductMBS, invalidProductIdentifiers() as string)`

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

Function: Called when the Apple App Store responds to the product request.

Notes: `products`: A list of products, one product for each valid product identifier provided in the original request.

`invalidProductIdentifiers`: An array of product identifier strings that were not recognized by the Apple App Store. This array should typically be empty.

6.12 class SKProductSubscriptionPeriodMBS

6.12.1 class SKProductSubscriptionPeriodMBS

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The class for a subscription period.

Notes: Available on MacOS 10.13.2.

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

6.12.2 Methods

6.12.3 Constructor

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The private constructor.

6.12.4 Properties

6.12.5 Handle as Integer

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The internal object reference.

Notes: (Read and Write property)

6.12.6 numberOfUnits as Integer

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The number of units.

Notes: (Read only property)

6.12.7 unit as Integer

Plugin Version: 18.1, Platform: macOS, Targets: Desktop & iOS.

Function: The unit of the period from day to year.

Notes: (Read only property)

6.12.8 Constants

Period units

Constant	Value	Description
PeriodUnitDay	0	Day
PeriodUnitMonth	2	Month
PeriodUnitWeek	1	Week
PeriodUnitYear	3	Year

6.13 class SKReceiptRefreshRequestMBS

6.13.1 class SKReceiptRefreshRequestMBS

Plugin Version: 13.5, Platform: macOS, Targets: Desktop & iOS.

Function: The SKReceiptRefreshRequest class allows an app to refresh its receipt.

Notes: With this API, the app can request a new receipt if the receipt is invalid or missing. In the sandbox environment, you can request a receipt with any combination of properties to test the state transitions related to Volume Purchase Plan receipts.

Requires Mac OS X 10.9.

Blog Entries

- [MBS Xojo Plugins, version 21.2pr4](#)
- [MBS Xojo Plugins, version 19.1pr6](#)
- [MBS Xojo / Real Studio plug-ins in version 13.5](#)
- [MBS Xojo / Real Studio Plugins, version 13.5pr1](#)

Xojo Developer Magazine

- [12.1, page 9: News](#)

6.13.2 Methods

6.13.3 cancel

Plugin Version: 13.5, Platform: macOS, Targets: Desktop & iOS.

Function: Cancels a previously started request.

Notes: When you cancel a request, the events are not called with an error.

6.13.4 Constructor(properties as dictionary = nil)

Plugin Version: 13.5, Platform: macOS, Targets: Desktop & iOS.

Function: Initialized a receipt refresh request with optional properties.

Notes: In the test environment, the properties that the new receipt should have. For keys, see SKReceipt-Property* methods.

In the production environment, set this parameter to nil.

6.13.5 Destructor

Plugin Version: 17.4, Platform: macOS, Targets: Desktop & iOS.

Function: The destructor.

6.13.6 SKReceiptPropertyIsExpired as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop & iOS.

Function: One of the keys for properties in initialization.

Notes: A key whose value is a Boolean value, indicating whether the receipt is expired.

6.13.7 SKReceiptPropertyIsRevoked as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop & iOS.

Function: One of the keys for properties in initialization.

Notes: A key whose value is a Boolean value, indicating whether the receipt has been revoked.

6.13.8 SKReceiptPropertyIsVolumePurchase as string

Plugin Version: 13.5, Platform: macOS, Targets: Desktop & iOS.

Function: One of the keys for properties in initialization.

Notes: A key whose value is a Boolean value, indicating whether the receipt is is a Volume Purchase Plan receipt.

6.13.9 start

Plugin Version: 13.5, Platform: macOS, Targets: Desktop & iOS.

Function: Sends the request to the Apple App Store.

Notes: The results for a request are sent to the events.

6.13.10 TerminateForInvalidReceipt

Plugin Version: 19.1, Platform: macOS, Targets: Desktop & iOS.

Function: Terminates an app if the license to use the app has expired.

Notes: Falls back to `exit(173)` for MacOS before 10.14.

6.13.11 Properties

6.13.12 Handle as Integer

Plugin Version: 13.5, Platform: macOS, Targets: Desktop & iOS.

Function: The internal object reference.

Notes: (Read and Write property)

6.13.13 receiptProperties as Dictionary

Plugin Version: 13.5, Platform: macOS, Targets: Desktop & iOS.

Function: The properties of the receipt. (read-only)

Notes: (Read only property)

6.13.14 Events

6.13.15 didFailWithError(error as NSErrorMBS)

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

Function: Called if the request failed to execute.

Notes: error: The error that caused the request to fail.

When the request fails, your application should release the request. The `requestDidFinish` event is not called after this method is called.

6.13.16 didFinish

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

Function: Called when the request has completed.

Notes: This method is called after all processing of the request has been completed.

6.14 module StoreKitMBS

6.14.1 module StoreKitMBS

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Globals for the StoreKit plugin.

Notes: Be aware that StoreKit requires your app to be signed.

Blog Entries

- [MBS Xojo Plugins, version 19.1pr6](#)

6.14.2 Methods

6.14.3 appStoreReceiptURL as string

Plugin Version: 19.1, Platform: macOS, Targets: Desktop & iOS.

Function: Queries URL for the app store receipt file.

6.14.4 available as Boolean

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: Whether the StoreKit framework is available.

Example:

```
msgbox "StoreKit available: "+str(StoreKitMBS.available)
```

Notes: Should always be true on Mac OS X 10.7 and newer.

6.14.5 requestReview

Plugin Version: 19.1, Platform: macOS, Targets: Desktop & iOS.

Function: Tells StoreKit to ask the user to rate or review your app, if appropriate.

Example:

```
If StoreKitMBS.StoreReviewAvailable Then  
StoreKitMBS.requestReview  
End If
```

Notes: Although you should call this method when it makes sense in the user experience flow of your app, the actual display of a rating/review request view is governed by App Store policy. Because this method may or may not present an alert, it's not appropriate to call it in response to a button tap or other user action.

When you call this method while your app is still in development mode, a rating/review request view is always displayed so that you can test the user interface and experience. However, this method has no effect when you call it in an app that you distribute using TestFlight.

When you call this method in your shipping app and a rating/review request view is displayed, the system handles the entire process for you. In addition, you can continue to include a persistent link in the settings or configuration screens of your app that deep-links to your App Store product page. To automatically open a page on which users can write a review in the App Store, append the query parameter `action=write-review` to your product URL.

Available on MacOS 10.14 or newer.

`requestReview` method will only work, if `StoreReviewAvailable` returns true.

Does nothing if called on older OS versions.

6.14.6 SKErrorDomain as string

Plugin Version: 11.2, Platform: macOS, Targets: Desktop & iOS.

Function: The domain for StoreKit errors.

6.14.7 StoreReviewAvailable as Boolean

Plugin Version: 19.1, Platform: macOS, Targets: Desktop & iOS.

Function: Checks whether `SKStoreReviewController` class is available.

Example:

```
If StoreKitMBS.StoreReviewAvailable Then
StoreKitMBS.requestReview
End If
```

Notes: `requestReview` method will only work, if `StoreReviewAvailable` returns true.

6.14.8 Constants

StoreKit error codes

Constant	Value	Description
SKErrorClientInvalid	1	client is not allowed to issue the request, etc.
SKErrorPaymentCancelled	2	user cancelled the request, etc.
SKErrorPaymentInvalid	3	purchase identifier was invalid, etc.
SKErrorPaymentNotAllowed	4	this machine is not allowed to make the payment
SKErrorUnknown	0	unknown error

Chapter 7

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Chapter 8

The FAQ

8.0.1 Can anyone help me convert seconds to time in this format hh:mm:ss?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sure, here's a routine I use (which has an advantage over the previously-posted Date-based solution in that you don't have to rely on the creation of an object – all that happens is some division and string concatenation):

Example:

```
Function SecsToTimeString(timeInSecs as Integer, padHours as boolean, padMinutes as boolean) as string
// Given an amount time (in seconds), generates a string representing that amount
// of time. The padHours and padMinutes parameters determine whether to display
// hours and minutes if their values are zero.
```

```
// Examples:
// timeInSecs = 90, padHours = true; returns "00:01:30"
// timeInSecs = 1, padHours = false, padMinutes = true; returns "00:01"
// timeInSecs = 3601, padMinutes = false; returns "01:00:01"
```

```
dim hours, minutes, seconds as Integer
dim hoursString, minutesString as string
```

```
hours = timeInSecs / 3600
minutes = (timeInSecs mod 3600) / 60
seconds = timeInSecs mod 60
```

```
if hours = 0 then
if padHours then
hoursString = "00:"
else
hoursString = ""
end if
```

```

else
hoursString = Format(hours, "##\:")
end if
if minutes = 0 then
if hours <>0 or padMinutes then
minutesString = "00:"
else
minutesString = ""
end if
else
minutesString = Format(minutes, "00\:")
end if

return hoursString + minutesString + Format(seconds, "00")
End Function

```

Notes: (from the rb mailinglist)

8.0.2 Do you have plugins for Android?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Since there is no plugin SDK for Android, we have no way to make a plugin for Android.

Notes: We support macOS, Windows, Linux and iOS.

8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use functions from NSColor to get proper highlight color in RGB:

Example:

```

Function ProperHighlightColor(active as Boolean) As Color
#if TargetCocoa
Dim theColor As NSColorMBS
If active Then
theColor = NSColorMBS.alternateSelectedControlColor
Else
theColor = NSColorMBS.secondarySelectedControlColor
End If

```

```

Dim rgbColor As NSColorMBS = theColor.colorUsingColorSpaceName(NSColorSpaceMBS.NSCalibrate-

```

```

dRGBColorSpace)
If rgbColor <>Nil Then
Dim red as Integer = rgbColor.redComponent * 255.0
Dim green as Integer = rgbColor.greenComponent * 255.0
Dim blue as Integer = rgbColor.blueComponent * 255.0
Return RGB(red, green, blue)
Else
Return HighlightColor
End If
#else
return HighlightColor
#endif
End Function

```

Notes: As you see we convert color to Calibrated RGB for best results.
See also:

- 8.0.4 How to catch delete key? 183
- 8.0.5 How to convert cmyk to rgb? 184
- 8.0.6 How to delete a folder? 185
- 8.0.7 How to detect if CPU if 64bit processor? 186
- 8.0.8 How to query variant type string for a variant? 187
- 8.0.9 How to refresh a htmlviewer on Windows? 188

8.0.4 How to catch delete key?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following is the code in keydown event catches delete or backspace keys.

Example:

```

Function KeyDown(Key As String) As Boolean
if asc(key) = 8 or asc(key) = 127 then
MsgBox "Delete"
Return true
end if
End Function

```

See also:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 182

- 8.0.5 How to convert cmyk to rgb? 184
- 8.0.6 How to delete a folder? 185
- 8.0.7 How to detect if CPU is 64bit processor? 186
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8.0.5 How to convert cmyk to rgb?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

The following is the code to convert cmyk values to an RGB color datatype.

It's just a basic estimate of the color values. If you are looking for completely color accurate solution, this is not it. It should work for most people. :)

Example:

Function CMYKToRGB(c as Integer, m as Integer, y as Integer, k as Integer) As color

// converts c,m,y,k values (0-100) to color data type RGB

// place this in a method. Supply C,M,Y,K values-

// it returns color datatype

```
dim color_RGB as color
```

```
dim r, g, b as Integer
```

```
r=255-round(2.55*(c+k))
```

```
if r<0 then
```

```
r=0
```

```
end if
```

```
g=255-round(2.55*(m+k))
```

```
if g<0 then
```

```
g=0
```

```
end if
```

```
b=255-round(2.55*(y+k))
```

```
if b<0 then
```

```
b=0
```

```
end if
```

```
color_RGB=RGB(r,g,b)
```

```
return color_RGB
```

```
End Function
```

Notes:

(from the rb mailinglist)
See also:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 182
- 8.0.4 How to catch delete key? 183
- 8.0.6 How to delete a folder? 185
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8.0.6 How to delete a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following is the code that deletes a folder recursively.

Example:

```
Sub deletefolder(f as folderitem)
dim files(-1) as FolderItem

if f=nil then Return

// delete single file
if f.Directory=false then
f.Delete
Return
end if

// get a list of all items in that folder
dim i,c as Integer
c=F.Count
for i=1 to c
files.Append f.TrueItem(i)
next

// delete each item
for each fo as FolderItem in files
if fo=nil then
' ignore
elseif fo.Directory then
deletefolder fo
fo.delete
else ' file
```

```
fo.Delete
end if
next
```

```
f.Delete
End Sub
```

See also:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 182
- 8.0.4 How to catch delete key? 183
- 8.0.5 How to convert cmyk to rgb? 184
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8.0.7 How to detect if CPU is 64bit processor?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Via CPUID you can ask CPU:

Example:

```
dim c as new CPUIDMBS

if c.Flags(CPUIDMBS.kFeatureLM) then
MsgBox "64-bit CPU"
else
MsgBox "32-bit CPU"
end if
```

Notes: Should work on all intel compatible CPUs.

See also:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 182
- 8.0.4 How to catch delete key? 183
- 8.0.5 How to convert cmyk to rgb? 184
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8.0.8 How to query variant type string for a variant?

Plugin Version: 20.5, Platforms: macOS, Linux, Windows.

Answer: The following example function returns type string for variant.

Example:

```
Public Function VariantTypeString(v as Variant) as string
// Xojo's VarType doesn't know Unsigned integers
'Dim type As Integer = VarType(v)

// MBS VarType can detect unsigned integer
Dim type As Integer = GetVariantTypeMBS(v)

Dim IsArray As Boolean = BitwiseAnd(type, Variant.TypeArray) = Variant.TypeArray

// type without array
type = BitwiseAnd(type, Bitwise.OnesComplement(Variant.TypeArray))

// build a dictionary to map types on first call
Static TypeMap As Dictionary
If TypeMap = Nil Then
TypeMap = New Dictionary
TypeMap.Value(Variant.TypeBoolean) = "Boolean"
TypeMap.Value(Variant.TypeCFStringRef) = "CFStringRef"
TypeMap.Value(Variant.TypeColor) = "Color"
TypeMap.Value(Variant.TypeCString) = "CString"
TypeMap.Value(Variant.TypeCurrency) = "Currency"
TypeMap.Value(Variant.TypeDate) = "Date"
TypeMap.Value(Variant.TypeDateTime) = "DateTime"
TypeMap.Value(Variant.TypeDouble) = "Double"
TypeMap.Value(Variant.TypeInt32) = "Int32"
TypeMap.Value(Variant.TypeInt64) = "Int64"
TypeMap.Value(Variant.TypeInteger) = "Integer"
TypeMap.Value(Variant.TypeNil) = "Nil"
TypeMap.Value(Variant.TypeObject) = "Object"
TypeMap.Value(Variant.TypeOSType) = "OSType"
TypeMap.Value(Variant.TypePString) = "PString"
TypeMap.Value(Variant.TypePtr) = "Ptr"
TypeMap.Value(Variant.TypeSingle) = "Single"
TypeMap.Value(Variant.TypeString) = "String"
TypeMap.Value(Variant.TypeStructure) = "Structure"
TypeMap.Value(Variant.TypeText) = "Text"
TypeMap.Value(Variant.TypeWindowPtr) = "WindowPtr"
TypeMap.Value(Variant.TypeWString) = "WString"

// MBS extra types
TypeMap.Value(Variant.TypeInt32+100) = "UInt32"
TypeMap.Value(Variant.TypeInt64+100) = "UInt64"
```

End If

```
// lookup type

#if DebugBuild then
If Not TypeMap.HasKey(type) Then
Break // missing type
End If
#endif

If IsArray Then
Return "Array of " + TypeMap.Lookup(type,"?")
Else
Return TypeMap.Lookup(type,"?")
End If
End Function
```

See also:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 182
- 8.0.4 How to catch delete key? 183
- 8.0.5 How to convert cmyk to rgb? 184
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8.0.9 How to refresh a htmlviewer on Windows?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can ask the browser to reload the website with this code line:

Example:

```
call htmlViewer1.IERunJavaScriptMBS("javascript:document.location.reload()")
```

See also:

- 8.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 182
- 8.0.4 How to catch delete key? 183
- 8.0.5 How to convert cmyk to rgb? 184

- 8.0.6 How to delete a folder? 189
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8.0.10 Is there an example for vector graphics in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this example inside the paint event of a window:

Example:

```
dim v as Group2D
dim r as RectShape
dim s as StringShape
```

```
const pi=3.14
```

```
s=new StringShape
s.Text="Hello World!"
s.TextFont="Geneva"
s.TextSize=24
s.FillColor=rgb(0,0,255)
s.Italic=true
s.y=5
s.x=0
```

```
r=new RectShape
```

```
r.X=0
r.y=0
r.Height=100
r.Width=180
r.BorderColor=rgb(255,0,0)
r.FillColor=rgb(0,255,0)
r.BorderWidth=5
r.Border=50
```

```
v=new Group2d
v.Append r
v.Append s
v.Rotation=pi*-20.0/180.0
v.x=150
v.y=150
```

```
g.DrawObject v
```

8.0.11 Picture functions do not preserve resolution values?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the picture functions return pictures with no/default resolution values.

Example:

```
dim l as Picture = LogoMBS(500)
```

```
l.HorizontalResolution = 300
```

```
l.VerticalResolution = 300
```

```
dim r as Picture = l.Rotate90MBS
```

```
MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)
```

```
r.HorizontalResolution = l.HorizontalResolution
```

```
r.VerticalResolution = l.VerticalResolution
```

```
MsgBox str(r.HorizontalResolution)+" x "+str(r.VerticalResolution)
```

Notes: So please fix them yourself after calling a function.

Maybe in the future this changes, but currently you can't really set this easily from plugin code.

8.0.12 A toolbox call needs a rect - how do I give it one?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Fill a memoryblock like this:

Example:

```
Dim MB As Memoryblock
```

```
MB = NewMemoryBlock(8)
```

```
MB.Short(0) = window1.Top
```

```
MB.Short(2) = window1.Left
```

```
MB.Short(4) = window1.Height+window1.Top // bottom
```

```
MB.Short(6) = window1.Width+window1.Left // right
```

8.0.13 API client not supported?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you get this exception message on `SQLConnectionMBS.Connect`, we may have a problem.

Notes: First case is that the given thing is not supported (e.g. MS SQL directly on Mac).

Second case is that the plugin compilation went wrong and the support for the database was not linked into the plugin. Like MySQL missing or MS SQL on Windows missing. In that case please contact us to fix the plugin.

8.0.14 Can I access Access Database with Java classes?

Plugin Version: all, Platform: Windows.

Answer: You can use `ucanaccess` to access databases created with Microsoft

Example:

```

dim options(-1) as string

// load all the jar files we have in a folder called java:

dim appFolder as FolderItem = GetFolderItem("")

Dim count as Integer = appFolder.Parent.Child("java").Count
dim libjs() as string
For i as Integer = 1 to count
Dim f As FolderItem = appFolder.Parent.Child("java").item(i)
If f <> Nil and f.Exists Then
libjs.append f.NativePath+";"
End If
Next

// now init virtual machine
dim library as string = Join(libjs, "")
dim vm as new JavaVMMBS(library)

if vm.Handle = 0 then
MsgBox "Failed to initialize virtual machine"
else
// now make a new database connection with ucanaccess
dim d as new JavaDatabaseMBS(vm,"net.ucanaccess.jdbc.UcanaccessDriver")
Dim DbFile as FolderItem = appFolder.Parent.Child("Database11.accdb")
dim j as JavaConnectionMBS = d.getConnection("jdbc:ucanaccess://" + DbFile.NativePath)

// select and show values
dim r as JavaResultSetMBS = j.MySelectSQL("Select * From test")
while r.NextRecord
MsgBox r.getString("FirstName") + " " + r.getString("LastName")
wend

end if

```

Exception `e` as `JavaExceptionMBS`
`MsgBox e.message+" errorcode: "+str(e.ErrorNumber)`

Notes: see website:
<http://ucanaccess.sourceforge.net/site.html>

8.0.15 Can I create PDF from Xojo Report using DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, we have a graphics class integration for DynaPDF.

Notes: Since MBS Plugin in version 19.2, we can integrate reports with Xojo.

8.0.16 Can I use AppleScripts in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, but they run on the server, not on the client.

Example:

```
dim a as new AppleScriptMBS

// query my application name
a.Compile "tell application ""System Events"" to return name of current application"

// run
a.Execute

// show result
label1.text = a.Result

// shows something like "My Application.fcgi.debug"
```

Notes: This can be useful to control the server from remote, if and only if the your sever is running Mac OS X.

8.0.17 Can I use graphics class with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sorry, no. We can't provide a graphics subclass from plugin.

Notes: This is a feature request to allow graphics subclasses:

Feedback case 11391: [feedback://showreport?report_id=11391](https://feedback.apple.com/showreport?report_id=11391)

8.0.18 Can I use sockets on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, but they run on the server, not on the client.

Notes: You can use `HTTPSocket`, `SMTPSocket`, `POP3Socket`, `SMTPSecureSocket`, `SecurePOP3Socket`, `EasyTCPSocket`, `EasyUDPSocket`, `AutoDiscovery`, our Bonjour classes or our `CURL*` classes. But all of them work on the server, not on the client.

This means if you search for a printer with Bonjour, you can find the printers in the local network on your server hosting site. Using `SMTPSocket` may be a good idea for sending emails from the server like notifications.

8.0.19 Can I use your ChartDirector plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our ChartDirector plugin works just fine on the Xojo Web Edition.

Example:

```
// The data for the pie chart
dim data(-1) as Double=array(55.0, 18.0, 25.0, 22.0, 18.0, 30.0, 35.0)

// The labels for the pie chart, Words are chosen 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 &hbbsbbb
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. Transferring those pictures takes time, so you can optimize that with using WebPicture class. There you can decide between different compressions to improve speed (use JPEG instead of PNG).

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with `"/usr/share/fonts/truetype/msttcorefonts"` as the path. No backslash on the end of a path, please.

8.0.20 Can I use your DynaPDF plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our DynaPDF plugin works just fine on the Xojo Web Edition.

Notes: PDF files are created on the server. You may want to offer a preview to the user which uses reduced resolution images to reduce the time to download the PDF.

See our Create PDF example for the Xojo Web Edition.

8.0.21 Can I use your plugin controls on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: No.

8.0.22 Can you get an unique machine ID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There is nothing like an unique machine ID.

Notes: 1:

You can use the MAC IDs of the network interfaces.

This can be changed by the user with software tools.

And the list of network interfaces changes if user reorder the interfaces.

2:

You can use the system folder creation date/time.

This may stay equal after cloning machines or after migration to new PC.

3:

You can use the Mac Serialnumber.

Mac only and it can happen that a Mac does not have a serial number.

4:

You can use the x86 CPU ID.

This is x86 CPU only and does not avoid running on the same CPU in different PCs.

8.0.23 ChartDirector: Alignment Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Alignment Specification

Notes: In many ChartDirector objects, you may specify the alignment of the object's content relative to its boundary. For example, for a TextBox object, you may specify the text's alignment relative to the box boundary by using `TextBox.setAlignment`.

The ChartDirector API defines several constants for the alignment options.

ConstantValueDescription

BottomLeft	1	The leftmost point on the bottom line.
BottomCenter	2	The center point on the bottom line.
BottomRight	3	The rightmost point on the bottom line.
Left	4	The leftmost point on the middle horizontal line.
Center	5	The center point on the middle horizontal line.
Right	6	The rightmost point on the middle horizontal line.
TopLeft	7	The leftmost point on the top line.
TopCenter	8	The center point on the top line.
TopRight	9	The rightmost point on the top line.
Bottom	2	The center point on the bottom line. Same as BottomCenter.
Top	8	The center point on the top line. Same as TopCenter.
TopLeft2	10	An alternative top-left position used in <code>Axis.setTitlePos</code> 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 <code>Axis.setTitlePos</code> 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 <code>Axis.setTitlePos</code> 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 <code>Axis.setTitlePos</code> 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.

8.0.24 ChartDirector: Color Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Color Specification

Notes: Many functions in the ChartDirector API accept colors as parameters. ChartDirector supports col-

ors specified in web and HTML compatible ARGB format, in which ARGB refers to the Alpha transparency, Red, Green and Blue components of the color.

In addition to ARGB colors, ChartDirector supports "dynamic" colors. A dynamic color is a color that changes depending on the position of the pixels. The "dynamic" colors that ChartDirector supports include "pattern colors", "metal colors", "gradient colors", "zone colors" and "dash line colors".

ChartDirector supports specifying colors indirectly using "palette colors". When a "palette color" is used, the color is specified as an index to a palette. The actual color is looked up from the palette. ARGB Color ARGB color consists of 4 components - alpha transparency, red, green and blue. The four components are encoded as a 32-bit number, with each component occupying 8 bits. In hexadecimal notation, it is AAR-RGGBB, where AA, RR, GG and BB are the alpha transparency, red, green and blue components.

Each component ranges from 00 - FF (0 - 255), representing its intensity. For example, pure red color is 00FF0000, pure green color is 0000FF00, and pure blue color is 000000FF. White color is 00FFFFFF, and black color is 00000000.

Most programming language requires you to put special prefix in front of hexadecimal characters. For C++, the prefix is "0x". For example, the syntax for the hexadecimal number 00FFFFFF is 0x00FFFFFF, or simply 0xFFFFFF.

For the alpha transparency component, a zero value means the color is not transparent at all. This is equivalent to traditional RGB colors. A non-zero alpha transparency means the color is partially transparent. The larger the alpha transparency, the more transparent the color will be. If a partially transparent color is used to draw something, the underlying background can still be seen.

For example, 80FF0000 is a partially transparent red color, while 00FF0000 is a non-transparent red color.

Note that ChartDirector's ARGB color is web and HTML compatible. For example, red is FF0000, the same as in HTML. There are many resources on the web that provide tables in which you can click a color and it will show its HTML color code. These color codes can be used in ChartDirector.

If alpha transparency is FF (255), the color is totally transparent. That means the color is invisible. It does not matter what the RGB components are. So in ChartDirector, only one totally transparent color is used - FF000000. All other colors of the form FFnnnnnn are reserved to represent palette colors and dynamic colors, and should not be interpreted as the normal ARGB colors.

The totally transparent color FF000000 is often used in ChartDirector to disable drawing something. For example, if you want to disable drawing the border of a rectangle, you can set the border color to totally transparent.

For convenience, ChartDirector defines a constant called Transparent, which is equivalent to FF000000. Pattern Color

A pattern color is a dynamic color that changes according to a 2D periodic pattern. When it is used to fill an area, the area will look like being tiled with a wallpaper pattern.

Pattern colors are created using `BaseChart.patternColor`, `BaseChart.patternColor2`, `DrawArea.patternColor` and `DrawArea.patternColor2`. The `patternColor` method creates pattern colors using an array of colors as a bitmap. The `patternColor2` method creates pattern colors by loading the patterns from image files.

These methods return a 32-bit integer acting as a handle to the pattern color. The handle can be used in any `ChartDirector` API that expects a color as its input.

A metal color is a color of which the brightness varies smoothly across the chart surface as to make the surface look shiny and metallic. `ChartDirector` supports using any color as the base color of the metal color. In particular, using yellow and grey as the base colors will result in metal colors that look gold and silver.

Metal colors are most often used as background colors of charts. They are created using `CDBaseChartMBS.metalColor`, `CDBaseChartMBS.goldColor` and `CDBaseChartMBS.silverColor`. The first method allows you to specify an arbitrary base color. The second and third methods use yellow and grey as the base colors, resulting in gold and silver metal colors.

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any `ChartDirector` API that expects a color as its input.

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.

A dash line color is a color that switches on and off periodically. When used to draw a line, the line will appear as a dash line.

Dash line colors are created using `BaseChart.dashLineColor` and `DrawArea.dashLineColor`. They accept a line color and a dash pattern code as arguments, and return a 32-bit integer acting as a handle to the dash line color. The handle can be used in any `ChartDirector` API that expects a color as its input.

Zone Colors
A zone color is for XY charts only. It is a color that automatically changes upon reaching a data threshold value along the x-axis or y-axis. Zone colors are created using `Layer.xZoneColor`, `Layer.yZoneColor`, `XYChart.xZoneColor` or `XYChart.yZoneColor`.

Palette Colors
Palette colors are colors of the format `FFFFnnnn`, where the least significant 16 bits (`nnnn`) are the index to the palette. A palette is simply an array of colors. For a palette color, the actual color is obtained by

looking up the palette using the index. For example, the color FFFF0001 is the second color in the palette (first color is index 0).

The colors in the palette can be ARGB colors or "dynamic" colors (pattern, gradient and dash line colors).

The first eight palette colors have special significance. The first three palette colors are the background color, default line color, and default text color of the chart. The 4th to 7th palette colors are reserved for future use. The 8th color is a special dynamic color that is equal to the data color of the "current data set".

The 9th color (index = 8) onwards are used for automatic data colors. For example, in a pie chart, if the sector colors are not specified, ChartDirector will automatically use the 9th color for the first sector, the 10th color for the second sector, and so on. Similarly, for a multi-line chart, if the line colors are not specified, ChartDirector will use the 9th color for the first line, the 10th color for the second line, and so on.

The ChartDirector API defines several constants to facilitate using palette colors.

ConstantValueDescription

Palette	FFFF0000	The starting point of the palette. The first palette color is (Palette + 0). The nth palette color is (Palette + n - 1).
BackgroundColor	FFFF0000	The background color.
LineColor	FFFF0001	The default line color.
TextColor	FFFF0002	The default text color.
[Reserved]	FFFF0003 - FFFF0006	These palette positions are reserved. Future versions of ChartDirector may use these palette positions for colors that have special significance.
SameAsMainColor	FFFF0007	A dynamic color that is equal to the data color of the current data set. This color is useful for objects that are associated with data sets. For example, in a pie chart, if the sector label background color is SameAsMainColor, its color will be the same as the corresponding sector color.
DataColor	FFFF0008	The starting point for the automatic data color allocation.

When a chart is created, it has a default palette. You may modify the palette using BaseChart.setColor, BaseChart.setColors, or BaseChart.setColors2.

The advantages of using palette colors are that you can change the color schemes of the chart in one place. ChartDirector comes with several built-in palettes represented by the following predefined constants.

ConstantDescription

8.0.25 ChartDirector: Font Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

defaultPalette	An array of colors representing the default palette. This palette is designed for drawing charts on white backgrounds (or lightly colored backgrounds).
whiteOnBlackPalette	An array of colors useful for drawing charts on black backgrounds (or darkly colored backgrounds).
transparentPalette	An array of colors useful drawing charts on white backgrounds (or lightly colored backgrounds). The data colors in this palette are all semi-transparent.

Answer: ChartDirector: Font Specification

Notes: Font Name

In ChartDirector, the font name is simply the file name that contains the font. For example, under the Windows platform, the "Arial" font is "arial.ttf", while the "Arial Bold" font is "arialbd.ttf".

NOTE: Mac OS X Specific Information

In Mac OS X, in addition to ".ttf", ChartDirector also supports Mac OS X font file formats, such as Font Suitcase files and Datafork files (.dfont). These files often contain multiple fonts. For example, the "GillSans.dfont" file contains 6 fonts.

So in addition to the file name, an index is needed to determine the font. The index is specified by appending a " | " character to the font name, followed by the index number. For example, the third font in "GillSans.dfont" is denoted as "GillSans.dfont | 2". (Note: The first font starts at 0.) If no index number is provided, the first font is assumed.

ChartDirector also supports using Mac OS X Font Manager names. For example, one may use "Gill Sans Light Italic" instead of using "GillSans.dfont | 1" as the font name. However, the Mac OS X Font Manager is active only if someone has logged into the Mac GUI console, so this method is only recommended for developing applications that run on the GUI console.

The sample programs that come with ChartDirector are designed to run on all operating systems, so they use generic font file names (eg. "arial.ttf") instead of Mac OS X specific names. To allow them to run on Mac OS X, ChartDirector on Mac OS X has a built-in table to map common font file names to Mac OS X font names:

"arial.ttf", "arialbd.ttf", "ariali.ttf" and "arialbi.ttf" are mapped to "Arial | 0" (Arial), "Arial | 1" (Arial Bold), "Arial | 2" (Arial Italic) and "Arial | 3" (Arial Bold Italic)

"times.ttf", "timesbd.ttf", "timesi.ttf" and "timesbi.ttf" are mapped to "Times New Roman | 0" (Times New Roman), "Times New Roman | 1" (Times New Roman Bold), "Times New Roman | 2" (Times New Roman Italic) and "Times New Roman | 3" (Times New Roman Bold Italic)

"cour.ttf", "courbd.ttf", "couri.ttf" and "courbi.ttf" are mapped to "Courier New | 0" (Courier New), "Courier New | 1" (Courier New Bold), "Courier New | 2" (Courier New Italic) and "Courier New | 3" (Courier New Bold Italic)

Font Location

ChartDirector on Windows does not come with any font files. It relies on the operating system's font files in the " [windows] \Fonts" directory. To see what fonts are installed in your operating system and their file names, use the File Explorer to view that directory.

ChartDirector on Windows will also search for the font files in the "fonts" subdirectory (if it exists) under the directory where the ChartDirector DLL "chartdir.dll" is installed. This is useful for private fonts. Also, for some especially secure web servers, the web anonymous user may not have access to the " [windows] \Fonts" directory. In this case, you may copy the font files to the above subdirectory.

ChartDirector on Mac OS X relies on operating system font files in "/Library/Fonts" and "/System/Library/Fonts".

ChartDirector on Linux, FreeBSD and Solaris assume the fonts files are in the "fonts" subdirectory under the directory where the ChartDirector shared object "libchartdir.so" is installed. ChartDirector on Linux, FreeBSD and Solaris come with a number of font files in the "fonts" subdirectory.

To keep the download size small, ChartDirector on Linux, FreeBSD and Solaris only come with some commonly used fonts. You may download additional fonts from the Internet. In particular, the Microsoft fonts at

http://sourceforge.net/project/showfiles.php?group_id=34153&release_id=105355

is highly recommended. Please refer to

<http://www.microsoft.com/typography/faq/faq8.htm>

on how you could use the fonts legally in your system.

ChartDirector supports True Type fonts (.ttf), Type 1 fonts (.pfa and .pfb) and Windows bitmap fonts (.fon). On Mac OS X, ChartDirector also supports Font Suitcase and Datafork (.dfont) files. On Linux, FreeBSD and Solaris, ChartDirector also supports Portable Compiled Fonts (.pcf fonts).

If you want ChartDirector to search other directories for the font files, you may list the directories in an environment variable called "FONTSPATH".

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.

ChartDirector supports several special keywords for specifying the font name indirectly. When these keywords are used as font names, ChartDirector will look up the actual font names from a font table. The keywords are as follows:

KeywordsDescription

"normal"	This default normal font, which is the first font in the font table. This is initially mapped to "arial.ttf" (Arial).
"bold"	The default bold font, which is the second font in the font table. This is initially mapped to "arialbd.ttf" (Arial Bold).
"italic"	The default italic font, which is the third font in the font table. This is initially mapped to "ariali.ttf" (Arial Italic).
"boldItalic"	The default bold-italic font, which is the fourth font in the font table. This is initially mapped to "arialbi.ttf" (Arial Bold Italic).
"fontN"	The (N + 1)th font in the font table (the first font is "font0").

The font table can be modified using `BaseChart.setFontTable` or `DrawArea.setFontTable`.

The advantage of using indirect font names is that you can change the fonts in your charts in one place.

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.

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.

This is the color to draw the font. (See Color Specification on how colors are represented in ChartDirector.)

This is the angle in degrees by which the font should be rotated anti-clockwise.

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.

8.0.26 ChartDirector: Mark Up Language

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Mark Up Language

Notes: ChartDirector Mark Up Language (CDML) is a language for including formatting information in text strings by marking up the text with tags.

CDML allows a single text string to be rendered using multiple fonts, with different colors, and even embed images in the text. **Font Styles**

You can change the style of the text by using CDML tags. For example, the line:

```
<*font=timesi.ttf,size=16,color=FF0000>Hello <*font=arial.ttf,size=12,color=8000*>world!
```

will result in the following text rendered:

In general, all tags in CDML are enclosed by <*> and *>. Attributes within the tags determine the styles of the text following the tags within the same block.

If you want to include <*> in text without being interpreted as CDML tags, use «* as the escape sequence.

The following table describes the supported font style attributes in CDML. See [Font Specification](#) for details on various font attributes.

AttributeDescription

Set the following text to be in superscript style. This attribute does not need to have a value. (You may use "super" as the attribute instead of "super=1".)

Note that unlike HTML tags, no double or single quotes are used in the tags. It is because CDML tags are often embedded as string literals in source code. The double or single quotes, if used, will conflict with the string literal quotes in the source code. Therefore in CDML, no quotes are necessary and they must not be used.

Also, unlike HTML tags, CDML uses the comma character as the delimiter between attributes. It is because certain attributes may contain embed spaces (such as the font file name). So space is not used as the delimiter and the comma character is used instead.

Note the font attribute above starts a new style section, while other attributes just modify the current style

font	Starts a new style section, and sets the font name. You may use this attribute without a value (that is, use "font" instead of "font=arial.ttf") to create a new style section without modifying the font name.
size	The font size.
width	The font width. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
height	The font height. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
color	The text color in hex format.
bgColor	The background color of the text in hex format.
underline	The line width of the line used to underline the following characters. Set to 0 to disable underline.
sub	Set the following text to be in subscript style. This attribute does not need to have a value. (You may use "sub" as the attribute instead of "sub=1".)
super	Set the following text to be in superscript style.
xoffset	Draw the following the text by shifting the text horizontally from the original position by the specified offset in pixels.
yoffset	Draw the following the text by shifting the text vertically from the original position by the specified offset in pixels.
advance	Move the cursor forward (to the right) by the number of pixels as specified by the value this attribute.
advanceTo	Move the cursor forward (to the right) to the position as specified by the value this attribute. The position is specified as the number of pixels to the right of the left border of the block. If the cursor has already passed through the specified position, the cursor is not moved.

section. You may use `</font*>` to terminate a style section, which will restore the font styles to the state before the style section.

Blocks and Lines

In CDML, a text string may contain multiple blocks. A block may contain multiple lines of text by separating them with new line characters ("`\n`") or with `<br*>`. The latter is useful for programming languages that cannot represent new line characters easily.

For example, the line:

```
<*size=15*><*block*><*color=FF*>BLOCK<*br*>ONE<*/*>and <*block*><*color=FF00*>BLOCK<*br*>TWO
```

will result in the following text rendered:

The above example contains a line of text. The line contains two blocks with the characters " and " in between. Each block in turn contains two lines. The blocks are defined using `<*block*>` as the start tag and

`<*/*>` as the end tag.

When a block ends, font styles will be restored to the state before entering the block. Embedding Images
CDML supports embedding images in text using the following syntax:

```
<*img=my_image_file.png*>
where my_image_file.png is the path name of the image file.
```

For example, the line:

```
<*size=20*>A <*img=sun.png*>day
will result in the following text rendered:
```

ChartDirector will automatically detect the image file format using the file extension, which must either png, jpg, jpeg, gif, wbmp or wmp (case insensitive).

Please refer to `BaseChart.setSearchPath` or `DrawArea.setSearchPath` on the directory that ChartDirector will search for the file.

The `<*img*>` tag may optionally contain width and height attributes to specify its pixel width and height. In this case, ChartDirector will stretch or compress the image if necessary to the required width and height. Blocks Attributes

CDML supports nesting blocks, that is, a block can contain other sub-blocks. Attributes are supported in the `<*block*>` tag to control the alignment and orientation of the sub-blocks. The `<*img=my_image_file.png*>` is treated as a block for layout purposes.

For example, the line:

```
<*block,valign=absmiddle*><*img=molecule.png*><*block*>Hydrazino\nMolecule<*/*><*/*>
will result in the following text rendered:
```

The the above starts `<*block,valign=absmiddle*>` which specifies its content should align with each others in the vertical direction using the absolute middle alignment. The block contains an image, followed by a space characters, and then another block which has two lines of text.

The following table describes the supported attributes inside `<*block*>` tag:

Attribute	Description
-----------	-------------

The value `baseline` means the baseline of sub-blocks should align with the baseline of the block. The `baseline`

width	The width of the block in pixels. By default, the width is automatically determined to be the width necessary for the contents of the block. If the width attribute is specified, it will be used as the width of the block. If the width is insufficient for the contents, the contents will be wrapped into multiple lines.
height	The height of the block in pixels. By default, the height is automatically determined to be the height necessary for the contents of the block. If the height attribute is specified, it will be used as the height of the block.
maxwidth	The maximum width of the block in pixels. If the content is wider than maximum width, it will be wrapped into multiple lines.
truncate	The maximum number of lines of the block. If the content requires more than the maximum number of lines, it will be truncated. In particular, if truncate is 1, the content will be truncated if it exceeds the maximum width (as specified by maxwidth or width) without wrapping. The last few characters at the truncation point will be replaced with "...".
linespacing	The spacing between lines as a ratio to the default line spacing. For example, a line spacing of 2 means the line spacing is two times the default line spacing. The default line spacing is the line spacing as specified in the font used.
bgColor	The background color of the block in hex format.
valign	The vertical alignment of sub-blocks. This is for blocks that contain sub-blocks. Supported values are baseline, top, bottom, middle and absmiddle.

is the underline position of text. This is normal method of aligning text, and is the default in CDML. For images or blocks that are rotated, the baseline is the same as the bottom.

The value top means the top line of sub-blocks should align with the top line of the block.

The value bottom means the bottom line of sub-blocks should align with the bottom line of the block.

The value middle means the middle line of sub-blocks should align with the the middle line of the block. The middle line is the middle position between the top line and the baseline.

The value absmiddle means the absolute middle line of sub-blocks should align with the absolute middle line of the block. The absolute middle line is the middle position between the top line and the bottom line.

halign The horizontal alignment of lines. This is for blocks that contain multiple lines. Supported values are left, center and right.

The value left means the left border of each line should align with the left border of the block. This is the default.

The value center means the horizontal center of each line should align with the horizontal center of the block.

The value right means the right border of each line should align with the right border of the block.

angle Rotate the content of the block by an angle. The angle is specified in degrees in counter-clockwise direction.

8.0.27 ChartDirector: Parameter Substitution and Formatting

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Parameter Substitution and Formatting

Notes: ChartDirector charts often contain a lot of text strings. For example, sector labels in pie charts, axis labels for x and y axes, data labels for the data points, HTML image maps, etc, are all text strings.

ChartDirector uses parameter substitution to allow you to configure precisely the information contained in the text and their format.

Format Strings

In parameter substitution, format strings are used to specify the entities to be include into labels and how to format numbers and dates.

For example, when drawing a pie chart with side label layout, the default sector label format string is:

```
" { label } ( { percent } %)"
```

When the sector label is actually drawn, ChartDirector will replace " { label } " with the sector name, and " { percent } " with the sector percentage. So the above label format will result is a sector label similar to "ABC (34.56%)".

You may change the sector label format by changing the format string. For example, you may change it to:

```
" { label } : US$ { value | 2 } K ( { percent } %)"
```

The sector label will then become something like "ABC: US\$ 123.00 (34.56%)".

In general, in ChartDirector parameter substitution, parameters enclosed by curly brackets will be substituted with their actual values when creating the texts.

For parameters that are numbers or dates/times, ChartDirector supports a special syntax in parameter substitution to allow formatting for these values. Please refer to the Number Formatting and Date/Time Formatting sections below for details.

Parameter Expressions

ChartDirector supports numeric expressions in format strings. They are denoted by enclosing the expression with curly brackets and using "=" as the first character. For example:

```
"USD { value } (Euro { = { value } *0.9 } )"
```

In the above, " { value } " will be substituted with the actual value of the sector. The expression " { = { value } *0.9 } " will be substituted with the actual value of the sector multiplied by 0.9.

ChartDirector parameter expressions support operators "+", "-", "*", "/", "%" (modulo) and "^" (exponentiation). Operators "*", "/", "%", "^" is computed first, followed by "+" and "-". Operators of the same precedence are computed from left to right). Parenthesis "(" and ")" can be used to change the computation order.

Parameters for Pie Charts

The following table describes the parameters available for pie charts.

Parameter	Description
sector	The sector number. The first sector is 0, while the nth sector is (n-1).
dataSet	Same as { sector } . See above.
label	The text label of the sector.
dataSetName	Same as { label } . See above.
value	The data value of the sector.
percent	The percentage value of the sector.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using BaseChart.addExtraField or BaseChart.addExtraField2.

Parameters for All XY Chart Layers

The followings are parameters that are apply to all XY Chart layers in general. Some layer types may have additional parameters (see below).

Note that certain parameters are inapplicable in some context. For example, when specifying the aggregate label of a stacked bar chart, the { dataSetName } parameter is inapplicable. It is because a stacked bar is composed of multiple data sets. It does not belong to any particular data set and hence does not have a data set name.

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

Additional Parameters for Line Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Trend Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Box-Whisker Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for HLOC and CandleStick Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Additional Parameters for Vector Layers

The followings are parameters that are in additional to the parameters for all XY Chart layers.

Parameters for All Polar Layers

The followings are parameters that are apply to all Polar Chart layers in general. Some layer types may have additional parameters (see below).

{ fieldN } means the extra field is indexed by the data point number. The Pth data point corresponds to the Pth element of the extra field.

Additional Parameters for PolarVector Layers

The followings are parameters that are in additional to the parameters for all Polar Chart layers.

Parameters for Axis

The following table describes the parameters available for pie charts.

Number Formatting

For parameters that are numbers, ChartDirector supports a number of formatting options in parameter substitution.

For example, if you want a numeric field { value } to have a precision of two digits to the right of the decimal point, use ',' (comma) as the thousand separator, and use '.' (dot) as the decimal point, and you may use { value | 2, . } . The number 123456.789 will then be displayed as 123,456.79.

For numbers, the formatting options are specified using the following syntax:

```
{ [ param ] | [ a ] [ b ] [ c ] [ d ] }
```

where:

If this field starts with "E" or "e", followed by a number, it means formatting the value using scientific notation with the specified number of decimal places. If the "E" or "e" is not followed by a number, 3 is assumed.

For example, { value | E4 } will format the value 10.3 to 1.0300E+1, and { value | e4 } will format the same value to 1.0300e+1.

If this field starts with "G" or "g", followed by a number, it means formatting the value using the scientific notation only if the value is large and requires more than the specified number of digits, or the value is less than 0.001. If scientific notation is used, the number following "G" or "g" also specifies the number of significant digits to use. If the "G" or "g" is not followed by a number, 4 is assumed.

For example, consider the format string { value | G4 } . The value 10 will be formatted to 10. The value 100000 will be formatted to 1.000E+5. Similarly, for { value | g4 } , the value 10 will be formatted to 10, while the value 100000 will be formatted to 1.000e+5.

If you skip this argument, ChartDirector will display the exact value using at most 6 decimal places.

You may skip [b] [c] [d] . In this case, the default will be used.

Date/Time Formatting

For parameters that are dates/times, the formatting options can be specified using the following syntax:

```
{ [ param ] | [ datetime_format_string ] }
```

where [datetime_format_string] must start with an english character (A-Z or a-z) that is not "G", "g", "E" or "e", and may contain any characters except ' } '. (If it starts with "G", "g", "E" or "e", it will be considered as a number format string.)

Certain characters are substituted according to the following table. Characters that are not substituted will be copied to the output.

For example, a parameter substitution format of { value | mm-dd-yyyy } will display a date as something similar to 09-15-2002. A format of { value | dd/mm/yy hh:nn:ss a } will display a date as something similar to 15/09/02 03:04:05 pm.

If you want to include characters in the format string without substitution, you may enclose the characters in single or double quotes.

For example, the format `{ value | mmm '<*color=dd0000*>'yyyy }` will display a date as something like `Jan <*color=dd0000*>2005` (the `<*color=dd0000*>` is a CDML tag to specify red text color). Note that the `<*color=dd0000*>` tag is copied directly without substitution, even it contains "dd" which normally will be substituted with the day of month.

Escaping URL/HTML/CDML characters

Parameter substitution is often used to create HTML image maps. In HTML, some characters has special meanings and cannot be used reliably. For example, the `'>'` is used to represent the end of an HTML tag.

Furthermore, if the field happens to be used as an URL, characters such as `'?'`, `'&'` and `'+'` also have special meanings.

By default, ChartDirector will escape template fields used in URL and query parameters when generating image maps. It will modify URL special characters to the URL escape format `"%XX"` (eg. `"?"` will become `"%3F"`). After that, it will modify HTML special characters to the HTML escape format `"&#nn;"` (eg. `">"` will become `">"`). Similarly, it will escape other attributes in the image map using HTML escape format (but not URL escape format).

In addition to escaping HTML and URL special characters, ChartDirector will also remove CDML fields in creating image maps. It is because CDML is only interpreted in ChartDirector, should not be useful outside of ChartDirector (such as in browser tool tips).

In some cases, you may not want ChartDirector to escape the special characters. For example, if the parameters have already been escaped before passing to ChartDirector, you may want to disable ChartDirector from escaping them again.

ChartDirector supports the following special fields to control the escape methods - `" { escape_url } "`, `" { noescape_url } "`, `" { escape_html } "`, `" { noescape_html } "`, `" { escape_cdml } "` and `" { noescape_cdml } "`. These fields enable/disable the escape methods used in the template fields that follow them.

8.0.28 ChartDirector: Shape Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Shape Specification

Notes: Several ChartDirector API accept shape specification as arguments. For example, `BarLayer.setBarShape` and `BarLayer.setBarShape2` can be used to specify shapes of bars in bar charts, while `DataSet.setDataSymbol`, `DataSet.setDataSymbol4`, `PolarLayer.setDataSymbol` and `PolarLayer.setDataSymbol4` can be used to specify shapes for data symbols.

Note that in addition to shapes, in many cases ChartDirector also accepts images or custom draw objects for data representation. For example, see `DataSet.setDataSymbol2`, `DataSet.setDataSymbol3`, `PolarLayer.setDataSymbol2` and `PolarLayer.setDataSymbol3`.

Built-In Shapes

Built-in shapes are specified as integers. The integers can be explicit constants, or can be generated by a `ChartDirector` method for parameterized shapes. For example, a circle is represented by an explicit constant `CircleShape (=7)`. On the other hand, the number representing a polygon depends on the number of sides the polygon has, so it is generated by using the `PolygonShape` method, passing in the number of sides as argument.

The following table illustrates the various `ChartDirector` shapes:

Custom Shapes

In `ChartDirector`, custom shapes are specified as an array of integers `x0, y0, x1, y1, x2, y2 ...` representing the coordinates of the vertices of the custom polygonal shape.

The polygon should be defined with a bounding square of 1000 x 1000 units, in which the x-axis is from -500 to 500 going from left to right, and the y-axis is from 0 to 1000 going from bottom to top.

`ChartDirector` will automatically scale the polygon so that 1000 units will become to the pixel size as requested by the various `ChartDirector` API.

As an example, the shape of the standard diamond shape in `ChartDirector` is represented as an array with 8 numbers:

```
0, 0, 500, 500, 0, 1000, -500, 500
```

8.0.29 Copy styled text?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: How to quickly copy styled text from one textarea to another?

Example:

```
#if TargetWin32 then
TextArea1.WinRTFDataMBS = TextArea2.WinRTFDataMBS
#elseif TargetMacOS then
TextArea1.NSTextViewMBS.textStorage.setAttributedString TextArea2.NSTextViewMBS.textStorage
#else
TextArea1.StyledText = TextArea2.StyledText
#endif
```

Notes: The code above uses special plugin functions on Mac and Windows and falls back to framework for Linux.

8.0.30 Do you have code to validate a credit card number?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can check the checksum to tell if a credit card number is not valid.

Example:

```
Dim strNumber As String
Dim nLength as Integer
Dim nValue as Integer
Dim nChecksum as Integer
Dim nIndex as Integer

strNumber = EditField1.Text
nLength = Len(strNumber)
nChecksum = 0

For nIndex = 0 To nLength - 2
    nValue = Val(Mid(strNumber, nLength - (nIndex + 1), 1)) * (2 - (nIndex Mod 2))
    If nValue < 10 Then
        nChecksum = nChecksum + nValue
    Else
        nChecksum = nChecksum + (nValue - 9)
    End If
Next

If Val(Mid(strNumber, Len(strNumber), 1)) = (10 - (nChecksum Mod 10)) Mod 10 Then
    MsgBox("The credit card number looks valid")
Else
    MsgBox("The credit card number is invalid")
End IF
```

Notes: Here's some code that will validate the checksum for a credit card. It works for Visa, MasterCard, American Express and Discover. Not sure about others, but I imagine they use the same basic algorithm. Of course, this doesn't actually mean that the credit card is valid, it's only useful for helping the user catch typos.

The above code doesn't have any error checking and it expects that the credit card number will be entered without spaces, dashes or any other non-numeric characters. Addressing those issues will be an exercise left to the reader. :)

(From Mike Stefanik)

8.0.31 Do you have plugins for X-Rite EyeOne, eXact or i1Pro?

Plugin Version: all.

Answer: Our EyeOne plugin is available on request for licensees of the X-Rite SDKs.

Notes: Please first go to X-Rite and get a SDK license.

Then we can talk about the plugin.

8.0.32 Does SQL Plugin handle stored procedures with multiple result sets?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the plugin can work with multiple recordsets.

Notes: You need to use SQLCommandMBS class. When you get back results, you use FetchNext to walk over all records in the first result set. Then you simply start again with FetchNext to get the second record set.

Even the RecordSet functions should work, just use them twice to get all records from both record sets.

8.0.33 Does the plugin home home?

Plugin Version: all, Platform: macOS.

Answer: Yes, we like to know who is using the plugin, so the plugin may contact our server.

Example:

none.

Notes: Please note that this does not affect your users as the plugin will only do this in the IDE and the relevant plugin part is never included in your applications.

The plugin if used for some hours, does contact our server to provide statistical data about Xojo version and OS versions. This way we know what versions are used. We can return the version number of the current plugin which may be visible in future versions somehow. And we transmit partial licenses data so we can track use of illegal license keys.

If you do not like to have this, you can block Xojo IDE from contacting our website via your Firewall.

Blocking the transfer will not disable the plugin or change the features.

Or contact us for a plugin version which explicitly does not contain this feature.

8.0.34 folderitem.absolutePath is limited to 255 chars. How can I get longer ones?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Paths on a Mac are not unique, so use them only to display them to the user.

Example:

```
Function AbsolutePath(f as FolderItem) As String
Dim s as string
Dim nf as FolderItem
nf = f
s = ""
while nf<>nil
s = nf.name + "." + s
nf = nf.parent
wend
Return s
End Function
```

8.0.35 Has anyone played round with using CoreImage to do things like add dissolve transitions say when changing from one tab to another within a window?

Platform: macOS.

Answer: This code implements animations for a tabpanel change:

Example:

// in a tabpanel.change event:

```
dim r as CGSTransitionRequestMBS
dim co as new CGSConnectionMBS
dim cw as CGSWindowMBS
dim ct as CGSTransitionMBS
static OldTab as Integer

cw=co.CGSWindow(window1)
If cw = Nil Then
return // 10.3...
End If
r=new CGSTransitionRequestMBS
r.TransitionType=r.CGSFlip
r.HasBackGround=false
r.HasBackColor=false
r.Win=cw
```

```

// watch the value of the clicked tab versus the last tab
if tabpanel1.Value=0 or tabpanel1.Value <OldTab then
r.TransitionOption=r.CGSLeft
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
else
r.TransitionOption=r.CGSRight
ct=co.NewTransition(r)
if ct<>Nil then
Refresh
ct.Invoke(1)
ct.Wait(1)
ct.Release
else
MsgBox "Error creating the transition."
end if
end if
// Keep track of the last tab clicked
OldTab = tabpanel1.Value

```

Notes: See CGS* classes for more details.

8.0.36 How about Plugin support for older OS X?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We support in general Mac OS X 10.5 and newer.

Notes: All the 64-bit plugins on Mac require OS X 10.7.

Intel 32-bit plugins on Mac require OS X 10.5 or newer.

Currently the ChartDirector 6, GraphicsMagick and GameKit plugins requires Mac OS X 10.6. Also for SQL Plugin the built in SQLite library requires 10.6.

8.0.37 How can I detect whether an Intel CPU is a 64bit CPU?

Plugin Version: all.

Answer: Look on the CPU family returned by sysctl:

Example:

Function is64bit() As Boolean

```
#if TargetLittleEndian
```

```
dim m as MemoryBlock = NewMemoryBlock(8)
```

```
dim family as Integer
```

```
dim s as string
```

```
m=SystemControlNameToMIBMBS("hw.cpufamily")
```

```
m=SystemControlMBS(m)
```

```
if m<>nil then
```

```
m.LittleEndian=True
```

```
family=m.Long(0)
```

```
const CPUFAMILY_INTEL_6_14 = &h73d67300 /* "Intel Core Solo" and "Intel Core Duo" (32-bit Pentium-M with SSE3) */
```

```
const CPUFAMILY_INTEL_6_15 = &h426f69ef /* "Intel Core 2 Duo" */
```

```
const CPUFAMILY_INTEL_6_23 = &h78ea4fbc /* Penryn */
```

```
const CPUFAMILY_INTEL_6_26 = &h6b5a4cd2 /* Nehalem */
```

```
Select case family
```

```
case CPUFAMILY_INTEL_6_14
```

```
Return false
```

```
case CPUFAMILY_INTEL_6_15
```

```
Return true
```

```
case CPUFAMILY_INTEL_6_23
```

```
Return true
```

```
case CPUFAMILY_INTEL_6_26
```

```
Return true
```

```
// newer CPUs may be missing here
```

```
end Select
```

```
end if
```

```
#endif
```

```
Return false
```

```
Exception
```

```
Return false
```

```
End Function
```

Notes: This code is written for Mac OS X where you only have a limited number of possible CPUs.

8.0.38 How can I disable the close box of a window on Windows?

Plugin Version: all, Platform: Windows.

Answer: The following code will remove the close item from the system menu of the window.

Example:

```
#if TargetWin32 then
Declare Function GetSystemMenu Lib "user32" (hwnd as Integer, bRevert as Integer) as Integer
Declare Function RemoveMenu Lib "user32" (hMenu as Integer, nPosition as Integer, wFlags as Integer) as Integer
Dim hSysMenu as Integer
hSysMenu = GetSystemMenu(me.WinHWND, 0)
RemoveMenu hSysMenu, &HF060, &H0
#endif
```

Notes: The window may not be updated directly.

8.0.39 How can I get all the environment variables from Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Example:

```
#if targetWin32
declare function GetEnvironmentStrings Lib "kernel32" () as ptr
dim m as memoryBlock
dim n as Integer

m=GetEnvironmentStrings()

n=0
do
msgBox m.cstring(n)
while m.byte(n)<>0
n=n+1
wend
n=n+1
```

```
loop until m.byte(n)=0
#endif
```

Notes: The MBS Plugin has an EnvironmentMBS class for this.

8.0.40 How can i get similar behavior to Roxio Toast or iTunes where clicking a 'burn' button allows the next inserted blank CD-R to bypass the Finder and be accepted by my application?

Plugin Version: all, Platform: macOS.

Answer: You need to get a media reservation.

Example:

```
dim d as DRDeviceMBS // get a device
d.AcquireMediaReservation
```

Notes: Use the plugin function AcquireMediaReservation and later release it using ReleaseMediaReservation.

See plugin examples on how to use it and check Apples DiscRecording framework documentation for more details.

8.0.41 How can I get text from a PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Crossplatform you can use DynaPDF Pro.

Notes: On Mac OS X you can also use PDFKit for the same job.

While DynaPDF Pro gives you each bit of text with rotation, font information and encoding details, PDFKit gives you only the text string for a PDF page.

8.0.42 How can I get text from a Word Document?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: to get the text string from a doc file, use the NSAttributedStringMBS class.

Notes: The NSAttributedStringMBS class is Mac OS X only and we have currently no solution for Windows or Linux.

Use the `NSAttributedStringMBS.initWithDocFormat(data as string)` as boolean method.

8.0.43 How can I get the item string for a given file creator?

Plugin Version: all.

Answer: Try this function:

Example:

```
Sub pullNativeDocs(aCREA As string)
Dim result as Integer
Dim m, k as memoryBlock
Dim f as folderItem
Dim newType as string
Dim anIcon As picture
Dim ofs as Integer
```

```
Declare Function GetFileTypesThatAppCanNativelyOpen Lib "Carbon" (appVRefNumHint as Short, appSignature as OSType, nativeTypes as Ptr) as Short Inline68K("701CABFC")
Declare Function GetDocumentKindString Lib "Carbon" (docVRefNum as Short, docType as OSType, docCreator as OSType, kindString as ptr) as Short Inline68K("7016ABFC")
```

```
listBox1.deleteAllRows
```

```
m = newMemoryBlock(1024)
result = GetFileTypesThatAppCanNativelyOpen(Volume(0).MacVRefNum, aCREA, m)
if result <> 0 then
listBox1.addRow "<Not found.>"
return
end if
```

```
do
if m.byte(ofs*4) = 0 then
exit
else
newType = m.OSTypeMBS(ofs*4)
listBox1.addRow newType
k = newMemoryBlock(64)
result = GetDocumentKindString(Volume(0).MacVRefNum, newType, aCREA, k)
if result = 0 then
listBox1.cell(ofs,1) = k.pString(0)
ofs = ofs + 1
else
listBox1.cell(ofs,1) = "(unknown)"
end if
end if
```

loop

End Sub

Notes: Change "Translation" to "CarbonLib" for Mac OS X.

8.0.44 How can I launch an app using it's creator code?

Plugin Version: all, Platform: macOS.

Answer: Send an AppleEvent "odoc" with the creator code to the Finder ("MACS"):

Example:

```
Function LaunchByCreator(C As String) As Boolean
Dim A As AppleEvent
A = NewAppleEvent("aevt","odoc","MACS")
A.ObjectSpecifierParam("—") = GetUniqueIDObjectDescriptor("appf",nil,C)
return A.Send
End Function
```

8.0.45 How can I learn what shared libraries are required by a plugin on Linux?

Plugin Version: all, Platform: macOS.

Answer: Please use the ldd command in the terminal.

Notes: You build an app on any platform, but for Linux.

For the resulting .so files in the libs folder, you can run the ldd command with the library path as parameter. It shows you references lib files and you can make sure you have those installed.

This is a sample run of our graphicsmagick plugin:

```
cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$ ldd libMBSGraphicsMagickPlugin17744.so
linux-gate.so.1 =>(0xb76ee000)
libdl.so.2 =>/lib/i386-linux-gnu/libdl.so.2 (0xb6f0e000)
libgtk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgtk-x11-2.0.so.0 (0xb6aa6000)
libpthread.so.0 =>/lib/i386-linux-gnu/libpthread.so.0 (0xb6a8a000)
libstdc++.so.6 =>/usr/lib/i386-linux-gnu/libstdc++.so.6 (0xb69a5000)
libm.so.6 =>/lib/i386-linux-gnu/libm.so.6 (0xb6979000)
libgcc_s.so.1 =>/lib/i386-linux-gnu/libgcc_s.so.1 (0xb695b000)
libc.so.6 =>/lib/i386-linux-gnu/libc.so.6 (0xb67b1000)
```

```

/lib/ld-linux.so.2 (0xb76ef000)
libgdk-x11-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk-x11-2.0.so.0 (0xb6701000)
libpangocairo-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangocairo-1.0.so.0 (0xb66f4000)
libX11.so.6 =>/usr/lib/i386-linux-gnu/libX11.so.6 (0xb65c0000)
libXfixes.so.3 =>/usr/lib/i386-linux-gnu/libXfixes.so.3 (0xb65ba000)
libatk-1.0.so.0 =>/usr/lib/i386-linux-gnu/libatk-1.0.so.0 (0xb659a000)
libcairo.so.2 =>/usr/lib/i386-linux-gnu/libcairo.so.2 (0xb64ce000)
libgdk_pixbuf-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgdk_pixbuf-2.0.so.0 (0xb64ad000)
libgio-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgio-2.0.so.0 (0xb6356000)
libpangoft2-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpangoft2-1.0.so.0 (0xb632a000)
libpango-1.0.so.0 =>/usr/lib/i386-linux-gnu/libpango-1.0.so.0 (0xb62e0000)
libfontconfig.so.1 =>/usr/lib/i386-linux-gnu/libfontconfig.so.1 (0xb62ab000)
libgobject-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgobject-2.0.so.0 (0xb625c000)
libglib-2.0.so.0 =>/lib/i386-linux-gnu/libglib-2.0.so.0 (0xb6163000)
libXext.so.6 =>/usr/lib/i386-linux-gnu/libXext.so.6 (0xb6151000)
libXrender.so.1 =>/usr/lib/i386-linux-gnu/libXrender.so.1 (0xb6147000)
libXinerama.so.1 =>/usr/lib/i386-linux-gnu/libXinerama.so.1 (0xb6142000)
libXi.so.6 =>/usr/lib/i386-linux-gnu/libXi.so.6 (0xb6132000)
libXrandr.so.2 =>/usr/lib/i386-linux-gnu/libXrandr.so.2 (0xb6129000)
libXcursor.so.1 =>/usr/lib/i386-linux-gnu/libXcursor.so.1 (0xb611e000)
libXcomposite.so.1 =>/usr/lib/i386-linux-gnu/libXcomposite.so.1 (0xb611a000)
libXdamage.so.1 =>/usr/lib/i386-linux-gnu/libXdamage.so.1 (0xb6115000)
libfreetype.so.6 =>/usr/lib/i386-linux-gnu/libfreetype.so.6 (0xb607b000)
libxcb.so.1 =>/usr/lib/i386-linux-gnu/libxcb.so.1 (0xb605a000)
libpixman-1.so.0 =>/usr/lib/i386-linux-gnu/libpixman-1.so.0 (0xb5fc2000)
libpng12.so.0 =>/lib/i386-linux-gnu/libpng12.so.0 (0xb5f98000)
libxcb-shm.so.0 =>/usr/lib/i386-linux-gnu/libxcb-shm.so.0 (0xb5f93000)
libxcb-render.so.0 =>/usr/lib/i386-linux-gnu/libxcb-render.so.0 (0xb5f89000)
libz.so.1 =>/lib/i386-linux-gnu/libz.so.1 (0xb5f73000)
libgmodule-2.0.so.0 =>/usr/lib/i386-linux-gnu/libgmodule-2.0.so.0 (0xb5f6e000)
libselinux.so.1 =>/lib/i386-linux-gnu/libselinux.so.1 (0xb5f4f000)
libresolv.so.2 =>/lib/i386-linux-gnu/libresolv.so.2 (0xb5f36000)
libexpat.so.1 =>/lib/i386-linux-gnu/libexpat.so.1 (0xb5f0c000)
libffi.so.6 =>/usr/lib/i386-linux-gnu/libffi.so.6 (0xb5f05000)
libpcre.so.3 =>/lib/i386-linux-gnu/libpcre.so.3 (0xb5ec9000)
librt.so.1 =>/lib/i386-linux-gnu/librt.so.1 (0xb5ec0000)
libXau.so.6 =>/usr/lib/i386-linux-gnu/libXau.so.6 (0xb5ebb000)
libXdmcp.so.6 =>/usr/lib/i386-linux-gnu/libXdmcp.so.6 (0xb5eb4000)
cs@Ubuntu32:
textasciitilde /MeinProgramm/MeinProgramm Libs$

```

As you see all library have been found and their load address is printed behind the na,e. If a library is missing, you usually see the address missing there or being zero.


```

while theRegexMatch <>nil
theStart = theRegexMatch.subExpressionStartB(0) + len(theRegexMatch.subExpressionString(0))

result = result + theRegexMatch.subExpressionString(1)
infoCharset = theRegexMatch.subExpressionString(2)
encodedPart = theRegexMatch.subExpressionString(4)
if theRegexMatch.subExpressionString(3) = "B" then
encodedPart = DecodeBase64(encodedPart)
elseif theRegexMatch.subExpressionString(3) = "Q" then
encodedPart = DecodeQuotedPrintable(encodedPart)
end if
if right(result, 1) = " " then
result = mid(result, 1, len(result)-1)
end if
encodedPart = encodedPart.DefineEncoding(GetInternetTextEncoding(infoCharset))
result = result + encodedPart

theRegex.SearchStartPosition = theStart
theRegexMatch = theRegex.search()
wend

result = result + mid(src, theStart+1)

else
result = src
end if
// theRegexMatch = theRegex.search

msgbox result

```

Notes: May not look nice depending on the controls used.
This is no longer needed when using MimeEmailMBS class which decodes for you.

8.0.48 How do I enable/disable a single tab in a tabpanel?

Plugin Version: all, Platform: macOS.

Answer: Use the TabpanelEnabledMBS method.

Example:

```
TabpanelEnabledMBS(tabpanel1, 1, false)
```

Notes: Use Carbon for MachO and CarbonLib for Mac Carbon and AppearanceLib for Mac OS Classic as

library.

For Cocoa, please use enabled property of NSTabViewItemMBS class.

8.0.49 How do I find the root volume for a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this function:

Example:

```
Function GetRootVolume(f as FolderItem) as FolderItem
dim root, dum as folderItem
if f <> nil then
root = f // f might be the volume
do
dum = root.parent
if dum <> nil then
root = dum
end if
loop until dum = nil
return root
end if
End Function
```

8.0.50 How do I get the current languages list?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```
dim p as new CFPREFERENCESMBS
dim a as CFArrayMBS
dim s as CFStringMBS
dim o as CFOBJECTMBS
dim sa(-1) as string

o=p.CopyAppValue("AppleLanguages", ".GlobalPreferences")

if o<>Nil then
a=CFArrayMBS(o)

dim i,c as Integer
```

```
c=a.Count-1
for i=0 to c
o=a.Item(i)

if o isa CFStringMBS then
s=CFStringMBS(o)
sa.Append s.str
end if
next
end if

MsgBox Join(sa,EndOfLine)
```

Notes: On Mac OS X you can get the list of current languages like this list:

```
de
en
ja
fr
es
it
pt
pt-PT
nl
sv
nb
da
fi
ru
pl
zh-Hans
zh-Hant
ko
```

Which has German (de) on the top for a German user.
This code has been tested on Mac OS X 10.5 only.

8.0.51 How do I get the Mac OS Version?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```

dim i as Integer
if system.gestalt("sysv", i) then
//do this in an 'If' in case you don't get any value back at all and system.gestalt returns boolean
if i = &h750 then //If OS is 7.5
//do stuff
elseif i = &h761 then //If OS is 7.6.1
//do stuff
end if
end if

```

Notes: The MBS Plugin has a function SystemInformationMBS.OSVersionString for this.

8.0.52 How do I get the printer name?

Plugin Version: all.

Answer: For Mac OS Classic see the code below and for Mac OS X use the Carbon Print Manager Classes from the MBS Plugin.

Example:

```

dim s as String
dim i as Integer

s=app.ResourceFork.GetResource("STR ",-8192)
if s<>"" then
i=ascb(leftb(s,1))
s=mid(s,2,i)

MsgBox s
end if

```

Notes: A note from Craig Hoyt:

After looking at your example I had a little deja-vu experience. Several years ago I played around with this same code if FutureBasic. I discovered that it did not and still doesn't provide the 'Printer Name', it does return the print driver name. If it returns 'LaserWriter 8' as the print driver you can look into this file and get the 'PAPA' resource #-8192 to get the actual Printer Name. Unfortunately this does not hold true for other printers. My Epson and HP Printers (the Epson has an Ethernet Card and the HP is USB) do not provide this info in their drivers. As far as I can tell it only returns the name by polling the printer itself.

8.0.53 How do I make a metal window if RB does not allow me this?

Plugin Version: all, Platform: macOS.

Answer: The following declare turns any window on Mac OS X 10.2 or newer into a metal one.

Example:

```
declare sub ChangeWindowAttributes lib "Carbon" (win as windowptr, a as Integer, b as Integer)
```

```
ChangeWindowAttributes window1,256,0
```

Notes: May not look nice depending on the controls used.

8.0.54 How do I make a smooth color transition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

I'd like to show in a report some bars, which start with color A and end with color B.

The color change should be very smooth.

My problem: If I would start from 255,0,0 and end by 0,0,0, I would have 255 different colors. If the bars are longer than 255 pixels, would this look nice?

Example:

```
// Window.Paint:
Sub Paint(g As Graphics)
dim w,w1,x,p as Integer
dim c1,c2,c as color
dim p1,p2 as Double

c1=rgb(255,0,0) // start color
c2=rgb(0,255,0) // end color

w=g.Width
w1=w-1

for x=0 to w1
p1=x/w1
p2=1.0-p1
```

```

c=rgb(c1.red*p1+c2.red*p2, c1.green*p1+c2.green*p2, c1.blue*p1+c2.blue*p2)

g.ForeColor=c
g.DrawLine x,0,x,g.Height

next
End Sub

```

Notes:

Try the code above in a window paint event handler.

8.0.55 How do I read the applications in the dock app?

Plugin Version: all, Platform: macOS.

Answer: Use CFPreferencesMBS class like in this example:

Example:

```

// Reads file names from persistent dock applications and puts them into the list

dim pref as new CFPreferencesMBS

dim persistentapps as CFStringMBS = NewCFStringMBS("persistent-apps")
dim ApplicationID as CFStringMBS = NewCFStringMBS("com.apple.dock")
dim tiledata as CFStringMBS = NewCFStringMBS("tile-data")
dim filelabel as CFStringMBS = NewCFStringMBS("file-label")

// get the array of persistent applications from dock preferences
dim o as CObjectMBS = 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.

8.0.56 How do I truncate a file?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In a `binarystream` you can set the `length` property to truncate.

8.0.57 How do update a Finder's windows after changing some files?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```

dim f as folderitem // some file
dim ae as appleevent
ae=newappleevent("fndr","fupd","MACS")
ae.folderitemparam("—")=f
if not ae.send then
//something went wrong

```

end if

Notes: The `folderitem.finderupdate` from the MBS Plugin does something like this.

8.0.58 How to access a USB device directly?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: First, it depends on the device.

Notes: Some devices can be talked directly from user mode code, but some require a kernel driver.

For some devices you can use plugins to access them like:

- Audio and Video sources using the `QTGrabberClassMBS`
- Mass storage devices using the `folderitem` class.
- Serial devices using the `System.SerialPort` function.
- HID USB devices can be used with `MacHIDMBS`, `WinHIDMBS` or `LinuxHIDInterface` class.
- Any USB device may be used with `MacUSBMBS` or `WinUSBMBS` classes.

In general it is always the best to take the most high level access to have others do the work for the details.

8.0.59 How to add icon to file on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use `FolderItem.AddCustomIcon` or `NSWorkspaceMBS.setIcon` functions.

Notes: Please close any open stream for the file you want to add an icon.

8.0.60 How to ask the Mac for the Name of the Machine?

Plugin Version: all, Platform: macOS.

Answer: Using Apple Events you can use this code:

Example:

Function `Computername()` *As string*

```

dim theEvent as AppleEvent
dim err as boolean

theEvent = newAppleEvent("mchn","getd","MACS")

err = theEvent.send

return theevent.ReplyString

End Function

```

Notes: Code above is for Mac OS 9!

Also the MBS Plugin has a function for this which may be faster and work also on Macs without Filesharing (which handles this event).

8.0.61 How to automatically enable retina in my apps?

Plugin Version: all, Platform: macOS.

Answer: You can run a build script on each build with this code:

Example:

```

Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSHighResolutionCapable""
YES")

```

Notes: This will set the NSHighResolutionCapable flag to YES.

8.0.62 How to avoid leaks with Cocoa functions?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:

Example:

```

// in a Timer Action event:
Sub Action()
static LastPool as NSAutoreleasePoolMBS = nil
static CurrentPool as NSAutoreleasePoolMBS = nil

```

```

LastPool = CurrentPool
CurrentPool = new NSAutoreleasePoolMBS

```

End Sub

Notes: With Xojo 2009r4 the code above should not be needed as Xojo runtime does automatically handle the NSAutoreleasePools for you. For older Xojo versions you need to use code with a timer with the action event above to avoid memory leaks.

Please do not use Xojo 2009r4 and newer with plugins before version 9.5. You can get crashes there which typically show a line with a objc_msgSend call.

8.0.63 How to avoid trouble connecting to oracle database with SQL Plugin?

Plugin Version: all, Platform: macOS.

Answer: For oracle the most important thing is to point the plugin to the libraries from oracle.

Notes: In environment variables, the paths like ORACLE_HOME must be defined.

On Mac OS X you also need to define DYLD_LIBRARY_PATH to point to the dylib files from oracle.

For that you need to modify /etc/launchd.conf for Mac OS X 10.8 and newer.

In older versions those variables in .MacOSX/environment.plist file in user's home.

Another way for the case you bundle things inside your app is to use the LSEnvironment key in info.plist. In info.plist it looks like this:

```
<key>LSEnvironment</key>
<dict>
<key>test</key>
<string>Hello World</string>
</dict>
```

8.0.64 How to avoid ___NSAutoreleaseNoPool console messages in threads?

Plugin Version: all, Platform: macOS.

Answer: You need to use your own NSAutoreleasePool on a thread like this:

Example:

```
sub MyThread.run
dim pool as new NSAutoreleasePoolMBS
// do work here

pool=nil
```

end sub

Notes: For more details read here:

http://developer.apple.com/mac/library/documentation/Cocoa/Reference/Foundation/Classes/NSAutoreleasePool_Class/Reference/Reference.html

8.0.65 How to bring app to front?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac you can use this code:

Example:

```
// First way:
app.FrontMostMBS = true
```

```
// second way:
dim p as new ProcessMBS
p.GetCurrentProcess
p.FrontProcess = true
```

```
// third way:
NSApplicationMBS.sharedApplication.activateIgnoringOtherApps(true)
```

```
// for Windows:
RemoteControlMBS.WinBringWindowToTop
```

Notes: This will bring a Mac app to the front layer.

8.0.66 How to bring my application to front?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code txt) to the frontmost application:

Example:

```
Dim A As AppleEvent
A = NewAppleEvent("misc", "actv", "")
If Not A.Send then
Beep
end if
```

Notes: (Code is Mac only)

8.0.67 How to catch Control-C on Mac or Linux in a console app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use SignalHandlerMBS class for this.

Example:

```
// watch for Control-C on Mac
call SignalHandlerMBS.SetFlagHandler(2)

dim ende as boolean = false
do
if SignalHandlerMBS.IsFlagSet(2) then
Print "Flag 2 set. Existing..."
ende = true
end if

DoEvents 1
loop until ende
```

Notes: The signal is caught, a flag is set and you can ask later in your normal application flow for the result.

8.0.68 How to change name of application menu?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use this code to change the application menu name on Mac OS X:

Example:

```
dim mb as new MenubarMBS
dim m as MenuMBS = mb.item(1) // 1 is in my tests the app menu
if m<>Nil then
m.MenuTitle = "Hello World"
end if
```

Notes: This code is for Carbon only.

8.0.69 How to change the name in the menubar of my app on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer:

You mean it screws up if the file name of the bundle itself is different than the name of the executable file in the MacOS folder within the bundle? If so, you should find something like this within your Info.plist file (or the 'plst' resource that the RB IDE builds for you):

```
<key>CFBundleExecutable</key>
<string>Executable file name here</string>
```

Just make sure that file name matches.

However, if your question involves how you can change the name of the app that appears in the menu and the dock, that's different. You can make this name different from the file name by changing the CFBundleName key:

```
<key>CFBundleName</key>
<string>Name for menu here</string>
```

Note that if you use my free AppBundler program, this second part is taken care of for you – just fill in a custom name in the right field. You can find AppBundler (from Thomas Reed) at <http://www.bitjuggler.com/products/appbundler/>.

8.0.70 How to check if a folder/directory has subfolders?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this to check all items in a folder:

Example:

```
Function HasSubFolder(folder as FolderItem) As Boolean
dim c as Integer = folder.Count
```

```
for i as Integer = 1 to c
dim item as FolderItem = folder.TrueItem(i)
```

```
if item<>Nil and item.Directory then
Return true
end if
```

next

End Function

Notes: We use trueitem() here to avoid resolving alias/link files. Also we check for nil as we may not have permission to see all items. And if one is a directory, we return without checking the rest.

8.0.71 How to check if Macbook runs on battery or AC power?

Plugin Version: all, Platform: macOS.

Answer: Please use our IOPowerSourcesMBS class like this:

Example:

```
Function PowerSourceState() as Integer
dim p as new IOPowerSourcesMBS

// check all power sources
dim u as Integer = p.Count-1
for i as Integer = 0 to u
dim d as CFDictionaryMBS = p.Item(i)
if d<>nil then
// check if they have a power source state key:
dim o as CFObjectMBS = d.Value(NewCFStringMBS("Power Source State"))
if o isa CFStringMBS then
dim s as string = CFStringMBS(o).str

'MsgBox s

if s = "AC Power" then
Return 1
elseif s = "Battery Power" then
Return 2
end if
end if
end if
next
Return 0 // unknown
End Function
```

Notes: If you want to check the CFDictionaryMBS content, simply use a line like "dim x as dictionary = d.dictionary" and check the contents in the debugger.

8.0.72 How to check if Microsoft Outlook is installed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you need Outlook for Scripting, you should simply check registry for the required Outlook.Application class:

Example:

```
Function OutlookInstalled() As Boolean
    #if TargetWin32 then

    try
    dim r as new RegistryItem("HKEY_CLASSES_ROOT\Outlook.Application\CLSID", false)

    Return true

    catch r as RegistryAccessErrorException
    // not installed
    Return false

    end try

    #else

    // Windows only, so false on other platforms
    Return false

    #endif

End Function
```

8.0.73 How to check on Mac OS which country or language is currently selected?

Plugin Version: all, Platform: macOS.

Answer: The code below returns a country value.

Example:

```
dim result as Integer

IF TargetMacOS THEN

CONST smScriptLang = 28
```

```

CONST smSystemScript = -1

DECLARE FUNCTION GetScriptManagerVariable LIB "Carbon" ( selector as Integer) as Integer
DECLARE FUNCTION GetScriptVariable LIB "Carbon" ( script as Integer, selector as Integer) as Integer

result=GetScriptVariable(smSystemScript, smScriptLang)

END IF

```

Notes: Returns values like:

For more values, check "Script.h" in the frameworks.

8.0.74 How to code sign my app with plugins?

Plugin Version: all, Platform: macOS.

Answer: When you try to code sign the application with plugin dylibs on Mac OS X, you may see error message that there is actually a signature included.

Notes: Please use the -f command line parameter with codesign utility to overwrite our MBS signature. We sign our plugins for MacOS, iOS and Windows to make sure they have not been modified.

In terminal, you do like this:

```

cd <Path to folder of app>

xattr -cr <Appname>.app
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.dylib
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app/Contents/Frameworks/*.framework
codesign -f -s "Developer ID Application: <Your Name>" <Appname>.app

```

Please use the name of your certificate (See keychain), the name of your app and the path to the app folder. If you have helper apps you need to sign them first.

You can use a build step to automatically sign your app on build.

8.0.75 How to collapse a window?

Plugin Version: all, Platform: macOS.

Answer: Use this function (Mac only):

Example:

```
Sub CollapseRBwindow(w as window, CollapseStatus as boolean)
dim state, err as Integer
dim wh as MemoryBlock
```

```
Declare Function CollapseWindow Lib "Carbon" (window as Integer, collapse as Integer) as Integer
```

```
IF CollapseStatus THEN
state = 1
ELSE
state = 0
END IF
```

```
err = CollapseWindow(w.MacWindowPtr, state)
```

```
End Sub
```

Notes: Also the MBS Plugin has a window.collapsedmbs property you can set. For Windows the MBS Plugin has a window.isiconicmbs property.

8.0.76 How to compare two pictures?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:

Example:

```
Function ComparePictures(p as picture,q as picture) as Integer
dim r,u as RGBSurface
dim x,y,n,m,h,w as Integer
dim w1,w2,h1,h2,d1,d2 as Integer
dim c1,c2 as color
```

```
h1=p.Height
h2=q.Height
w1=p.Width
w2=q.Width
d1=p.Depth
d2=q.Depth
```

```
if d1<>d2 then
Return 1
elseif w1<>w2 then
```

```

return 2
elseif h1<>h2 then
Return 3
else
r=p.RGBSurface
u=q.RGBSurface

if r=nil or u=nil then
Return -1
else
h=h1-1
w=w1-1
m=min(w,h)

for n=0 to m
c1=r.Pixel(n,n)
c2=u.Pixel(n,n)
if c1<>c2 then
Return 4
end if
next

for y=0 to h
for x=0 to w
c1=r.Pixel(x,y)
c2=u.Pixel(x,y)
if c1<>c2 then
Return 5
end if
next
next

// 0 for equal
// -1 for error (no RGBsurface)
// 1 for different depth
// 2 for different width
// 3 for different height
// 4 for different pixels (fast test)
// 5 for different pixels (slow test)
end if
end if

Exception
Return -1
End Function

```

Notes: Remember that this only works on bitmap pictures, so the `picture.BitmapMBS` function may be useful.

8.0.77 How to compile PHP library?

Plugin Version: all, Platform: macOS.

Answer: You have to download the source code and compile a static version of the library.

Notes: This instructions were written based on PHP 5.2.6 on Mac OS X:

- Best take a new Mac with current Xcode version installed.
- Download the source code archive. e.g. "php-5.2.6.tar.bz2"
- Expand that archive on your harddisc.
- Open terminal window
- change directory to the php directory. e.g. "cd /php-5.2.6"
- execute this two lines to define the supported CPU types and the minimum Mac OS X version:
- export CFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"
- export CXXFLAGS="-arch ppc -arch i386 -mmacosx-version-min=10.3"
- the command "./configure help" does show the configure options.
- use configure with a line like this:
- ./configure --enable-embed --with-curl --enable-ftp --enable-zip --enable-sockets --enable-static --enable-soap --with-zlib --with-bz2 --enable-exif --enable-bcmath --enable-calendar
- start the compilation with "make all"
- other option is to use "make install" which first does the same as "make all" and than does some installation scripts.
- you may get an error about a duplicate symbole __yytext. Search the file "zend_ini_scanner.c", search a line with "char *yytext;" and change it to "extern char *yytext;".
- On the end you get a lot of error messages, but you have a working library (named libphp5.so) file in the invisible ".libs" folder inside your php source folder.

Possible problems and solutions:

- If the path to your files has spaces, you can get into trouble. e.g. "/RB Plugins/PHP" is bad as files will be searched sometimes in "/RB".

- If you have in /usr/local/lib libraries which conflict with the default libraries, you can get into trouble.
- If you installed some open source tools which compiled their own libraries, you can get into conflicts.
- if you have to reconfigure or after a problem, you may need to use "make clean" before you start "make all" again.

Feel free to install additional libraries and add more packages to the configure line.

8.0.78 How to convert a `BrowserType` to a `String` with `WebSession.Browser`?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:

Example:

```
Function GetBrowserName(s as WebSession.BrowserType) As string
Select case s
case WebSession.BrowserType.Android
Return "Andriod"
case WebSession.BrowserType.Blackberry
Return "Blackberry"
case WebSession.BrowserType.Chrome
Return "Chrome"
case WebSession.BrowserType.ChromeOS
Return "ChromeOS"
case WebSession.BrowserType.Firefox
Return "Firefox"
case WebSession.BrowserType.InternetExplorer
Return "InternetExplorer"
case WebSession.BrowserType.Opera
Return "Opera"
case WebSession.BrowserType.Safari
Return "Safari"
case WebSession.BrowserType.SafariMobile
Return "SafariMobile"
case WebSession.BrowserType.Unknown
Return "Unknown"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

8.0.79 How to convert a EngineType to a String with WebSession.Engine?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:

Example:

```
Function GetRenderingEngineName(s as WebSession.EngineType) As string
Select case s
case WebSession.EngineType.Gecko
Return "Gecko"
case WebSession.EngineType.Presto
Return "Presto"
case WebSession.EngineType.Trident
Return "Trident"
case WebSession.EngineType.Unknown
Return "Unknown"
case WebSession.EngineType.WebKit
Return "WebKit"
else
Return "Unkown: "+str(integer(s))
end Select

End Function
```

8.0.80 How to convert a PlatformType to a String with WebSession.Platform?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this:

Example:

```
Function GetPlatformName(s as WebSession.PlatformType) As string
Select case s
case WebSession.PlatformType.Blackberry
Return "Blackberry"
case WebSession.PlatformType.iPad
Return "iPad"
case WebSession.PlatformType.iPhone
Return "iPhone"
case WebSession.PlatformType.iPodTouch
Return "iPodTouch"
case WebSession.PlatformType.Linux
Return "Linux"
case WebSession.PlatformType.Macintosh
Return "Macintosh"
```

```

case WebSession.PlatformType.PS3
Return "PS3"
case WebSession.PlatformType.Unknown
Return "Unknown"
case WebSession.PlatformType.WebOS
Return "WebOS"
case WebSession.PlatformType.Wii
Return "Wii"
case WebSession.PlatformType.Windows
Return "Windows"
else
Return "Unkown: "+str(integer(s))
end Select

End Function

```

8.0.81 How to convert a text to iso-8859-1 using the TextEncoder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you although it's not perfect.
You need to set lc to the current color you use.

Example:

```

dim outstring as string
dim theMac, thePC as textencoding
dim Mac2PC as textconverter

theMac = getTextEncoding(0) // MacRoman
thePC = getTextEncoding(&h0201) // ISOLatin1

Mac2PC = getTextConverter(theMac, thePC)
// if you wanted to do the opposite just create a converter
// PC2Mac = getTextConverter(thePC, theMac)

outstring = Mac2PC.convert("Bj√rn, this text should be converted")
Mac2PC.clear

```

Notes:

You have to call Mac2PC.clear after every conversion to reset the encoding engine.
See also newer TextConverterMBS class.

8.0.82 How to convert ChartTime back to Xojo date?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have this example code:

Example:

```
Function ChartTimeToDate(ChartTime as Double) As date
static diff as Double = 0.0
```

```
if diff = 0.0 then
dim d2 as Double = CDBaseChartMBS.chartTime(2015, 1, 1)
dim da as new date(2015, 1, 1)
dim ts as Double = da.TotalSeconds
```

```
diff = ts - d2
end if
```

```
dim d as new date
d.TotalSeconds = diff + ChartTime
```

```
Return d
End Function
```

Notes: As you see we calculate the difference in base date from Date and ChartTime and later use difference to convert.

8.0.83 How to convert line endings in text files?

Plugin Version: all, Platform: macOS.

Answer: You can simply read file with TextInputStream and write with new line endings using TextOutputStream class.

Example:

```
dim inputfile as FolderItem = SpecialFolder.Desktop.Child("test.txt")
dim outputfile as FolderItem = SpecialFolder.Desktop.Child("output.txt")
dim it as TextInputStream = TextInputStream.Open(inputfile)
dim ot as TextOutputStream = TextOutputStream.Create(outputfile)
```

```
ot.Delimiter = EndOfLine.Windows // new line ending
while not it.EOF
ot.WriteLine it.ReadLine
wend
```

Notes: `TextInputStream` will read any input line endings and with `delimiter` property in `TextOutputStream` you can easily define your new delimiter.

8.0.84 How to convert picture to string and back?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use this plugin functions:

Notes: JPEG:

`JPEGStringToPictureMBS(buf as string)` as picture
`JPEGStringToPictureMBS(buf as string,allowdamaged as Boolean)` as picture
`PictureToJPEGStringMBS(pic as picture,quality as Integer)` as string

PNG:

`PictureToPNGStringMBS(pic as picture, gamma as single)` as string
`PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single)` as string
`PictureToPNGStringMBS(pic as picture, gamma as single, Interlace as Boolean, FilterType as Integer)` as string
`PictureToPNGStringMBS(pic as picture, mask as picture, gamma as single, Interlace as Boolean, FilterType as Integer)` as string
`PNGStringToPictureMBS(data as string, gamma as single)` as picture
`PNGStringToPNGPictureMBS(data as string, gamma as single)` as PNGpictureMBS

Tiff:

`TIFFStringToPictureMBS(data as string)` as picture
`TIFFStringToTiffPictureMBS(data as string)` as TiffPictureMBS

BMP:

`BMPStringtoPictureMBS(data as string)` as picture
`Picture.BMPDataMBS(ResolutionValueDPI as Integer=72)` as string

GIF:

`GifStringToGifMBS(data as string)` as GIFMBS
`GifStringToPictureMBS(data as string)` as Picture

8.0.85 How to copy an array?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy an array:

Example:

```
Function CopyArray(a() as Double) as Double()
dim r() as Double
for each v as Double in a
r.Append v
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double. For a deep copy of an array of objects, you need to change code to also make a copy of those objects.

8.0.86 How to copy a dictionary?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy a dictionary:

Example:

```
Function CopyDictionary(d as Dictionary) As Dictionary
dim r as new Dictionary
for each key as Variant in d.keys
r.Value(key) = d.Value(key)
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double. For a deep copy of a dictionary of objects, you need to change code to also make a copy of those objects.

8.0.87 How to copy parts of a movie to another one?

Plugin Version: all, Platforms: macOS, Windows.

Answer: The code below copies ten seconds of the snowman movie to the dummy movie starting at the 5th second.

Example:

```

dim f as FolderItem
dim md as EditableMovie
dim ms as EditableMovie

f=SpecialFolder.Desktop.Child("Our First Snowman.mov")
ms=f.OpenEditableMovie

ms.SelectionStartMBS=5
ms.SelectionLengthMBS=10

f=SpecialFolder.Desktop.Child("dummy.mov")
md=f.CreateMovie

msgbox str(md.AddMovieSelectionMBS(ms))

```

Notes: If result is not 0, the method fails.

8.0.88 How to create a birthday like calendar event?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```

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

// needed for the error details
dim e as NSErrorMBS

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

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

// create a new calendar
dim c as new CalEventMBS

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

dim calendars() as CalCalendarMBS = s.calendars

```

```

// set properties
c.Title="Test Birthday"
c.startDate=d
c.recurrenceRule = r
c.calendar=calendars(0) // add to first calendar
c.addAlarm(a)
c.endDate = d
c.isAllDay = true

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

```

Notes: This adds an event to iCal for the given date with alarm to remember you and repeats it every year.

8.0.89 How to create a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the UUIDMBS class for this.

8.0.90 How to create a Mac picture clip file?

Plugin Version: all, Platform: Windows.

Answer: You can use code like this one.

Example:

```

dim f As FolderItem
dim p As Picture

f=SpecialFolder.Desktop.Child("Test.pictClipping")
if f=nil then Return

p=new Picture(300,200,32) 'Make a sample picture
p.Graphics.ForeColor=RGB(0,255,255)
p.Graphics.FillOval 0,0,99,99

```

```
p.Graphics.ForeColor=RGB(255,0,0)
p.Graphics.DrawOval 0,0,99,99
```

```
dim r As ResourceFork 'ResourceFork is needed for a clip file
```

```
// Please define a file type Any
r=f.CreateResourceFork("Any")
```

```
// get PICT data using plugin function
dim pictdata as string = p.PicHandleDataMBS
r.AddResource(pictdata,"PICT",256,"Picture")
```

```
dim m as new MemoryBlock(8)
```

```
m.LittleEndian = false
m.Int16Value(0) = 0
m.Int16Value(2) = 0
m.Int16Value(4) = p.Width
m.Int16Value(6) = p.Height
```

```
r.AddResource(m,"RECT",256,"")
```

```
'Values taken from a sample file and irrelevant to the problem
```

```
dim data as string = DecodeBase64("AQAAAAAAAAAAAAAAAAACAFRDRVIAAABAAAAAAAAAAAAAAAAABUQ0IQAAAAA")
r.AddResource(data,"drag",128,"") 'ditto
r.Close
```

Notes: In general Apple has deprecated this, but a few application still support clippings.

8.0.91 How to create a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Check our DynaPDF plugin and the examples.

Notes: An alternative can be to use the CoreGraphics and Cocoa functions on Mac OS X. For Windows, we can only suggest our DynaPDF plugin.

8.0.92 How to create EmailAttachment for PDF Data in memory?

Plugin Version: all, Platform: macOS.

Answer: You can use code like the one below:

Example:

Function EmailAttachmentFromPDFData(PDFData as string, filename as string) As EmailAttachment
 dim a as new EmailAttachment

```
a.data = EncodeBase64(PDFData, 76)
a.ContentEncoding = "base64"
a.MIMEType = "application/pdf"
a.MacType = "PDF "
a.MacCreator = "prvw"
a.Name = filename
```

Return a
 End Function

Notes: Compared to sample code from Xojo documentation, we set the mime type correct for PDF. The MacType/MacCreator codes are deprecated, but you can still include them for older Mac email clients. "prvw" is the creator code for Apple's preview app.

8.0.93 How to create PDF for image files?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use DynaPDF like this:

Example:

```
Function CreatePrintPDF(jpgFiles() as folderitem, pdfFile as FolderItem, PageWidth as Integer, PageHeight as Integer) As Boolean
  // have files?
  If pdfFile = Nil Then Return False
  If jpgFiles = Nil Then Return False

  If jpgFiles.Ubound < 0 Then Return False

  // new DynaPDF
  Dim pdf As New MyDynapdfMBS

  // page width/height in MilliMeter
  Dim pdfWidth as Integer = PageWidth * 72 / 25.4
  Dim pdfHeight as Integer = PageHeight * 72 / 25.4

  // put your license here
  Call pdf.SetLicenseKey "Starter"

  // create pdf
  Call pdf.CreateNewPDF pdfFile
```

```

// set a couple of options
Call pdf.SetPageCoords(MyDynaPDFMBS.kpcTopDown)
Call pdf.SetResolution(300)
Call pdf.SetUseTransparency(False)
Call pdf.SetSaveNewImageFormat(False)
Call pdf.SetGStateFlags(MyDynaPDFMBS.kgfUseImageColorSpace, False)
Call pdf.SetJPEGQuality(100)

// set page size
Call pdf.SetBBox(MyDynaPDFMBS.kpbMediaBox, 0, 0, pdfWidth, pdfHeight)
Call pdf.SetPageWidth(pdfWidth)
Call pdf.SetPageHeight(pdfHeight)

// append pages with one image per page
For i as Integer = 0 To jpgFiles.Ubound
Call pdf.Append
Call pdf.InsertImageEx(0, 0, pdfWidth, pdfHeight, jpgFiles(i), 1)
Call pdf.EndPage
Next

// close
Call pdf.CloseFile

Return True
End Function

```

Notes: This is to join image files in paper size to a new PDF.
e.g. scans in A4 into an A4 PDF.

8.0.94 How to CURL Options translate to Plugin Calls?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a few tips on how to translate command line CURL calls to plugin calls.

Notes: `curl -vX PUT http://localhost:5984/appserials/78569238475/DocumentRegister.docx?rev=3-25634563456 -data-binary @DocumentRegister.docx -H "Content-Type: application/msword"`

- The option `-v` means verbose. You can use `OptionVerbose` and listen for messages in the `DebugMessage` event.
- The option `-X PUT` means we want to do a HTTP PUT Request. So set `OptionPut` to true. Also you will want to set `OptionUpload` to true as you upload data.
- We have the URL which you put into `OptionURL` property.

- The `-data-binary` option tells CURL to pass the given data. With the `@` before the data, it is interpreted as a file name, so the data is read from the given file. You'll need to open this file and pass data with the Read event as needed. (See CURLS ftp file upload example project)
- The last option `-H` specifies an additional header for the upload. Pass this additional header with the `SetOptionHTTPHeader` method.

```
curl -X PUT http://127.0.0.1:5984/appserials/f2f4e540bf8bb60f61cfc4328001c59 -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)

8.0.95 How to delete file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can set post/pre quotes to have ftp commands executed before or after the download/upload.

Example:

```
dim d as CURLMBS // your curl object
```

```
// delete file
```

```
dim ws() As String
```

```
ws.Append "DELE Temp.txt"
```

```
d.SetOptionPostQuote(ws)
```

Notes: Use `SetOptionPostQuote`, `SetOptionPreQuote` or `SetOptionQuote`.

The ftp commands you pass here are native ftp commands and not the commands you use with ftp applications. To delete use `DELE` and the file path.

8.0.96 How to detect display resolution changed?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac OS X simply listen for display changed notifications.

Notes: Use the "Distribution Notification Center.rbp" example project as a base and use it to listen to notifications with the name "O3DeviceChanged".

8.0.97 How to detect retina?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use `Window.BackingScaleFactorMBS` to query the factor.

Example:

```
msgbox str(window1.BackingScaleFactorMBS)
```

8.0.98 How to disable force quit?

Plugin Version: all, Platform: macOS.

Answer:

Please visit this website and get the control panel for Mac OS 9 there:

<http://www3.sk.sympatico.ca/tinyjohn/DFQ.html>

For Mac OS X use the MBS Plugin with the `SetSystemUIModeMBS` method.

Notes:

Please use `presentationOptions` in `NSApplicationMBS` for Cocoa applications.

8.0.99 How to disable the error dialogs from Internet Explorer on javascript errors?

Plugin Version: all, Platform: Windows.

Answer: You can use this code in the `htmlviewer` open event:

Example:

```
if targetwin32 then
htmlviewer1._ole.Content.value("Silent") = True
end if
```

Notes: This disables the error dialogs from Internet Explorer.

8.0.100 How to display a PDF file in Xojo?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac OS X you can use CoreGraphics or PDFKit to display a PDF.

Notes: An alternative can be to load the PDF into a htmlviewer so the PDF plugin can display it. On Windows you may need to use the Acrobat ActiveX control from Adobe or launch Acrobat Reader.

8.0.101 How to do a lottery in RB?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this function:

Example:

```

Sub Lotto(max as Integer,count as Integer,z() as Integer)
// Lotto count numbers of max put into the array z beginning at index 0
dim n(0) as Integer ' all the numbers
dim m as Integer ' the highest field in the current array
dim i,a,b,d as Integer ' working variables

'fill the array with the numbers
m=max-1
redim n(m)

for i=0 to m
n(i)=i+1
next

' unsort them by exchanging random ones
m=max*10
for i=1 to m
a=rnd*max
b=rnd*max

d=n(a)
n(a)=n(b)
n(b)=d
next

' get the first count to the dest array
m=count-1
redim z(m)
for i=0 to m
z(i)=n(i)
next

'sort the result
z.sort
End Sub

```

```

Sub Open()
// Test it

dim za(0) as Integer ' the array of the numbers

lotto 49,6,za ' 6 of 49 in Germany

' and display them
staticText1.text=str(za(0))+chr(13)+str(za(1))+chr(13)+str(za(2))+chr(13)+str(za(3))+chr(13)+str(za(4))+chr(13)+str(za(5))+chr(13)+str(za(6))+chr(13)+str(za(7))+chr(13)+str(za(8))+chr(13)+str(za(9))+chr(13)+str(za(10))+chr(13)+str(za(11))+chr(13)+str(za(12))+chr(13)+str(za(13))+chr(13)+str(za(14))+chr(13)+str(za(15))+chr(13)+str(za(16))+chr(13)+str(za(17))+chr(13)+str(za(18))+chr(13)+str(za(19))+chr(13)+str(za(20))+chr(13)+str(za(21))+chr(13)+str(za(22))+chr(13)+str(za(23))+chr(13)+str(za(24))+chr(13)+str(za(25))+chr(13)+str(za(26))+chr(13)+str(za(27))+chr(13)+str(za(28))+chr(13)+str(za(29))+chr(13)+str(za(30))+chr(13)+str(za(31))+chr(13)+str(za(32))+chr(13)+str(za(33))+chr(13)+str(za(34))+chr(13)+str(za(35))+chr(13)+str(za(36))+chr(13)+str(za(37))+chr(13)+str(za(38))+chr(13)+str(za(39))+chr(13)+str(za(40))+chr(13)+str(za(41))+chr(13)+str(za(42))+chr(13)+str(za(43))+chr(13)+str(za(44))+chr(13)+str(za(45))+chr(13)+str(za(46))+chr(13)+str(za(47))+chr(13)+str(za(48))+chr(13)+str(za(49))+chr(13)+str(za(50))+chr(13)+str(za(51))+chr(13)+str(za(52))+chr(13)+str(za(53))+chr(13)+str(za(54))+chr(13)+str(za(55))+chr(13)+str(za(56))+chr(13)+str(za(57))+chr(13)+str(za(58))+chr(13)+str(za(59))+chr(13)+str(za(60))+chr(13)+str(za(61))+chr(13)+str(za(62))+chr(13)+str(za(63))+chr(13)+str(za(64))+chr(13)+str(za(65))+chr(13)+str(za(66))+chr(13)+str(za(67))+chr(13)+str(za(68))+chr(13)+str(za(69))+chr(13)+str(za(70))+chr(13)+str(za(71))+chr(13)+str(za(72))+chr(13)+str(za(73))+chr(13)+str(za(74))+chr(13)+str(za(75))+chr(13)+str(za(76))+chr(13)+str(za(77))+chr(13)+str(za(78))+chr(13)+str(za(79))+chr(13)+str(za(80))+chr(13)+str(za(81))+chr(13)+str(za(82))+chr(13)+str(za(83))+chr(13)+str(za(84))+chr(13)+str(za(85))+chr(13)+str(za(86))+chr(13)+str(za(87))+chr(13)+str(za(88))+chr(13)+str(za(89))+chr(13)+str(za(90))+chr(13)+str(za(91))+chr(13)+str(za(92))+chr(13)+str(za(93))+chr(13)+str(za(94))+chr(13)+str(za(95))+chr(13)+str(za(96))+chr(13)+str(za(97))+chr(13)+str(za(98))+chr(13)+str(za(99))
End Sub

```

8.0.102 How to do an asycron DNS lookup?

Plugin Version: all, Platform: Windows.

Answer: use CFHostMBS class (Mac OS X only).

Notes: Xojo internal functions and plugin DNS functions are sycronized.

You can use DNSLookupThreadMBS class for doing them asycron.

8.0.103 How to draw a dushed pattern line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:

Example:

```
// call like this: DrawDushedPatternLine g,0,0,width,height,10
```

```

Sub DrawDushedPatternLine(g as graphics,x1 as Integer,y1 as Integer,x2 as Integer,y2 as Integer, partlen
as Integer)
dim x,y,ox,oy as Double
dim dx,dy as Double
dim w,h,d as Double
dim b as Boolean

w=x2-x1
h=y2-y1

d=sqrt(w*w+h*h)

dx=w/d*partlen
dy=h/d*partlen

```

```

b=true
x=x1
while (x<x2) and (y<y2)
  ox=x
  oy=y

  x=x+dx
  y=y+dy

  if b then
    g.DrawLine ox,oy,x,y
  end if

  b=not b
wend

```

End Sub

Notes: It would be possible to add this to the plugin, but I think it's better if you do it in plain Xojo code, so it even works on Windows.

8.0.104 How to draw a nice antialiased line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you although it's not perfect.
You need to set lc to the current color you use.

Example:

```

Sub drawLine(xs as Integer, ys as Integer, xe as Integer, ye as Integer, face as RGBSurface, lineColor as
color)
  dim intX, intY, count, n, xDiff, yDiff as Integer
  dim v, v1, floatX, floatY, xx, yy, xStep, yStep as Double
  dim c as color

  const st=1.0

  xDiff=xe-xs
  yDiff=ye-ys
  count=max(abs(xDiff), abs(yDiff))
  xStep=xDiff/count
  yStep=yDiff/count

```

```

xx=xs
yy=ys
for n=1 to count
intX=xx
intY=yy
floatX=xx-intX
floatY=yy-intY

v=(1-floatX)*(1-floatY)*st
v1=1-v
c=face.pixel(intX, intY)
face.pixel(intX, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*(1-floatY)*st
v1=1-v
c=face.pixel(intX+1, intY)
face.pixel(intX+1, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=(1-floatX)*floatY*st
v1=1-v
c=face.pixel(intX, intY+1)
face.pixel(intX, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*floatY*st
v1=1-v
c=face.pixel(intX+1, intY+1)
face.pixel(intX+1, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)

xx=xx+xStep
yy=yy+yStep
next

End Sub

```

Notes:

PS: st should be 1 and face should be a RGBSurface or a Graphics object.

8.0.105 How to dump java class interface?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In terminal you can use "javap -s <classname>" to display the class with the method names and parameters.

Notes: For example show ResultSet class: javap -s java.sql.ResultSet

8.0.106 How to duplicate a picture with mask or alpha channel?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this function:

Example:

```
Function Duplicate(extends p as Picture) As Picture
#if RBVersion >= 2011.04 then
if p.HasAlphaChannel then

// create nw picture and copy content:
dim q as new Picture(p.Width, p.Height)
q.Graphics.DrawPicture p,0,0

Return q

end if
#endif

// create new picture
dim q as new Picture(p.Width, p.Height, 32)

// get mask
dim oldMask as Picture = p.mask(false)
if oldMask = nil then
// no mask, so simple copy
q.Graphics.DrawPicture p,0,0
Return q
end if

// remove mask
p.mask = nil

// copy picture and mask
q.Graphics.DrawPicture p, 0, 0
q.mask.Graphics.DrawPicture oldMask,0,0

// restore mask
p.mask = oldmask

Return q
End Function
```

Notes: Simply copy it to a module and call it like this: `q = p.duplicate`.

The code above works with old Xojo versions because of the `#if` even if your RS version does not support alpha channel pictures. This way it's future proof.

8.0.107 How to enable assistive devices?

Plugin Version: all, Platform: macOS.

Answer: You can use AppleScript code like below:

Notes: tell application "System Events"
activate

```
set UI elements enabled to true
```

```
return UI elements enabled
end tell
```

You can run this with AppleScriptMBS class.

8.0.108 How to encrypt a file with Blowfish?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:

Example:

```
dim fi as FolderItem = SpecialFolder.Desktop.Child("test.xojo_binary_project")
dim fo as FolderItem = SpecialFolder.Desktop.Child("test.encrypted")
```

```
// read input
```

```
dim bi as BinaryStream = BinaryStream.Open(fi)
```

```
dim si as string = bi.Read(bi.Length)
```

```
bi.Close
```

```
// encrypt
```

```
dim so as string = BlowfishMBS.Encrypt("MyKey",si)
```

```
// write output
```

```
dim bo as BinaryStream = BinaryStream.Create(fo)
```

```
bo.Write so
```

```
bo.Close
```

Notes: Of course you can decrypt same way, just use Decrypt function and of course swap files.

8.0.109 How to extract text from HTML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use both RemoveHTMLTagsMBS and DecodingFromHTMLMBS like this:

Example:

```
dim html as string = "<p><B>Gr&uuml;&szlig;e</B></P>"
dim htmltext as string = RemoveHTMLTagsMBS(html)
dim text as string = DecodingFromHTMLMBS(htmltext)
```

MsgBox text // shows: Gr√üë

Notes: You can use it together with RemoveHTMLTagsMBS to remove html tags. What you get will be the text without tags.

DecodingFromHTMLMBS turns HTML escapes back to unicode characters. Like ä to √.

8.0.110 How to find empty folders in a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this code:

Example:

```
dim folder as folderitem // your folder

dim c as Integer = folder.count
for i as Integer = 1 to c
dim item as folderitem = folder.trueitem(i)
if item = nil then
// ignore
elseif item.directory then
// folder
if item.count = 0 then
// found empty folder
end if
end if
next
```

8.0.111 How to find iTunes on a Mac OS X machine fast?

Plugin Version: all, Platform: macOS.

Answer: You can try Launch Services.

Example:

```
dim f as FolderItem

f=LaunchServicesFindApplicationForInfoMBS("hook","com.apple.iTunes","iTunes.app")

MsgBox f.NativePath
```

8.0.112 How to find network interface for a socket by it's name?

Plugin Version: all, Platform: macOS.

Answer: You can use our plugin to build a lookup table.

Example:

```
Function FindNetworkInterface(name as string) As NetworkInterface
name = name.trim

if name.len = 0 then Return nil

// search by IP/MAC
dim u as Integer = System.NetworkInterfaceCount-1
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if n.IPAddress = name or n.MACAddress = name then
Return n
end if
next

// use MBS Plugin to build a mapping
dim interfaces() as NetworkInterfaceMBS = NetworkInterfaceMBS.AllInterfaces
dim map as new Dictionary

for each n as NetworkInterfaceMBS in interfaces
dim IPv4s() as string = n.IPv4s
dim IPv6s() as string = n.IPv6s

for each IPv4 as string in IPv4s
map.Value(IPv4) = n.Name
next
for each IPv6 as string in IPv6s
map.Value(IPv6) = n.Name
next
if n.MAC<>>" then
map.Value(n.MAC) = n.Name
```

```

end if
next

// now search interfaces by name, IPv4 or IPv6
for i as Integer = 0 to u
dim n as NetworkInterface = System.GetNetworkInterface(i)
if map.Lookup(n.IPAddress, "") = name then
Return n
end if

if map.Lookup(n.MACAddress, "") = name then
Return n
end if
next

End Function

```

Notes: The code above uses a lookup table build using NetworkInterfaceMBS class to find the network interface by name.

8.0.113 How to find version of Microsoft Word?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:

Example:

```

// find Word
dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("", "com.microsoft.Word", "")

// open bundle
dim c as new NSBundleMBS(f)

// read info
dim d as Dictionary = c.infoDictionary

// show version
MsgBox d.Lookup("CFBundleVersion", "")

```

Notes: Older versions of Word can be found with creator code "MSWD".

8.0.114 How to fix CURL error 60/53 on connecting to server?

Plugin Version: all, Platform: macOS.

Answer: You probably connect with SSL and you have no valid certificate.

Example:

```
dim d as new CURLSMBS

// Disable SSL verification
d.OptionSSLVerifyHost = 0 // don't verify server
d.OptionSSLVerifyPeer = 0 // don't proofs certificate is authentic

// With SSL Verification:
dim cacert as FolderItem = Getfolderitem("cacert.pem")
d.OptionCAInfo = cacert.NativePath
d.OptionSSLVerifyHost = 2 // verify server
d.OptionSSLVerifyPeer = 1 // proofs certificate is authentic
```

Notes: You can either use the code above to disable the SSL verification and have no security. Or you use the cacert file and enable the verification. Than you only get a connection if the server has a valid certificate.

see also:

<http://curl.haxx.se/ca/>

8.0.115 How to format double with n digits?

Plugin Version: all, Platform: macOS.

Answer: You can use the FormatMBS function for this.

Example:

```
dim d as Double = 123.4567890
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)
listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)

d = 0.000000123456
listbox1.AddRow FormatMBS("%f", d)
listbox1.AddRow FormatMBS("%e", d)
```

```
listbox1.AddRow FormatMBS("%g", d)

listbox1.AddRow FormatMBS("%5.5f", d)
listbox1.AddRow FormatMBS("%5.5e", d)
listbox1.AddRow FormatMBS("%5.5g", d)
```

Notes: see FormatMBS for details.

In general %f is normal style, %e is scientific and %g is whichever gives best result for given space.

8.0.116 How to get a time converted to user time zone in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebSession.GMTOffset property.

Example:

```
Sub Open()
// current date on server
dim d as new date
dim s as string = d.LongTime

// adjust to client GMT offset
d.GMTOffset = d.GMTOffset + Session.GMTOffset

dim t as string = D.LongTime

MsgBox s+EndOfLine+t
End Sub
```

8.0.117 How to get an handle to the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

Answer: This function returns a handle for the frontmost window:

Example:

```
Function GetForegroundWindowHandle() as Integer
#if targetwin32 then
declare function GetForegroundWindow Lib "user32.dll" as Integer
Return GetForegroundWindow()
#endif
End Function
```

8.0.118 How to get CFAbsoluteTime from date?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use code like this:

Example:

```
dim d as new date
dim t as CFTimeZoneMBS = SystemCFTimeZoneMBS
dim g as new CFGregorianCalendarMBS
g.Day = d.Day
g.Month = d.Month
g.Year = d.Year
g.Minute = d.Minute
g.Hour = d.Hour
g.Second = d.Second

dim at as CFAbsoluteTimeMBS = g.AbsoluteTime(t)
dim x as Double = at.Value
```

```
MsgBox str(x)
```

Notes: As you see we need a timezone and put the date values in a gregorian date record. Now we can query absolute time for the given timezone.

8.0.119 How to get client IP address on web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the WebSession.RemoteAddress property.

Example:

```
Sub Open()
Title = Session.RemoteAddress
End Sub
```

8.0.120 How to get fonts to load in charts on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use the SetFontSearchPath method in the CDBaseChartMBS class to specify where your fonts are.

Example:

```

if TargetLinux then
CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype;/usr/share/fonts/truetype/msttcorefonts"
else
// on Mac and Windows we use system fonts.
end if

// also you can later switch default fonts:

dim Chart as CDBaseChartMBS // your chart

#If TargetARM And TargetLinux Then
// use specific fonts on Linux on Raspberry Pi
Call Chart.setDefaultFonts("/usr/share/fonts/truetype/piboto/PibotoLt-Regular.ttf", "/usr/share/fonts/truetype/piboto/Pi
#EndIf

```

Notes: On macOS, iOS and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

8.0.121 How to get fonts to load in DynaPDF on Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use the AddFontSearchPath method in the DynaPDFMBS class to specify where your fonts are.

Example:

```

dim d as new DynaPDFMBS
if TargetLinux then
call d.AddFontSearchPath "/usr/share/fonts/truetype", true
else
// on Mac and Windows we use system fonts.
end if

```

Notes: On Mac OS X and Windows, the fonts are loaded from the system's font folder.

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

8.0.122 How to get GMT time and back?

Plugin Version: all, Platform: macOS.

Answer: You can use the date class and the GMTOffset property.

Example:

```
// now
dim d as new date

// now in GMT
dim e as new date
e.GMTOffset = 0

// show
MsgBox str(d.TotalSeconds,"0.0")+ " " +str(e.TotalSeconds, "0.0")

dim GMTTimeStamp as Double = e.TotalSeconds

// restore
dim f as new date

// add GMT offset here
f.TotalSeconds = GMTTimeStamp + f.GMTOffset*3600
// because here it's removed
f.GMTOffset = f.GMTOffset

MsgBox d.ShortTime+" (" +str(d.GMTOffset)+") " +str(d.TotalSeconds,"0.0")+EndOfLine+_
e.ShortTime+" (" +str(e.GMTOffset)+") " +str(e.TotalSeconds,"0.0")+EndOfLine+_
f.ShortTime+" (" +str(f.GMTOffset)+") " +str(f.TotalSeconds,"0.0")
```

Notes: It's sometimes a bit tricky with the date class as setting one property often changes the others.

8.0.123 How to get good crash reports?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Check this website from the webkit website:

Notes: <http://webkit.org/quality/crashlogs.html>

8.0.124 How to get list of all threads?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the runtime module like in this function:

Example:

```
Function Threads() As Thread()
#pragma DisableBackgroundTasks
dim t() as Thread

Dim o as Runtime.ObjectIterator=Runtime.IterateObjects
While o.MoveNext
if o.Current isa Thread then
t.Append thread(o.current)
end if
Wend

Return t
End Function
```

Notes: This returns an array of all thread objects currently in memory.

The pragma is important here as it avoids thread switches which may cause a thread to be created or deleted.

8.0.125 How to get parameters from webpage URL in Xojo Web Edition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the Webpage.ParametersReceived event.

Example:

```
Sub ParametersReceived(Variables As Dictionary)
for each key as Variant in Variables.keys
MsgBox key+" ->" +Variables.Value(key)
next
End Sub
```

Notes: The text encodings of this strings is not defined in Xojo 2010r5. Please use DefineEncoding.

8.0.126 How to get the color for disabled textcolor?

Plugin Version: all, Platform: macOS.

Answer: Ask the appearance manager:

Example:

```
Function GetThemeTextColor(inColor as Integer, inDepth as Integer, inColorDev as Boolean) As Color
declare function GetThemeTextColor lib "Carbon" (inColor as Integer, inDepth as Integer, inColorDev as
Boolean, outColor as Ptr) as Integer
```

```
dim i as Integer
```

```
dim col as MemoryBlock
```

```
col = newMemoryBlock(6)
```

```
i = GetThemeTextColor(inColor, inDepth, inColorDev, col)
```

```
return RGB(col.UShort(0)\256, col.UShort(2)\256, col.UShort(4)\256)
```

```
End Function
```

Notes: The color for this is:

```
const kThemeTextColorDialogInactive = 2.
```

```
c = GetThemeTextColor(kThemeTextColorDialogInactive, Screen(0).Depth, true)
```

For Mac OS X you should use "CarbonLib" instead of "AppearanceLib" ...

8.0.127 How to get the current free stack space?

Plugin Version: all, Platform: macOS.

Answer: You can something like the code below:

Example:

```
Sub ShowStackSize()
```

```
dim threadid as Integer
```

```
dim size as Integer
```

```
declare function GetCurrentThread lib "Carbon" (byref threadid as Integer) as short
```

```
declare function ThreadCurrentStackSize lib "Carbon" (threadid as Integer, byref size as Integer) as short
```

```
if GetCurrentThread(threadid)=0 then
```

```
if 0=ThreadCurrentStackSize(threadid,size) then
```

```
MsgBox str(size)
```

```
end if
```

```
end if
```

End Sub

Notes: For Mac OS 9, use "ThreadLib" instead of "CarbonLib". You can use #if if you like for that.

8.0.128 How to get the current timezone?

Plugin Version: all, Platforms: macOS, Windows.

Answer:

You can use the TimeZoneMBS class or the CTimeZoneMBS class.
Or code like below:

Example:

```
Function GMTOffsetInMinutes() as Integer
// Returns the offset of the current time to GMT in minutes.
// supports Mac OS and Windows, but not Linux yet (let me know if
// you have code for that, please)
//
// Note that the offset is not always an even multiple of 60, but
// there are also half hour offsets, even one 5:45h offset

// This version by Thomas Tempelmann (rb@tempel.org) on 25 Nov 2005
// with a fix that should also make it work with future Intel Mac targets.
//
// Using code from various authors found on the RB NUG mailing list

dim result, bias, dayLightbias as Integer
dim info as memoryBlock
dim offset as Integer

#if targetMacOS then

Declare Sub ReadLocation lib "Carbon" (location As ptr)

info = NewMemoryBlock(12)
ReadLocation info
if false then
// bad, because it does not work on Intel Macs:
'offset = info.short(9) * 256 + info.byte(11)
else
offset = BitwiseAnd (info.long(8), &hFFFFFF)
end

offset = info.short(9) * 256 + info.byte(11)
```

```

offset = offset \60
return offset

#endif

#if targetWin32 then

Declare Function GetTimeZoneInformation Lib "Kernel32" ( tzInfoPointer as Ptr ) as Integer
// returns one of
// TIME_ZONE_ID_UNKNOWN 0
// - Note: e.g. New Delhi (GMT+5:30) and Newfoundland (-3:30) return this value 0
// TIME_ZONE_ID_STANDARD 1
// TIME_ZONE_ID_DAYLIGHT 2

info = new MemoryBlock(172)
result = GetTimeZoneInformation(info)

bias = info.Long(0)
// note: the original code I found in the NUG archives used Long(84) and switched to Long(0)
// only for result=1 and result=2, but my tests found that Long(0) is also the right value for result=0

if result = 2 then
daylightBias = info.long(168)
end if
offset = - (bias + dayLightbias)
return offset

#endif

End Function

```

8.0.129 How to get the current window title?

Plugin Version: all, Platform: macOS.

Answer: The code below returns the current window title for the frontmost window on Mac OS X if Accessibility services are

Example:

```

Function CurrentWindowTitle() As string
// your application needs permissions for accessibility to make this work!

dim SystemWideElement,FocusedApplicationElement,FocusedWindowElement as AXUIElementMBS
dim FocusedApplication,FocusedWindow,Title as AXValueMBS
dim s as String
dim cs as CFStringMBS

```

```

SystemWideElement=AccessibilityMBS.SystemWideAXUIElement
if SystemWideElement<>nil then
FocusedApplication=SystemWideElement.AttributeValue(AccessibilityMBS.kAXFocusedApplicationAttribute)
if FocusedApplication.Type=AccessibilityMBS.kAXUIElementMBSTypeID then
FocusedApplicationElement=new AXUIElementMBS
FocusedApplicationElement.Handle=FocusedApplication.Handle
FocusedApplicationElement.RetainObject

FocusedWindow=FocusedApplicationElement.AttributeValue(AccessibilityMBS.kAXFocusedWindowAttribute)

if FocusedWindow<>nil and AccessibilityMBS.kAXUIElementMBSTypeID=FocusedWindow.Type then

FocusedWindowElement=new AXUIElementMBS
FocusedWindowElement.Handle=FocusedWindow.Handle
FocusedWindowElement.RetainObject

Title=FocusedWindowElement.AttributeValue(AccessibilityMBS.kAXTitleAttribute)
if Title<>nil and Title.Type=kCFStringMBSTypeID then
cs=new CFStringMBS
cs.handle=Title.Handle
cs.RetainObject
Return cs.str
end if
end if
end if
end if
End Function

```

8.0.130 How to get the cursor blink interval time?

Plugin Version: all, Platform: macOS.

Answer: On Mac OS you can use GetCaretTime from the toolbox.

Example:

```
declare function GetCaretTime lib "Carbon" () as Integer
```

```
MsgBox str(GetCaretTime()+ " ticks")
```

Notes: 60 ticks make one second.

8.0.131 How to get the list of the current selected files in the Finder?

Plugin Version: all, Platform: macOS.

Answer:

Use the AppleScript like this one:

```
tell application "finder"
return selection
end tell
```

Which translates into this AppleEvent:

```
Process("Finder").SendAE "core,getd,'—':obj { form:prop, want:type(prop), seld:type(sele), from:'null'() }
"
```

and as Xojo code it looks like this:

Example:

```
dim ae as appleEvent
dim o1 as appleEventObjectSpecifier
dim f as folderItem
dim alist as appleEventDescList
dim i as Integer
dim dateiname as string

// setup the AppleEvent
o1=getpropertyObjectDescriptor( nil, "sele")
ae= newappleEvent("core", "getd", "MACS")
ae.objectSpecifierParam("—")=o1

// send it
if ae.send then
// got the list
alist=ae.replyDescList

// now show the list of filename into an editfield:

for i=1 to alist.count
f=alist.folderItem(i)

dateiname=f.name
// editfield1 with property "multiline=true"!
editfield1.text=editfield1.text + dateiname + chr(13)
next
```

end if

8.0.132 How to get the Mac OS system version?

Plugin Version: all, Platform: macOS.

Answer: The following code queries the value and displays the version number:

Example:

```

dim first as Integer
dim second as Integer
dim third as Integer
dim l as Integer

if System.Gestalt("sysv",l) then

Third=Bitwiseand(l,15)
second=Bitwiseand(l\16,15)
first=Bitwiseand(l\256,15)+10*Bitwiseand(l\256\16,15)
end if

if First>=10 then
msgbox "Mac OS X "+str(First)+" "+str(Second)+" "+str(third)
else
msgbox "Mac OS "+str(First)+" "+str(Second)+" "+str(third)
end if

```

8.0.133 How to get the Mac OS Version using System.Gestalt?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```

Dim s As String
Dim b As Boolean
Dim i, resp as Integer

// Systemversion
b = System.Gestalt("sysv", resp)
If b then
s = Hex(resp)

```

```

For i =Len(s)-1 DownTo 1
s=Left(s,i)+””+Mid(s,i+1)
Next
MsgBox ”Systemversion: Mac OS ” + s
end if

```

Notes: The MBS Plugin has a SystemInformationMBS.OSVersionString function for this.

8.0.134 How to get the screensize excluding the task bar?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Notes: Use the Screen class with the available* properties.

8.0.135 How to get the size of the frontmost window on Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Notes: Make yourself a class for the WindowRect with four properties:

```

Bottom as Integer
Left as Integer
Right as Integer
Top as Integer

```

Add the following method to your class:

```

Sub GetWindowRect(windowhandle as Integer)
dim err as Integer
dim mem as memoryBlock
#if targetwin32 then
Declare Function GetWindowRect Lib ”user32.dll” (hwnd as Integer, ipRect As Ptr) as Integer

mem = newmemoryBlock(16)
err = GetWindowRect(windowhandle, mem)
Left = mem.long(0)
Top = mem.Long(4)
Right = mem.Long(8)
Bottom = mem.Long(12)

```

```
#endif  
End Sub
```

Good to use for the MDI Master Window!

8.0.136 How to get the source code of a HTMLViewer?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```
// for Windows:
```

```
msgbox HTMLViewer1.IEHTMLTextMBS
```

```
// for MacOS with WebKit 2.x:
```

```
msgbox HTMLViewer1.WKWebViewMBS.HTMLText
```

8.0.137 How to get Xojo apps running Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You need to install some require packages.

Notes: You need CUPS as well as GTK packages. On 64 bit systems also the ia32-libs package.

Please note that you need a x86 compatible Linux. So no PPC, Power, ARM or other CPUs.

8.0.138 How to handle really huge images with GraphicsMagick or ImageMagick?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sometimes it may be better to use an extra application to process images.

Notes: A typical 32 bit app made with Xojo can use around 1.8 GB on Windows and 3 GB on Mac OS X. Some images may be huge, so that processing them causes several copies of the image to be in memory. With a 500 MB image in memory, doing a scale or rotation may require a temp image. So with source, temp and dest images with each 500 MB plus your normal app memory usage, you may hit the limit of Windows with 1.8 GB.

In that case it may be worth running a tool like gm in the shell class. gm is the command line version of GraphicsMagick. There you can run the 64 bit version which is not limited in memory like your own application. Also you can monitor progress and keep your app responsive.

8.0.139 How to handle tab key for editable cells in listbox?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this function:

Example:

```
Function HandleTabInList(list as listbox, row as Integer, column as Integer, key as String) As Boolean
// Handle tab character in Listbox.CellKeyDown event
```

```
Select case asc(key)
case 9
if Keyboard.AsyncShiftKey then
// back

// look for column left
for i as Integer = column-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next

// not found, so look in row before
row = row - 1
if row >= 0 then
for i as Integer = list.ColumnCount-1 downto 0
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
else
// forward

// look for column right
for i as Integer = column+1 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
```

```

// not found, so look in row below
row = row + 1
if row <list.ListCount then
for i as Integer = 0 to list.ColumnCount-1
if list.ColumnType(i) >= list.TypeEditable then
list.EditCell(row, i)
Return true
end if
next
end if
end if
end Select
End Function

```

Notes: You call it from CellKeyDown event like this:

```

EventHandler Function CellKeyDown(row as Integer, column as Integer, key as String) As Boolean
if HandleTabInList(me, row, column, key) then Return true
End EventHandler

```

As you see in the code, we handle tab and shift + tab for moving back and forward. Also we wrap to previous/next row if needed. Feel free to extend this to wrap from last to first row or create a new row for editing.

8.0.140 How to hard link MapKit framework?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Our MapKit classes weak link the framework. If you need hard linking it for the App Store, you can add this method to a class:

Example:

```

Sub ReferenceMapKit()
// just put this in window or app class

#if TargetMachO and Target64Bit then
Declare sub testing Lib "MapKit" Selector "test" (id as ptr)
testing(nil)
#endif

End Sub

```

Notes: No need to call the method.

Just having it in a window or app, will cause the compiler to hard link the framework.

8.0.141 How to have a PDF downloaded to the user in a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use a WebHTMLViewer control and load the PDF file with the PDF plugin from the browser.

Example:

```
dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMEType = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer
CurrentFile.ForceDownload = true

// start the download
showurl(CurrentFile.url)
```

Notes: See our Create PDF example for the Xojo Web Edition.

8.0.142 How to hide all applications except mine?

Platform: macOS.

Answer: The code below will on Mac OS hide all applications except your one:

Example:

```
dim p as new ProcessMBS

p.GetFirstProcess
do
if not p.FrontProcess then
p.Visible=false
end if
loop until not p.GetNextProcess
```

8.0.143 How to hide script errors in HTMLViewer on Windows?

Plugin Version: all, Platform: Windows.

Answer: Set Internet Explorer to silent mode with code like this:

Example:

```
htmlviewer1._ole.Content.value("Silent") = True
```

Notes: Simply put this code in the open event of your htmlviewer control (using me instead of htmlviewer1).

8.0.144 How to hide the grid/background/border in ChartDirector?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: If you want to hide something in a chart, simply assign the kTransparent constant as color.

8.0.145 How to hide the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:

Example:

```
Declare Sub HideCursor Lib "Carbon" () Inline68K("A852")
```

```
HideCursor
```

Notes: The MBS Plugin has this function and supports it on Windows, too.

8.0.146 How to insert image to NSTextView or TextArea?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to insert file:

Example:

```
// insert a file to textview
```

```
Public Sub InsertFile(textview as NSTextViewMBS, f as FolderItem)
```

```
// read to file
```

```

dim b as BinaryStream = BinaryStream.Open(f)
dim s as string = b.Read(b.Length)

// build wrapper
dim fileWrapper as NSFileWrapperMBS = NSFileWrapperMBS.initRegularFileWithContents(s)
fileWrapper.preferredFilename = f.name

// make attachment
dim fileAttachment as new NSTextAttachmentMBS(fileWrapper)
dim attributedString as NSAttributedStringMBS = NSAttributedStringMBS.attributedStringWithAttachment(fileAttachment)

// add to a NSTextViewMBS
textview.insertText attributedString

End Sub

```

Notes: For TextArea you can query the underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

8.0.147 How to jump to an anchor in a htmlviewer?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You can use javascript to change the current window's location.

Example:

```

// load website
htmlviewer1.LoadURL "http://www.monkeybreadsoftware.net/addressbook-abpersonmbs.shtml"

// later jump to anchor named "16":

if TargetWin32 then
call HTMLViewer1.IERunJavaScriptMBS "window.location = ""#16""
end if

```

8.0.148 How to keep a movieplayer unclickable?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: To keep the user away from clicking on a playing Movie you can just drop a Canvas in front of the Movieplayer and take the clicks there.

Example:

```
Function Canvas1.MouseDown(X as Integer, Y as Integer) as boolean
return true // take it and do nothing
End Function
```

8.0.149 How to keep my web app from using 100% CPU time?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Linux and MacOS you can use renice command in the terminal. On Windows use the task manager to reduce priority.

Notes: If you launch your app with nohup on Linux or Mac OS X like this from the terminal or a script:

```
nohup /webapps/MyApp/MyApp &
```

you can simply have a second line saying this:

```
renice 20 $ !
```

which tells the system to lower priority to lowest value for the latest background process.

8.0.150 How to kill a process by name?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can kill a process (or application) by name if you loop over all the processes and kill the one you need.

Example:

```
dim p as new ProcessMBS
p.GetfirstProcess ' get first
do
if p.name = "TextEdit" then
call p.KillProcess
Return
end if
loop until not p.GetNextProcess
```

Notes: You may want to check the result of killProcess function. Not every user is allowed to kill every application.

8.0.151 How to know how many CPUs are present?

Plugin Version: all, Platform: macOS.

Answer: Try this function:

Example:

```
Function GetCPUCount() as Integer
Declare Function MPPProcessors Lib "Carbon" () as Integer
```

```
Return MPPProcessors()
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.

8.0.152 How to know the calling function?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: On Mac you can use a helper function like this this code:

Example:

```
Public Function CallingFunction() as string
// Query name of calling function of a function
```

```
#Pragma BreakOnExceptions false
```

```
try
```

```
// raise a dummy exception
dim r as new NilObjectException
raise r
```

```
catch x as NilObjectException
```

```
// get stack
dim stack() as string = x.Stack
```

```
// pick function name and return
dim name as string = stack(2)
Return name
```

```
end try
End Function
```

Notes: You need to include function names in your application.

8.0.153 How to launch an app using it's creator code?

Plugin Version: all, Platform: macOS.

Answer: Send an AppleEvent "oapp" with the creator code to the Finder ("MACS"):

Example:

```
Dim a as AppleEvent
dim creator as string

creator = "MSIE" ' here the Internet Explorer

a = NewAppleEvent("aevt", "odoc", "MACS")
a.Timeout = -1

a.ObjectSpecifierParam("—") = GetUniqueIDObjectDescriptor("appf", nil, creator)

if not a.send then
msgBox "An error has occured"
else

end if
```

8.0.154 How to launch disc utility?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use this code:

Example:

```
dim f as FolderItem = LaunchServicesFindApplicationForInfoMBS("", "com.apple.DiskUtility", "")

if f<>Nil then
f.Launch
end if
```

Notes: This works even if people renamed the disc utility or moved it to another folder.

8.0.155 How to make a lot of changes to a REAL SQL Database faster?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You may try to embed your changes to the database between two transaction calls.

Example:

```
dim db as Database // some database

db.SQLiteExecute "BEGIN TRANSACTION"
// Do some Stuff
db.SQLiteExecute "END TRANSACTION"
```

Notes: This can increase speed by some factors.

8.0.156 How to make a NSImage object for my retina enabled app?

Plugin Version: all, Platform: macOS.

Answer: You can use code like this:

Example:

```
Function NewRetinaImage(pic as Picture, mask as Picture = nil) As NSImageMBS
// first make a NSImageMBS from it
dim n as new NSImageMBS(pic, mask)

// now set to half the size, so we have 2x pixels for the image
n.size = new NSSizeMBS(n.width/2, n.height/2)

// and return
Return n
End Function
```

Notes: The thing to do is to have 2x the pixels, but assign a size to the image which gives it the right size in points.

You can pass the NSImageMBS from here to NSMenuItemMBS. For Retina displays, the full resolution is used. For others it will be reduced.

8.0.157 How to make a window borderless on Windows?

Plugin Version: all, Platform: Windows.

Answer: Try this declares:

Example:

```
// Sets window to borderless popup type, and sets its initial dimensions.
// Call this method, then Win32SetBorderlessPos, and then RB's Show
// method. Use RB Frame type 7 (Global Floating Window).

Const SWP_NOMOVE = &H2
Const SWP_FRAMECHANGED = &H20
Const HWND_TOPMOST = -1
Const GWL_STYLE = -16
Const WS_POPUPWINDOW = &H80880000

Dim styleFlags as Integer

#If TargetWin32 Then

Declare Function SetWindowLong Lib "user32" Alias "SetWindowLongA" (hwnd as Integer, nIndex as Integer, dwNewLong as Integer) as Integer
Declare Function SetWindowPos Lib "user32" (hwnd as Integer, hWndInstertAfter as Integer, x as Integer, y as Integer, cx as Integer, cy as Integer, flags as Integer) as Integer

styleFlags = SetWindowLong( w.WinHWND, GWL_STYLE, WS_POPUPWINDOW )
styleFlags = BitwiseOr( SWP_FRAMECHANGED, SWP_NOMOVE )
styleFlags = SetWindowPos( w.WinHWND, HWND_TOPMOST, 0, 0, wd, ht, styleFlags )

#EndIf
```

8.0.158 How to make an alias using AppleEvents?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```
Sub MakeAlias(folder as folderitem, target as folderitem, aliasname as string)
dim ev as AppleEvent
dim myResult as boolean
dim properties as AppleEventRecord

ev = NewAppleEvent("core", "crel", "MACS")
ev.MacTypeParam("kocl") = "alis"
ev.FolderItemParam("to ") = target
ev.FolderItemParam("insh") = folder

properties=new AppleEventRecord
```

```

properties.StringParam("pnam")=aliasname

ev.RecordParam("prdt")=properties

myResult = ev.send
// true on success, false on error
End Sub

```

Notes: Call it like this:

```
MakeAlias SpecialFolder.Desktop, SpecialFolder.Desktop.Child("Gif Copy.rb"), "test.rb alias"
```

Seems to not work on Mac OS X 10.6

8.0.159 How to make AppleScripts much faster?

Plugin Version: all, Platform: macOS.

Answer: use "ignoring application responses" like in this example:

```

Notes: on run { fn,fpx,fpy }
ignoring application responses
tell app "Finder" to set the position of folder fn to fpx,fpy
end ignoring
end run

```

8.0.160 How to make double clicks on a canvas?

Plugin Version: all, Platform: macOS.

Answer:

Update: Newer Xojo versions support DoubleClick event, so you don't need this code.

Here's my tip from the tips list on how to add a double-click event to the Canvas control. The technique could easily be used for a window or any Rectcontrol:

Because of its built-in drawing methods, the Canvas control is often used to create custom interface controls. But while the Canvas control has event handlers for most mouse events, it doesn't have an event handler for DoubleClick events. Fortunately, you can add a double-click event handler to a Canvas control easily. Basically, you're going to create a new class based on Canvas and add a double-click event to that. You can then use the new class anytime you need a Canvas with a double-click event.

To create a new Canvas class with a DoubleClick event handler, do this:

1. Add a new class to your project.
2. Set the Super property of the new class to "Canvas".
3. Change the name of this new class to "DoubleClickCanvas".

A double-click occurs when two clicks occur within the users double-click time (set in the Mouse control panel on both Macintosh and Windows) and within five pixels of each other. So, you'll need a few properties to store when and where the last click occurred.

4. Add a new property with the following declaration and mark it as private: lastClickTicks as Integer
5. Add a new property with the following declaration and mark it as private: lastClickX as Integer
6. Add a new property with the following declaration and mark it as private: lastClickY as Integer

Since the Canvas control doesn't have a DoubleClick event, you will need to add one.

7. Add a new event to your class by choosing New Event from the Edit menu and enter "DoubleClick" as the event name.

Double-clicks occur on MouseUp. In order for the mouseUp event to fire, you must return True in the MouseDown event.

8. In the MouseDown event, add the following code:
Return True

In the MouseUp event, you will need to determine what the users double-click time is. This value is represented on both the Mac and Windows in ticks. A tick is 1/60th of a second. Since there isn't a built-in function for this, you'll need to make a toolbox call. The mouseUp event code below makes the appropriate toolbox call for both Macintosh and Windows. It then compares the time of the users last click to the time of the current click and compares the location of the users last click to the location of the current click.

9. Add the following code to the MouseUp event:

```
dim doubleClickTime, currentClickTicks as Integer

#if targetMacOS then
Declare Function GetDbtTime Lib "Carbon" () as Integer
doubleClickTime = GetDbtTime()
#endif

#if targetWin32 then
Declare Function GetDoubleClickTime Lib "User32.DLL" () as Integer
```

```

doubleClickTime = GetDoubleClickTime()/60 // convert to ticks from milliseconds
#endif

currentClickTicks = ticks
//if the two clicks happened close enough together in time
if (currentClickTicks - lastClickTicks) <= doubleClickTime then
//if the two clicks occurred close enough together in space
if abs(X - lastClickX) <= 5 and abs(Y - LastClickY) <= 5 then
DoubleClick //a double click has occurred so call the event
end if
end if
lastClickTicks = currentClickTicks
lastClickX = X
lastClickY = Y

```

10. Now to test out your new DoubleClickCanvas, drag the class from the Project window to a window in your project to create an instance of it.

11. Double-click on the canvas you just added to your window to open the Code Editor. Notice that the canvas has a DoubleClick event handler. In this event handler, add the following code:
BEEP

8.0.161 How to make my Mac not sleeping?

Plugin Version: all, Platform: macOS.

Answer: Just inform the Mac OS about some system activity with code like this:

Example:

```

Sub UpdateSystemActivity()

#if TargetCarbon
declare function myUpdateSystemActivity lib "Carbon" alias "UpdateSystemActivity" (activity as Integer)
as short

const OverallAct = 0 // Delays idle sleep by small amount */
const UsrActivity = 1 // Delays idle sleep and dimming by timeout time */
const NetActivity = 2 // Delays idle sleep and power cycling by small amount */
const HDAActivity = 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.

8.0.162 How to make my own registration code scheme?

Plugin Version: all, Platform: Windows.

Answer: There are excellent articles about how to make a registration code scheme, but you can also simply use our RegistrationEngineMBS class.

Notes: If you need a license text, why not use the one from Xojo as a starting point?

8.0.163 How to make small controls on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:

Example:

```

'/*
** Use the control's default drawing variant. This does not apply to
** Scroll Bars, for which Normal is Large.
**/
const kControlSizeNormal = 0

'/*
** Use the control's small drawing variant. Currently supported by
** the Check Box, Combo Box, Radio Button, Scroll Bar, Slider and Tab
** controls.
**/
const kControlSizeSmall = 1

'/*
** Use the control's small drawing variant. Currently supported by
** the Indeterminate Progress Bar, Progress Bar and Round Button
** controls.
**/
const kControlSizeLarge = 2

```

```

'/*
' * Control drawing variant determined by the control's bounds. This
' * ControlSize is only available with Scroll Bars to support their
' * legacy behavior of drawing differently within different bounds.
' */
const kControlSizeAuto = &hFFFF

const kControlSizeTag = "size"

declare function SetControlData lib "Carbon" (controlhandle as Integer, part as short, tagname as OS-
Type, size as Integer, data as ptr) as short

dim m as MemoryBlock

m=NewMemoryBlock(2)
m.UShort(0)=kControlSizeSmall

Title=str(SetControlData(CheckBox1.Handle, 0, kControlSizeTag, 2, m))

```

8.0.164 How to mark my Mac app as background only?

Plugin Version: all, Platform: macOS.

Answer: You can run a build script on each build with this code:

Example:

```

Dim App As String = CurrentBuildLocation + "/" + CurrentBuildAppName + ".app"
Call DoShellCommand("/usr/bin/defaults write " + App + "/Contents/Info ""NSUIElement"" YES")

```

Notes: This will set the NSUIElement flag to YES.

8.0.165 How to move a file or folder to trash?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:

Example:

```

Function MoveToTrash(f as FolderItem) As Boolean
#if TargetMacOS then
dim r as FolderItem
dim e as Integer = MacFileOperationMBS.MoveObjectToTrashSync(f, r, MacFileOperationMBS.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.

8.0.166 How to move an application to the front using the creator code?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code ttxt) to the frontmost application:

Example:

```

dim a as appleevent

a=newappleEvent("misc","actv","ttxt")

```

```
if a.send then
end if
```

Notes: (Code is Mac only)

8.0.167 How to move file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can set post/pre quotes to have ftp commands executed before or after the download/upload.

Example:

```
dim d as CURLMBS // your curl object

// rename/move file
dim ws() As String
ws.Append "RNFR Temp.txt"
ws.append "RNT0 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 RNT0 with the new file name. To delete use DELE and the file path.

8.0.168 How to normalize string on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:

Example:

```
Function Normalize(t as string) As string
const kCFStringNormalizationFormD = 0 // Canonical Decomposition
const kCFStringNormalizationFormKD = 1 // Compatibility Decomposition
const kCFStringNormalizationFormC = 2 // Canonical Decomposition followed by Canonical Composition
const kCFStringNormalizationFormKC = 3 // Compatibility Decomposition followed by Canonical Composition

dim s as CFStringMBS = NewCFStringMBS(t)
dim m as CFMutableStringMBS = s.Normalize(kCFStringNormalizationFormD)
```

```
Return m.str  
End Function
```

Notes: This uses Apple's CFString functions to normalize unicode variants.

8.0.169 How to obscure the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:

Example:

```
Declare Sub ObscureCursor Lib "Carbon" ()
```

```
ObscureCursor
```

Notes: The MBS Plugin has this function, but it's not supported for Windows.

8.0.170 How to open icon file on Mac?

Plugin Version: all, Platform: macOS.

Answer: Use the NSImageMBS class like this:

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.ico")  
dim n as new NSImageMBS(f)
```

```
window1.Backdrop = n.CopyPictureWithMask
```

8.0.171 How to open PDF in acrobat reader?

Plugin Version: all, Platform: macOS.

Answer: Try this code:

Example:

```
dim pdf as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
```

```

// open PDF in Acrobat Reader on Mac:

// find app
dim bundleID as string = "com.adobe.Reader"
dim app as FolderItem = LaunchServicesFindApplicationForInfoMBS("", bundleID, "")

if app<>nil then

// launch app with parameters

dim docs() as FolderItem
docs.Append pdf

dim param as new LaunchServicesLaunchParameterMBS
param.Defaults = true
param.Application = app

dim x as FolderItem = LaunchServicesOpenXMBS(docs, param)

// on failure, simply launch it
if x = nil then
pdf.Launch(true)
end if

else
pdf.Launch(true)
end if

```

Notes: On Windows, simply use pdf.launch or WindowsShellExecuteMBS.

8.0.172 How to open printer preferences on Mac?

Plugin Version: all, Platform: macOS.

Answer: You can use our OpenMacOSXPreferencesPaneMBS function like this:

Example:

```

dim e as Integer = OpenMacOSXPreferencesPaneMBS("PrintAndFax")
if 0 = e then
MsgBox "OK"
elseif e = -43 then
MsgBox "File not found."
else
MsgBox "Error: "+str(e)
end if

```

8.0.173 How to open special characters panel on Mac?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have functions for that in Cocoa and Carbon.

Example:

```
dim a as new NSApplicationMBS
a.orderFrontCharacterPalette
```

Notes: For Cocoa, you can use `orderFrontCharacterPalette` method in `NSApplicationMBS` class.

Or simply for Carbon and Cocoa the `ShowCharacterPaletteMBS` method.

8.0.174 How to optimize picture loading in Web Edition?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the `WebPicture` class.

Notes: Take your picture and create a `WebPicture` object. Store this `WebPicture` in a property of the `WebPage`, `Session` or `app` (as global as possible). On the first time you use this picture on an user session, the browser will load it. Second time you use it, the browser will most likely pick it from the cache.

Having pictures in `App` or some module reuses the same picture for all sessions which reduces memory footprint.

This does not work well with pictures you change very often or use only for one webpage on one user.

If you like to see an example, check our `Map` example.

8.0.175 How to parse XML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use code like this:

Example:

```
dim s as string = "<test><test /></test>"
```

```
try
```

```

dim x as new XmlDocument(s)
MsgBox "OK"
catch xe as XmlException
MsgBox "invalid XML"
end try

```

Notes: If you got an exception, you have a parse error.

8.0.176 How to play audio in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the HTML5 audio tag and control it with javascript.

Notes: This is just another example app I made today. It plays a christmas song. The audio file is provided by the application to the server, so no external web server is needed and this application can run stand alone. To compile and run you need Xojo 2010r5.

In the open event we search the audio files and open them as binarystreams. We create the two webfile objects. Those webfiles are part of the app class, so we have them globally. There we set the data with the content of our streams. We also define file names and mime types. They are needed so browser know what we have here:

```

audioFileM4V = new WebFile
audioFileM4V.Data = bM.Read(BM.Length)
audioFileM4V.Filename = "music.m4a"
audioFileM4V.MIMEType = "audio/m4a"

```

```

audioFileOGG = new WebFile
audioFileOGG.Data = bO.Read(BO.Length)
audioFileOGG.Filename = "music.ogg"
audioFileOGG.MIMEType = "audio/ogg"

```

Next in the open event of the webpage we have a PageSource control. The location is set to be before content. In the open event we define the html code for this. First we pick the URLs for the audio files. Than we build the html to use the audio tag. As you see, we give it an ID for later use and have it preload automatically. If you add an autoplay tag, you can have the audio play right away. Inside the audio tag we have two sources so we provide audio for both Firefox (OGG) and Safari (MPEG4). Finally we have a text to display if HTML5 audio tag is not supported.

You can set the source in the EditSource event:

```
dim urlO as string = app.audioFileOGG.URL
dim urlM as string = app.audioFileM4V.URL
me.Source = "<audio id=""mymusic"" preload=""auto""><source src="""+urlO+""" type=""audio/ogg""
/><source src="""+urlM+""" type=""audio/mpeg"" />Your browser does not support the audio ele-
ment.</audio>"
```

Next in the Play button we execute code to play the audio. This is a short javascript code which searches in the html document for the element with the ID "mymusic" which is the ID of our audio tag above. Once we got the object, we call it's play method to start playback.

```
me.ExecuteJavaScript("document.getElementById('mymusic').play();")
```

same for pause:

```
me.ExecuteJavaScript("document.getElementById('mymusic').pause();")
```

and finally for changing volume:

```
me.ExecuteJavaScript("document.getElementById('mymusic').volume="+str(me.Value/100.0)+"");")
```

8.0.177 How to pretty print xml?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the XML Transform method with the right XLS.

Notes: Learn more here:

<http://docs.xojo.com/index.php/XMLDocument.Transform>

8.0.178 How to print to PDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: This code below shows how to redirect printing to a PDF file on Mac OS X.

Example:

```
// get Xojo printer setup
dim p as new PrinterSetup

// now put it into NSPrintInfo to manipulate
dim n as new NSPrintInfoMBS
n.SetupString = p.SetupString
```

```

// change destination to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
n.SetSaveDestination(f)

// move back
p.SetupString = n.SetupString

// and print as usual
dim g as Graphics = OpenPrinter(p)
g.DrawString "Hello World", 20, 20

```

Notes: And you can use normal graphics class for that.

8.0.179 How to query Spotlight's Last Open Date for a file?

Plugin Version: all, Platform: macOS.

Answer: You can use a MDItemMBS objec to query this value:

Example:

```

Function LastOpenedDate(Extends F As FolderItem, DefaultOtherDates As Boolean = True) As Date
#If TargetMacOS Then
Dim xMDItem as New MDItemMBS(F)
Dim xDate as Variant

If xMDItem <>Nil Then
xDate = xMDItem.GetAttribute(xMDItem.kMDItemLastUsedDate).DateValue
If xDate IsA Date Then Return xDate
Else
If xDate <>Nil Then Break
End If
#EndIf

If DefaultOtherDates Then
If F.ModificationDate <>Nil Then Return F.ModificationDate
If F.CreationDate <>Nil Then Return F.CreationDate
End If
End Function

```

Notes: Thanks for Josh Hoggan for this example code.

8.0.180 How to quit windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Example:

```
#if targetwin32 then
dim i1,i2,r as Integer
declare function ExitWindowsEx lib "user32" (uFlags as Integer, dwReserved as Integer) as Integer
i1 = 2
i2 = 0
r = ExitWindowsEx(i1,i2)
if r<>0 then
' Error()
end if

#endif
```

Notes: uFlags parameters:

```
'4 = EWX_Force
'0 = EWX_Logoff
'2 = EWX_Reboot
'1 = EWX_shutdown, should shut down computer
```

Also check the ExitWindowsMBS method.

8.0.181 How to read a CSV file correctly?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With all the rules for quotes and delimiters, you can simply use the SplitCommaSeparatedValuesMBS method in our plugins like this:

Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.csv")
dim t as TextInputStream = f.OpenAsTextFile

while not t.EOF
dim s as string = t.ReadLine(encodings.ASCII)

dim items() as string = SplitCommaSeparatedValuesMBS(s, ";", """")
```

```
List.AddRow """
dim u as Integer = UBound(items)
for i as Integer = 0 to u
List.Cell(List.LastIndex,i) = items(i)
next

wend
```

Notes: Please make sure you choose the right text encoding.

8.0.182 How to read the command line on windows?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Example:

```
#if targetwin32 then
dim line as string
Dim mem as MemoryBlock

Declare Function GetCommandLineA Lib "kernel32" () As Ptr

mem=GetCommandLineA()
s=mem.cstring(0)

#endif
```

Notes: Newer Xojo versions have a system.commandline property.

8.0.183 How to render PDF pages with PDF Kit?

Plugin Version: all, Platform: Windows.

Answer: Try this code:

Example:

```
// choose a file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")

// open it as PDF Document
dim sourceFile as New PDFDocumentMBS(f)
```

```

if sourceFile.handle <>0 then // it is a PDF file

// get upper bound of pages
dim c as Integer = sourceFile.pageCount-1

// from first to last page
for n as Integer = 0 to c

// pick that page
dim page as PDFPageMBS = sourceFile.pageAtIndex(n)

// render to image
dim p as NSImageMBS = page.Render

// and convert to RB picture and display
Backdrop = p.CopyPictureWithMask

next

end if

```

Notes: PDFKit works only on Mac OS X.

8.0.184 How to restart a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:

Example:

```

dim ae as appleevent
ae=newappleEvent("FNDR","rest","MACS")
if not ae.send then
msgBox "The computer couldn't be restarted."
end if

```

8.0.185 How to resume ftp upload with curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: CURL supports that and you simply need to set the right options.

Notes: First of course OptionUpload must be true. Second OptionFTPAppend must be true so the OptionResumeFrom is used. Store there (or in OptionResumeFromLarge) your start value. Don't forget to implement the read event and return data there as requested.

8.0.186 How to rotate a PDF page with CoreGraphics?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: This code opens a PDF and draws the first page into a new PDF with 90–∞ rotation.

Example:

```
// Rotate a PDF page

// our files
dim sourcefile as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
dim destfile as FolderItem = SpecialFolder.Desktop.Child("rotated.pdf")

// open PDF
dim pdf as CGPDFDocumentMBS = sourcefile.OpenAsCGPDFDocumentMBS

// query media size of first page
dim r as CGRectMBS = pdf.MediaBox(1)

// create new PDF
dim c as CGContextMBS = destfile.NewCGPDFDocumentMBS(r,"title","Author","Creator")

// create rotated rectangle
dim nr as new CGRectMBS(0,0,r.Height,r.Width)

// create new page
c.BeginPage nr
c.SaveGState

const pi = 3.14159265

// rotate by 90–∞
c.RotateCTM pi*1.5

// fix origin
c.TranslateCTM -r.width,0

// draw PDF
c.DrawCGPDFDocument pdf,r,1

// cleanup
c.RestoreGState
c.EndPage
```

```
c = nil

// show in PDF viewer
destfile.Launch
```

Notes: This code is Mac only as it needs CoreGraphics.

8.0.187 How to rotate image with CoreImage?

Plugin Version: all, Platform: macOS.

Answer: Use the code like the one below:

Example:

```
// Rotate image with CoreImage

// load image
dim f as FolderItem = SpecialFolder.Desktop.Child("test.png")
dim image as new CIImageMBS(f)

// rotate 45 degree
dim n as new NSAffineTransformMBS
n.rotateByDegrees(45)

dim TransformFilter as new CIFilterAffineTransformMBS
TransformFilter.inputImage = image
TransformFilter.inputTransform = n

// get result
dim resultImage as CIImageMBS = TransformFilter.outputImage

// for saving to file
dim outputImage as NSImageMBS = resultImage.RenderNSImage(false)

f = SpecialFolder.Desktop.Child("output.png")
dim b as BinaryStream = BinaryStream.Create(f, true)
b.Write outputImage.PNGRepresentation

// as Xojo picture object for display
dim pic as Picture = outputImage.CopyPictureWithMask

Backdrop = pic
```

8.0.188 How to run a 32 bit application on a 64 bit Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Install 32 bit compatibility libraries.

Notes: The package is called ia32-libs for ubuntu (and others).

Some applications need to be run on a 32 bit system as they need some hardware related libraries. Like libUSB or libHID for USB devices.

8.0.189 How to save HTMLViewer to PDF with landscape orientation?

Plugin Version: all, Platform: macOS.

Answer: You can use NSPrintInfoMBS to change the options for PrintToPDFFile function.

Example:

```
// make it landscape
dim n as NSPrintInfoMBS = NSPrintInfoMBS.sharedPrintInfo
n.orientation = n.NSLandscapeOrientation

// save html to file
dim f as FolderItem = SpecialFolder.Desktop.Child("test.pdf")
call HTMLViewer1.PrintToPDFFileMBS(f,10,30,10,30)
```

Notes: You may want to reset options later.
This code is only for Mac OS X.

8.0.190 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to save to RTFD:

Example:

```
// save text as RTFD including image attachments
dim f as FolderItem = GetSaveFolderItem(FileTypes1.ApplicationRtfd, "test.rtf")

if f = nil then Return

dim a as NSAttributedStringMBS = textView.textStorage
dim w as NSFileWrapperMBS = a.RTFDFileWrapperFromRange(0, a.length, DocumentAttributes)

dim e as NSErrorMBS
if w.writeToFile(f, e) then
```

```

else
MsgBox e.LocalizedDescription
end if

```

Notes: For TextArea you can query the underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

8.0.191 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: How to load PDF to htmlviewer on desktop?

Example:

```

Public Sub LoadPDFData(viewer as HTMLViewer, PDFData as string)
Dim base64string As String = EncodeBase64(PDFData)

// remove line endings to make it a big line
base64string = ReplaceLineEndings(base64string, "")

// build data URL
// https://en.wikipedia.org/wiki/Data_URI_scheme
Dim dataURL As String = "data:application/pdf;base64," + base64string

// show in webviewer
HTMLViewer1.LoadURL(dataURL)

// may not work everywhere due to URL length limit
// for Web projects, use WebFile instead!
End Sub

```

Notes: This avoids a temporary file, which may also work.
For Web Apps, please use WebFile.

8.0.192 How to scale a picture proportionally with mask?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.

Example:

```

Function ProportionalScaledWithMask(extends pic as Picture, Width as Integer, Height as Integer) As Picture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)

// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// check if we have a mask and clear it
dim m as picture = pic.mask(False)
pic.mask = nil

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

if m <>nil then
// restore mask and scale it
pic.mask = m
NewPic.mask.Graphics.DrawPicture m, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height
end if

// return result
Return NewPic
End Function

```

Notes: This version handles mask. As you see we actually have to remove mask in order to copy the picture part correctly.

8.0.193 How to scale a picture proportionally?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.

Example:

```

Function ProportionalScaled(extends pic as Picture, Width as Integer, Height as Integer) As Picture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)

```

```

// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

// return result
Return NewPic
End Function

```

Notes: This does not handle mask, but you can scale the mask the same way and assign it to the new picture.
(see other FAQ entry with mask)

8.0.194 How to scale/resize a CIIImageMBS?

Plugin Version: all, Platform: Windows.

Answer: Use the CIFilterLanczosScaleTransform filter to scale down a picture to a specific size.

Example:

```

Dim pic As Picture = LogoMBS(500)
Dim image As CIIImageMBS = CIIImageMBS.imageWithPicture(pic)

Dim filter As New CIFilterLanczosScaleTransformMBS

Const targetWidth = 600.0
Const targetHeight = 400.0

Dim scale As Double = targetHeight / image.Extent.Height
Dim aspect As Double = targetWidth / (image.Extent.Width * scale)

filter.inputImage = image
filter.inputScale = scale
filter.inputAspectRatio = aspect

Dim result As Picture = filter.outputImage.RenderPicture

Backdrop = result

```

Notes: This is same code as our scaleTo convenience method.

8.0.195 How to scale/resize a picture?

Plugin Version: all, Platform: Windows.

Answer: There are several ways to scale or resize a picture. The easiest way may be the ScaleMBS function in the Picture class.

Example:

```
dim Original,Scaled as Picture
```

```
Original=LogoMBS(500)
Scaled=Original.ScaleMBS(100,100,true)
```

Notes: The plugin ways:

- GraphicsMagick can scale/resize.
- CoreImage scale filter may result in the fastest and best images on Mac OS X 10.4.
- NSImageMBS can scale, but is Mac OS X only.
- CGImageMBS can scale, but is Mac OS X only.
- CIImageMBS can scale, but is Mac OS X only.
- QuickTime Graphics exporter and importer can be connected to scale. (this was used more often a few years ago)
- ImageMagick can scale very nice and crossplatform. But the ImageMagick libraries are big.
- The picture.ScaleMBS function is self written and results in equal output on Mac, Windows and Linux without any additional libraries installed.
- Picture.ScalingMBS does crossplatform scaling with several modes.

with pure Xojo:

- make a new picture and draw the old one with new size inside.

8.0.196 How to search with regex and use unicode codepoints?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can specify unicode characters in search string with backslash x and digits.

Example:

```
dim r as RegExMbs
dim s as string
dim c as Integer
```

```

s="123 √$√√° 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

```

8.0.197 How to see if a file is invisible for Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: Try this function:

Example:

```

Function Invisible(F As FolderItem) As Boolean
Dim TIS As TextInputStream
Dim S,All As String
Dim I as Integer
dim g as folderitem

If Left(F.Name,1)="." or not f.visible Then
Return True
End If

g=F.Parent.Child(".hidden")
If g.Exists Then
TIS=g.OpenAsTextFile
if tis<>Nil then
All=TIS.ReadAll
For I=1 to CountFields(All,Chr(11))
S=NthField(All, Chr(11), I)

```

```

If S=F.name Then
Return True
End If
Next
end if
End if
End Function

```

8.0.198 How to set cache size for SQLite or REALSQLDatabase?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You use the pragma cache_size command on the database.

Example:

```

// set cache size to 20000 pages which is about 20 MB for default page size
dim db as REALSQLDatabase
db.SQLExecute "PRAGMA cache_size = 20000"

```

Notes: Default cache size is 2000 pages which is not much.

You get best performance if whole database fits in memory.

At least you should try to have a cache big enough so you can do queries in memory.

You only need to call this pragma command once after you opened the database.

8.0.199 How to set the modified dot in the window?

Plugin Version: all, Platform: macOS.

Answer: Try this declares:

Example:

```

window1.ModifiedMBS=true

```

8.0.200 How to show a PDF file to the user in a Web Application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use a WebHTMLViewer control and load the

Example:

```

dim CurrentFile as WebFile // a property of the WebPage

// define the PDF file
CurrentFile = new WebFile
CurrentFile.Filename = "test.pdf"
CurrentFile.MIMETYPE = "application/pdf"
CurrentFile.Data = "some pdf data" // MyDynaPDF.GetBuffer

// load into html viewer
HTMLViewer1.URL = CurrentFile.URL

```

Notes: See our Create PDF example for the Xojo Web Edition.

8.0.201 How to show Keyboard Viewer programmatically?

Platform: macOS.

Answer: Use Xojo or AppleScript to launch the KeyboardViewerServer.app.

Example:

```

dim a as new AppleScriptMBS
dim text as string
dim lines(-1) as string

lines.append "set theApplication to ""KeyboardViewerServer""
lines.append "set thePath to ""/System/Library/Components/KeyboardViewer.component/Contents/Shared-
Support/KeyboardViewerServer.app""
lines.append ""
lines.append "set POSIXPath to ((POSIX file thePath) as string)"
lines.append "tell application ""System Events"" to set isRunning to 0 <(count (application processes whose
name is theApplication))"
lines.append "if isRunning then tell application POSIXPath to quit"
lines.append "delay 0.15"
lines.append ""
lines.append "ignoring application responses"
lines.append " tell application POSIXPath to run"
lines.append "end ignoring"

text=join(lines,EndOfLine.macintosh)

a.Compile text
a.Execute

```

Notes: AppleScript code:

```
set theApplication to "KeyboardViewerServer"
set thePath to "/System/Library/Components/KeyboardViewer.component/Contents/SharedSupport/KeyboardViewerServer.app"
```

```
set POSIXPath to ((POSIX file thePath) as string)
tell application "System Events" to set isRunning to 0 <(count (application processes whose name is theApplication))
if isRunning then tell application POSIXPath to quit
delay 0.15
```

```
ignoring application responses
tell application POSIXPath to run
end ignoring
```

8.0.202 How to show the mouse cursor on Mac?

Plugin Version: all, Platform: macOS.

Answer: Try this declare:

Example:

```
Declare Sub ShowCursor Lib "Carbon" ()
```

```
ShowCursor
```

Notes: The MBS Plugin has this function and supports it on Windows, too.

8.0.203 How to shutdown a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:

Example:

```
dim ae as appleevent
ae=newappleEvent("FNDR","shut","MACS")
if not ae.send then
msgBox "The computer couldn't be shutdown."
end if
```

Notes: Or toolbox call (Attention: This method will stop the computer immediatly: No document asked to be saved, all applications quitting without knowing).

```
Declare Sub ShutDwnPower Lib "Carbon" ()
ShutDwnPower
```

8.0.204 How to sleep a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:

Example:

```
dim ae as appleevent
ae=newappleEvent("FNDR","slep","MACS")
if not ae.send then
msgBox "The computer doesn't want to sleep."
end if
```

8.0.205 How to speed up rasterizer for displaying PDFs with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Here a few speed tips:

Notes:

- Use the DynaPDFRasterizerMBS function instead of our render functions.
- Reuse DynaPDFRasterizerMBS as long as the target picture size doesn't change.
- Import only the PDF pages you want to display.
- Let DynaPDF do zooming, rotating or other effects instead of you change it.

8.0.206 How to use PDFLib in my RB application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The PDFlib plugin was discontinued in favor of our DynaPDF plugin.

Notes: If you need help to move, please contact us.

8.0.207 How to use quotes in a string?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Just double them.

Example:

```
msgbox "This String contains ""quotes"""
```

8.0.208 How to use Sybase in Web App?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use our MBS Xojo SQL Plugin to connect to a Sybase Database in your web application.

Notes: If you see db.Connect giving the error message "cs_ctx_alloc ->CS_MEM_ERROR", than some things are not setup right for Sybase.

The Apache process may not have all the SYBASE environment variables being set when the CGI was launched.

Adding these lines to /etc/httpd/conf/httpd.conf stopped the faux memory errors for us:

```
SetEnv LD_LIBRARY_PATH /opt/sybase/OCS-15_0/lib:/opt/sybase/OCS-15_0/lib3p64:/opt/sybase/OCS-15_0/lib3p:
SetEnv SYBROOT /opt/sybase
SetEnv SYBASE_OCS /opt/sybase
SetEnv SYBASE /opt/sybase
```

8.0.209 How to use the Application Support folder?

Plugin Version: all, Platform: macOS.

Answer:

I was saving a registration code for an app to the Preference folder. People on the list have suggested that it would be better in the ApplicationSupportFolder. How do I save the file called CWWPrefs into that folder using MBS?

I have checked for examples and the docs but can't see how to apply it

```
//f = SpecialFolder.Preferences.child("CWWPrefs")
f = ApplicationSupportFolderMBS(-32768)
```

Example:

```

dim folder,file as FolderItem

folder = createApplicationSupportFolderMBS(-32763)

if folder=nil then
// Some very old Mac OS Versions may not support it
// or the plugin may fail for any reason
folder=SpecialFolder.Preferences
end if

file=folder.Child("CWWPrefs")

MsgBox file.NativePath

```

Notes:

You may not be able to write there with a normal user account!

8.0.210 How to use the IOPMCopyScheduledPowerEvents function in Xojo?

Plugin Version: all, Platform: macOS.

Answer: You can use the following code which does this using the SoftDeclareMBS class.

Example:

```

Sub Open()
dim c as CFDateMBS
dim t as CFAbsoluteTimeMBS

// get current date
c=NewCFDateMBS

// in absolute time (seconds since x)
t=c.AbsoluteTime

// add 600 seconds (= 10 Minutes)
t.Value=t.Value+600

// Make a Date from it
c=t.Date

// Schedule the event
// 0 on success
// E00002C1 for missing root rights

```

```

Title=hex(schedulePowerEvent(c, "wake"))

// Just for information, display the scheduled stuff
CFShowMBS CopyScheduledPowerEvents
End Sub

Function CopyScheduledPowerEvents() As carrayMBS
dim s as SoftDeclareMBS
dim m as MemoryBlock

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMCopyScheduledPowerEvents") then
if s.CallFunction(0,nil) then
Return NewCFArrayMBSHandle(s.Result,true)
else
MsgBox "Failed to Call IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOKit."
end if

Return nil
End Function

Function SchedulePowerEvent(time_to_wake as CFDateMBS, Type as CFStringMBS) as Integer
dim s as SoftDeclareMBS
dim m as MemoryBlock

'/*
'* Types of power event
'* These are potential arguments to IOPMSchedulePowerEvent().
'* These are all potential values of the kIOPMPowerEventTypeKey in the CFDictionaryes
'* returned by IOPMCopyScheduledPowerEvents().
'*/
'/*!
'@define kIOPMAutoWake
'@abstract Value for scheduled wake from sleep.
'*/
'#define kIOPMAutoWake "wake"
,
'/*!
'@define kIOPMAutoPowerOn
'@abstract Value for scheduled power on from off state.

```

```

*/
`#define kIOPMAutoPowerOn "poweron"
,
`/*!
`@define kIOPMAutoWakeOrPowerOn
`@abstract Value for scheduled wake from sleep, or power on. The system will either wake OR
`power on, whichever is necessary.
*/
,
`#define kIOPMAutoWakeOrPowerOn "wakepoweron"
`/*!
`@define kIOPMAutoSleep
`@abstract Value for scheduled sleep.
*/
,
`#define kIOPMAutoSleep "sleep"
`/*!
`@define kIOPMAutoShutdown
`@abstract Value for scheduled shutdown.
*/
,
`#define kIOPMAutoShutdown "shutdown"

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMSchedulePowerEvent") then

m=NewMemoryBlock(12)
m.Long(0)=time_to_wake.handle
m.Long(4)=0 // nil
m.Long(8)=type.Handle

if s.CallFunction(3,m) then
Return s.Result
end if
end if
end if

End Function

```

Notes: Requires Mac OS X and to execute root rights.

8.0.211 How to validate a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use this function below which uses a regular expression to verify that the string is a valid UUID/GUID:

Example:

Function IsGUID(guid as string) As Boolean

dim r as new RegEx

```
r.SearchPattern = "^(\{ { 0,1 } ( [ 0-9a-fA-F ] ) { 8 } -( [ 0-9a-fA-F ] ) { 4 } -( [ 0-9a-fA-F ] ) { 4 } -( [ 0-9a-fA-F ] ) { 4 } -( [ 0-9a-fA-F ] ) { 12 } \} { 0,1 } )$ "
```

Return r.Search(guid)<>nil

End Function

Notes: Simply parsing the GUID with CFUUIDMBS does not give the same result as CFUUIDMBS will also take a string like "DDDD".

8.0.212 How to walk a folder hierarchie non recursively?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like this one:

Example:

Sub Walk(folder as FolderItem)

dim folders() as FolderItem

folders.Append folder

while UBound(folders)>=0

dim currentFolder as FolderItem = folders.pop

dim c as Integer = currentFolder.Count

for i as Integer = 1 to c

dim item as FolderItem = currentFolder.TrueItem(i)

if item = Nil then

// no permission

elseif item.Visible then // only visible

if item.Directory then

folders.Append item

```
else
// work with file here
end if

end if

next

wend
End Sub
```

Notes: As you see we go with a long loop which runs until we don't have more folders to process. We ignore items we can't access due to permission limits. And we only work visible items. If you like, check `folderitem.isBundleMBS` on item to handle packages and applications better on Mac OS X.

8.0.213 I got this error: PropVal, QDPictMBS.Name (property value), Type mismatch error. Expected CGDataProviderMBS, but got Variant, Name:QDPictMBS

Plugin Version: all, Platform: macOS.

Answer: The plugins MacOSX and MacOSXCF belong together. If you use one part, please also install the other part.

Notes: We splitted the plugin because the Xojo IDE on Windows crashed on compilation.

8.0.214 I registered the MBS Plugins in my application, but later the registration dialog is shown.

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There are two main reasons.

Notes: 1. you may use the plugin before registering them. This is often the case if you register in a window open event and use the plugin in a control open event.

On the console on Mac OS X or Windows, you may see a message like this "MBS Plugins were used by the application before the RegisterMBSPlugin function was called. Please fix this in your code!".

2. you may have mixed different plugin versions which are not compatible.

In this case you can see a message "Internal plugin registration error." on the console on Mac OS X. Newer plugins may show a message dialog reporting this. Older version simply think they are not registered.

If the installer just merges old and new applications, users may have libraries of older and newer plugin versions in the libs folder. If your application loads the wrong version, the registration fails.

If you use remote debugging, make sure you clear the temporary files there, too. Otherwise you may have old DLLs on your hard disc which may disturb your application.

You can run into issues if you use your registration code on different places of your app. Please register only once in app.open (or app Constructor). If you have several codes, simply call them one after the other.

Also check that you only call RegisterMBSPlugin with valid serial number. If you later call RegisterMBSPlugin with Demo like in example code above, you remove the license.

Next check if you can clear the Xojo caches and that helps. This includes the Xojo Scratch folder and the Plugins & Project caches. Simply locate those folders and delete them. For Windows look in hidden AppData folder in your user folder. For Mac, please check textasciitilde /Library/Caches and your temp folders.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

8.0.215 I want to accept Drag & Drop from iTunes

Plugin Version: all, Platform: macOS.

Answer: You need to accept AcceptMacDataDrop "itun" and Handle the DropObject.

Example:

```
Sub Open()
window1.AcceptMacDataDrop "itun"
End Sub
```

```
Sub DropObject(obj As DragItem)
dim s as string
dim f as folderItem
dim d as CFDictionaryMBS
dim o as CFObjectMBS
dim key as CFStringMBS
dim dl as CFDictionaryListMBS
dim i,c as Integer
dim u as CFURLMBS
dim file as FolderItem
```

```
if obj.MacDataAvailable("itun") then
s = obj.MacData("itun")
```

```
// Parse XML
o=NewCFOBJECTMBSFromXML(NewCFBinaryDataMBSStr(s))

// Make dictionary
if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

// get Tracks Dictionary
key=NewCFStringMBS("Tracks")
o=d.Value(key)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)
dl=d.List

// Walk over all entries in the Tracks dictionary
c=dl.Count-1
for i=0 to c
o=dl.Value(i)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

key=NewCFStringMBS("Location")
o=d.Value(key)
if o isa CFStringMBS then
u=NewCFURLMBS CFStringMBS(o),nil

file=u.file
if file<>nil then
MsgBox file.NativePath
end if
end if
end if
next
end if
end if
end if
End Sub
```

Notes: The code above inside a window on Xojo 5.5 with MBS Plugin 5.3 will do it nice and show the paths.

8.0.216 I'm drawing into a listbox but don't see something.

Plugin Version: all.

Answer: If you draw this in a listbox cellbackground, you need to draw on the correct position

Example:

```
Function CellBackgroundPaint(g As Graphics, row as Integer, column as Integer) As Boolean
dim f as FolderItem
f=SpecialFolder.Desktop
f.DrawWideIconMBS(g,listbox1.left,listbox1.top+row*20,16)
Return true
End Function
```

Notes: Try this in a listbox. The Graphics object there has a clipping and an offset which the plugin doesn't know about.

8.0.217 I'm searching for a method or so to move a window from position x.y to somewhere else on the screen.

Platform: macOS.

Answer:

The code I produced in RB isn't smooth enough. Is there a call in MBS, if not, can it be done? The speed of it has to be like the show of a DrawerWindow.

Try the declare below for Carbon. With WindowLib it will work on Mac OS 8.5 and newer.

Notes:

See Window.Transition functions.

8.0.218 If I use one of your plug-ins under windows, would this then impose the use of dll after compilation or my would my compiled soft still be a stand-alone single file software?

Platforms: macOS, Linux, Windows.

Answer: Stand alone.

Notes: Xojo compiles all used plugins into the application binary.

Some plugin parts need external dlls but you will find that in the documentation. (e.g. pdfib for some classes)

8.0.219 Is the fn key on a powerbook keyboard down?

Plugin Version: all, Platform: macOS.

Answer: I am unable to figure out how or if it is possible to detect if the fn key is down on a powerbook keyboard. Is it possible?

Example:

' Window.Open Event of a blank project:

```
dim i as Integer

for i=0 to 127
if keyboard.asynckeydown(i) then
title=str(i) // found
return
end if
next
title="" // not found
```

Notes: This test application shows the keycode (decimal) 63 for the fn key.

8.0.220 Is there a case sensitive Dictionary?

Plugin Version: all.

Answer: The MBS Plugin has several classes which can work as a replacement.

Notes: First you could use VariantToVariantHashMapMBS or VariantToVariantOrderedMapMBS.

If you know that all keys are Strings or Integers only, you can use the specialized classes which are a little bit faster due to avoiding variants:

```
IntegerToIntegerHashMapMBS class
IntegerToIntegerOrderedMapMBS class
IntegerToStringHashMapMBS class
IntegerToStringOrderedMapMBS class
IntegerToVariantHashMapMBS class
IntegerToVariantOrderedMapMBS class
StringToStringHashMapMBS class
StringToStringOrderedMapMBS class
StringToVariantHashMapMBS class
StringToVariantOrderedMapMBS class
```

8.0.221 Is there a way to use the MBS plugin to get only the visible item and folder count on a volume?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the DirectorySizeMBS class for this as in the example below:

Example:

```
dim d as DirectorySizeMBS

d=new DirectorySizeMBS

// volume(1) as my boot volume is very full
if d.update(volume(1),true,0) then
MsgBox str(d.VisibleItemCount)+" visible items, "+str(d.HiddenItemCount)+" invisible items."
end if
```

Notes: Complete Question: Is there a way to use the MBS plugin to get only the visible item and folder count on a volume? The FileCount and FolderCount properties of VolumeInformationMBS seem to provide the total # of items including invisible items such as .DS_Store and more importantly .Trashes which is causing me a great amount of difficulty during a recursive scan of a volume. I've got a progress bar which uses the total of the filecount and foldercount properties as the maximum value, but my routine needs to filter out all invisible items, as it is creating a catalog of a volume for archiving purposes. Any thoughts how I could get accurate number.

8.0.222 Is there an easy way I can launch the Displays preferences panel?

Plugin Version: all, Platform: macOS.

Answer: Use the code below:

Example:

```
dim error as Integer

error=OpenMacOSXPreferencesPaneMBS("Displays")
if error<>0 then
MsgBox "Failed to launch QuickTime System Preferences panel."
end if
```

8.0.223 List of Windows Error codes?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We have a list of windows error codes on our website.

Notes: <http://www.monkeybreadsoftware.de/xojo/winerror.shtml>

8.0.224 Midi latency on Windows problem?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The issue is system related, not a problem with RB or the plugin.

Notes: Two things will adversely affect the timing:

(1) latency of the software synthesizer output driver. The default Windows wavetable synthesizer has considerable latency. I don't know how many milliseconds, but it is noticeable.

(2) latency of the digital audio output driver. Different systems have different drivers for different audio hardware. My Dell laptop has a minimum 15ms latency in the audio driver.

These two things put together were causing a very sluggish MIDI response. I was able to verify these as the culprits by routing MIDI directly out of RB into a sample player, which only introduces the latency of (2) and does not include latency of (1).

I don't know how widely known are these facts, if not then you may want to add this information to the documentation, since Windows programmers using the MIDI plugin may not know those problems, and might mistakenly blame your plugin, as I did :) Sorry about that!

(From Aaron Andrew Hunt)

8.0.225 My Xojo Web App does not launch. Why?

Plugin Version: all, Platform: macOS.

Answer: Here is a list of checks to do for linux apache installations with Xojo or Xojo Web applications:

Notes: Just a list of checks to do for linux apache installations:

- You have 64bit linux? Than you need 32 bit compatibility libraries.
- The folder of your app is writable? Set permissions to 777.
- The cgi script is executable? Set permissions to 755.

- The app file itself is executable? Set permissions to 755.
- You uploaded cgi file as text, so it has unix line endings? (this often gives error "Premature end of script headers" in apache log)
- You uploaded config.cfg file and made it writable? Set permissions to 666.
- Your apache allows execution of cgi scripts? You enabled cgi for apache and uncommented addhandler command for CGI on a new apache installation?
- You uploaded the app file and libraries as binary files? Upload as text breaks them.
- You did upload the libs folder?
- You don't have code in app.open, session.open and other events which crashes app right at launch?
- You don't have a print command in your app.open event? (see feedback case 23817)
- You allowed htaccess file to overwrite permissions?

8.0.226 SQLiteDatabase not initialized error?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Before you can use SQLiteDatabaseMBS, it must be initialized.

Example:

```
dim d as new SQLiteDatabaseMBS
```

Notes: This happens normally when you use "new SQLiteDatabaseMBS".

But if you just have a SQLConnectionMBS and get a recordset there, the initialization may not have happened, yet.

So please simply add a line "dim d as new SQLiteDatabaseMBS" to your app.open code after registration, so the plugin part can initialize and late provide recordsets.

8.0.227 Textconverter returns only the first x characters. Why?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Some older Xojo versions limit the Textconverter to around 1024 characters in input and output. This should be fixed with RB5.

Notes:

Xojo seems not to support Textconverters at all on Windows.

8.0.228 The type translation between CoreFoundation/Foundation and Xojo data types.

Plugin Version: all, Platform: macOS.

Answer: The plugin does conversion between Cocoa/Carbon data types and native Xojo data types. The following list help you knowing what the current plugins support:

Notes: Cocoa NSObject to Variant:

```

nil ->nil
NSDictionary ->Dictionary
NSData ->MemoryBlock
NSString ->String
NSAttributedString ->NSAttributedStringMBS
NSDate ->Date
NSNumber ->double/integer/Int64/UInt64/UInt32/Boolean
NSURL ->String
NSValue with NSRect ->NSRectMBS
NSValue with NSPoint ->NSPointMBS
NSValue with NSSize ->NSSizeMBS
NSValue with NSRange ->NSRangeMBS
NSValue with QTTime ->QTTimeMBS
NSValue with QTTimeRange ->QTTimeRangeMBS
NSArray ->Array of Variant
QuartzFilter ->QuartzFilterMBS

```

- ->*MBS

Variant to Cocoa NSObject:

```

nil ->nil
Dictionary ->NSDictionary
Boolean ->NSNumber
Integer ->NSNumber
Color ->NSColor
Int64 ->NSNumber
Single ->NSNumber
Double ->NSNumber
Date ->NSDate
MemoryBlock ->NSData
String ->NSString
NSImageMBS ->NSImage
NSAttributedStringMBS ->NSAttributedString
NSColorMBS ->NSColor
NSRectMBS ->NSValue with NSRect
NSSizeMBS ->NSValue with NSSize

```

NSPointMBS ->NSValue with NSPoint
 NSRangeMBS ->NSValue with NSRange
 NSBurnMBS ->NSBurn
 NSViewMBS ->NSView
 NSFontMBS ->NSFont
 NSParagraphStyleMBS ->NSParagraphStyle
 NSAttributedStringMBS ->NSAttributedString
 WebPolicyDelegateMBS ->WebPolicyDelegate
 WebUIDelegateMBS ->WebUIDelegate
 WebFrameLoadDelegateMBS ->WebFrameLoadDelegate
 WebResourceLoadDelegateMBS ->WebResourceLoadDelegate
 NSIndexSetMBS ->NSIndexSet
 QTimeMBS ->QTime
 QTimeRangeMBS ->QTimeRange
 Array of Variant ->NSArray
 Array of String ->NSArray
 CFStringMBS ->NSString
 CFNumberMBS ->NSNumber
 CFDataMBS ->NSData
 CFURLMBS ->NSURL
 CFArrayMBS ->NSArray
 CFDictionaryMBS ->NSDictionary
 CFBinaryDataMBS ->NSData

Carbon CTypeRef 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 CTypeRef:

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.

8.0.229 Uploaded my web app with FTP, but it does not run on the server!

Plugin Version: all, Platform: Windows.

Answer: If you see errors like a simple "Segmentation Fault" on Linux or some other wired errors, you may want to check your FTP upload mode. It must be binary for web apps. ASCII mode corrupts the application.

8.0.230 What classes to use for hotkeys?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use CarbonHotKeyMBS class on Mac and WindowsKeyFilterMBS on Windows.

Notes: CarbonHotKeyMBS will also work fine in Cocoa apps.

8.0.231 What do I need for Linux to get picture functions working?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: In order to get our plugins working on Linux systems without GUI, the plugin loads graphics

libraries dynamically.

Notes: To get it working, the plugin tries to load gtk with this paths:

- libgtk-x11-2.0.so”
- libgtk-x11-2.0.so.0”
- /usr/lib/libgtk-x11-2.0.so”
- /usr/lib32/libgtk-x11-2.0.so”
- /usr/lib/libgtk-x11-2.0.so.0”
- /usr/lib32/libgtk-x11-2.0.so.0”

gdk is loaded with this paths:

- libgdk-x11-2.0.so”
- libgdk-x11-2.0.so.0”
- /usr/lib/libgdk-x11-2.0.so”
- /usr/lib32/libgdk-x11-2.0.so”
- /usr/lib/libgdk-x11-2.0.so.0”
- /usr/lib32/libgdk-x11-2.0.so.0”

For the paths without explicit path, the system will search in /lib, /usr/lib and all directories in the LD_LIBRARY_PATH environment variable.

8.0.232 What does the NAN code mean?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

8.0.233 What font is used as a 'small font' in typical Mac OS X apps?

Plugin Version: all, Platform: macOS.

Answer:

Xojo 4.5 has a constant "SmallSystem" to use for a font name.

For older versions try this code:

Example:

```

Sub GetThemeFont(fontType as Integer, ByRef fontName as String, ByRef fontSize as Integer, ByRef
fontName as Integer)
dim err as Integer
dim theFont, theFontSize, theFontStyle as MemoryBlock

const smSystemScript = -1

Declare Function GetThemeFont Lib "Carbon" (inFontID as Integer, inScript as Integer, outFontName
as Ptr, outFontSize as Ptr, outStyle as Ptr) as Integer

theFont = NewMemoryBlock(256) //Str255
theFontSize = NewMemoryBlock(2) //SInt16
theFontStyle = NewMemoryBlock(1) //Style

err = GetThemeFont(fontType, smSystemScript, theFont, theFontSize, theFontStyle)

if err = 0 then
fontName = theFont.PString(0)
fontSize = theFontSize.UShort(0)
fontStyle = theFontStyle.Byte(0)
else
fontName = ""
fontSize = 0
fontStyle = 0
end if
End Sub

```

8.0.234 What is last plugin version to run on Mac OS X 10.4?

Plugin Version: all, Platform: Windows.

Answer: Last Version with 10.4 support is version 15.4.

Notes: With version 15.4 you can build applications for OS X 10.4 and newer.

For Version 16.0 we disabled 10.4 and moved minimum to 10.5. We may be able to enable it again to build a version of 16.x, but may need to charge for this by hour.

8.0.235 What is last plugin version to run on PPC?

Plugin Version: all, Platform: Windows.

Answer: Last Version with PPC is 15.4.

Notes: With version 15.4 you can build PPC applications for OS X 10.4 and newer.

For Version 16.0 we disabled PPC. We may be able to enable it again to build a PPC version of 16.x, but may need to charge for this by hour.

8.0.236 What is last version of the plugins for macOS 32-bit?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use version 23.0 or older.

Notes: We stopped including 32-bit code for macOS in version 23.1.

Please use older versions if you use an old Xojo.

Xojo 2017r3 and newer load our 64-bit plugins.

8.0.237 What is the difference between Timer and WebTimer?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Timer is server side and WebTimer client side.

Notes: Timer is the normal timer class in Xojo. It runs on the server. On the side the WebTimer runs on the client. It triggers a request to the server to perform the action. So a WebTimer is good to keep the connection running and the website updated regularly. A timer on the server is good to make regular jobs like starting a database backup every 24 hours.

8.0.238 What is the list of Excel functions?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a list of function names known by LibXL.

Notes: LibXL parses the functions and writes tokens to the excel file. So even if Excel can do more functions, we can only accept the ones known by LibXL.

ABS, ABSREF, ACOS, ACOSH, ACTIVE.CELL, ADD.BAR, ADD.COMMAND, ADD.MENU, ADD.TOOLBAR, ADDRESS, AND, APP.TITLE, AREAS, ARGUMENT, ASC, ASIN, ASINH, ATAN, ATAN2, ATANH, AVEDEV, AVERAGE, AVERAGEA, BAHTTEXT, BETADIST, BETAINV, BINOMDIST, BREAK, CALL, CALLER, CANCEL.KEY, CEILING, CELL, CHAR, CHECK.COMMAND, CHIDIST, CHIINV, CHITEST, CHOOSE, CLEAN, CODE, COLUMN, COLUMNS, COMBIN, CONCATENATE, CONFIDENCE, CORREL, COS, COSH, COUNT, COUNTA, COUNTBLANK, COUNTIF, COVAR, CREATE.OBJECT, CRITBINOM, CUSTOM.REPEAT, CUSTOM.UNDO, DATE, DATEDIF, DATESTRING, DATEVALUE, DAVERAGE, DAY, DAYS360, DB, DBCS, DCOUNT, DCOUNTA, DDB, DEGREES, DELETE.BAR, DELETE.COMMAND, DELETE.MENU, DELETE.TOOLBAR, DEREf, DEVSQ, DGET, DIALOG.BOX, DIRECTORY, DMAX, DMIN, DOCUMENTS, DOLLAR, DPRODUCT, DSTDEV, DSTDEVP, DSUM, DVAR, DVARP, ECHO, ELSE, ELSE.IF, ENABLE.COMMAND, ENABLE.TOOL, END.IF, ERROR, ERROR.TYPE, EVALUATE, EVEN, EXACT, EXEC, EXECUTE, EXP, EXPONDIST, FACT, FALSE, FCLOSE, FDIST, FILES, FIND, FINDB, FINV, FISHER, FISHERINV, FIXED, FLOOR, FOPEN, FOR, FOR.CELL, FORECAST,

FORMULA.CONVERT, FPOS, FREAD, FREADLN, FREQUENCY, FSIZE, FTEST, FV, FWRITE, FWRITELN, GAMMADIST, GAMMAINV, GAMMALN, GEOMEAN, GET.BAR, GET.CELL, GET.CHART.ITEM, GET.DEF, GET.DOCUMENT, GET.FORMULA, GET.LINK.INFO, GET.MOVIE, GET.NAME, GET.NOTE, GET.OBJECT, GET.PIVOT.FIELD, GET.PIVOT.ITEM, GET.PIVOT.TABLE, GET.TOOL, GET.TOOLBAR, GET.WINDOW, GET.WORKBOOK, GET.WORKSPACE, GETPIVOTDATA, GOTO, GROUP, GROWTH, HALT, HARMEAN, HELP, HLOOKUP, HOUR, HYPERLINK, HYPGEOMDIST, IF, INDEX, INDIRECT, INFO, INITIATE, INPUT, INT, INTERCEPT, IPMT, IRR, ISBLANK, ISERR, ISERROR, ISLOGICAL, ISNA, ISNONTEXT, ISNUMBER, ISPMT, ISREF, ISTEXT, ISTHAIDIGIT, KURT, LARGE, LAST.ERROR, LEFT, LEFTB, LEN, LENB, LINEST, LINKS, LN, LOG, LOG10, LOGEST, LOGINV, LOGNORMDIST, LOOKUP, LOWER, MATCH, MAX, MAXA, MDETERM, MEDIAN, MID, MIDB, MIN, MINA, MINUTE, MINVERSE, MIRR, MMULT, MOD, MODE, MONTH, MOVIE.COMMAND, N, NA, NAMES, NEGBINOMDIST, NEXT, NORMDIST, NORMINV, NORMSDIST, NORMSINV, NOT, NOTE, NOW, NPER, NPV, NUMBERSTRING, ODD, OFFSET, OPEN.DIALOG, OPTIONS.LISTS.GET, OR, PAUSE, PEARSON, PERCENTILE, PERCENTRANK, PERMUT, PHONETIC, PI, PIVOT.ADD.DATA, PMT, POISSON, POKE, POWER, PPMT, PRESS.TOOL, PROB, PRODUCT, PROPER, PV, QUARTILE, RADIANS, RAND, RANK, RATE, REFTTEXT, REGISTER, REGISTER.ID, RELREF, RENAME.COMMAND, REPLACE, REPLACEB, REPT, REQUEST, RESET.TOOLBAR, RESTART, RESULT, RESUME, RETURN, RIGHT, RIGHTB, ROMAN, ROUND, ROUNDBAHTDOWN, ROUNDBAHTUP, ROUNDDOWN, ROUNDUP, ROW, ROWS, RSQ, RTD, SAVE.DIALOG, SAVE.TOOLBAR, SCENARIO.GET, SEARCH, SEARCHB, SECOND, SELECTION, SERIES, SET.NAME, SET.VALUE, SHOW.BAR, SIGN, SIN, SINH, SKEW, SLN, SLOPE, SMALL, SPELLING.CHECK, SQRT, STANDARDIZE, STDEV, STDEVA, STDEVP, STDEVPA, STEP, STEYX, SUBSTITUTE, SUBTOTAL, SUM, SUMIF, SUMPRODUCT, SUMSQ, SUMX2MY2, SUMX2PY2, SUMXMY2, SYD, T, TAN, TANH, TDIST, TERMINATE, TEXT, TEXT.BOX, TEXTREF, THAIDAYOFWEEK, THAIDIGIT, THAIMONTHOFYEAR, THAINUMSOUND, THAINUMSTRING, THAISTRINGLENGTH, THAIYEAR, TIME, TIMEVALUE, TINV, TODAY, TRANSPOSE, TREND, TRIM, TRIMMEAN, TRUE, TRUNC, TTEST, TYPE, UNREGISTER, UPPER, USDOLLAR, USERDEFINED, VALUE, VAR, VARA, VARP, VARPA, VDB, VIEW.GET, VLOOKUP, VOLATILE, WEEKDAY, WEIBULL, WHILE, WINDOW.TITLE, WINDOWS, YEAR and ZTEST.

8.0.239 What is the replacement for PluginMBS?

Plugin Version: all, Platform: macOS.

Answer: Use the SoftDeclareMBS class to load libraries dynamically.

8.0.240 What to do on Xojo reporting a conflict?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

I get an error like "This item conflicts with another item of the same name" when using one of the plugin functions.

Xojo just wants to tell you that you dropped something in the plugins folder what is not a plugin.

Notes:

Some users dropped the examples, the documentation or other files into the plugins folder. Don't do it.

8.0.241 What to do with a NSImageCacheException?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You need to add exception handlers for NSExcptionMBS in order to catch this exception.

Notes: You may also add code to write the stack of the exception into a log file for later locating the error source.

A NSImage has several image representations in memory. So basicly you pass in the base image and for whatever size an image is needed, the NSImage class will create a cache image representation of the requested size so on the next query it can use that cache for the same requested size.

8.0.242 What to do with MySQL Error 2014?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can get this error on MySQL if you have a recordset open while you create another one.

8.0.243 What to do with SQL Plugin reporting Malformed string as error?

Plugin Version: all, Platform: macOS.

Answer: Please make sure the table and/or database fields have a text encoding set.

Notes: For Firebird our plugin tries to use UTF-8 encoding if possible and to correctly convert between various tables, the tables and their fields need to have a text encoding defined.

e.g. if the text field in the table is windows-1252 and the other ISO 8859-5, then the Firebird database can convert them to UTF-8 and deliver texts to the plugin.

If encoding is set to none, it may get confused for non-ascii text.

8.0.244 Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetActiveDisplayList.

8.0.245 Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithPoint.

8.0.246 Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithRect.

8.0.247 Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetOnlineDisplayList.

8.0.248 Where is GetObjectClassNameMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use this replacement method:

Example:

```
Function GetObjectClassNameMBS(o as Object) As string
dim t as Introspection.TypeInfo = Introspection.GetType(o)
Return t.FullName
End Function
```

Notes: GetObjectClassNameMBS was removed from the plugins.

8.0.249 Where is NetworkAvailableMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We removed NetworkAvailableMBS some versions ago. It was not working right and basically it's not useful. If you want to check whether you have a network, than do a DNS resolve:

Example:

```

// two independent domain names
const domain1 = "www.google.com"
const domain2 = "www.macs.w.de"

// resolve IPs
dim ip1 as string = DNSNameToAddressMBS(Domain1)
dim ip2 as string = DNSNameToAddressMBS(Domain2)

// if we got IPs and not the same IPs (error/login pages)
if len(ip1)=0 or len(ip2)=0 or ip1=ip2 then
MsgBox "no connection"
else
MsgBox "have connection"
end if

```

Notes: This way you can detect whether you got something from DNS. And you can make sure that a DNS redirection to a login page won't catch you.

8.0.250 Where is StringHeight function in DynaPDF?

Plugin Version: all, Platform: Windows.

Answer: Use the function GetFTextHeight or GetFTextHeightEx.

Notes: Be aware that GetFTextHeight works with format commands and you may want to escape your text if you don't use them.

8.0.251 Where is XLSDocumentMBS class?

Plugin Version: all, Platform: macOS.

Answer: This class has been removed in favor of XLBookMBS class.

Notes: These classes have been removed: XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

8.0.252 Where to get information about file formats?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Please visit this web page:

<http://www.wotsit.org>

8.0.253 Where to register creator code for my application?

Plugin Version: all, Platform: macOS.

Answer:

Register at Apple:

<http://developer.apple.com/dev/cftype/information.html>

8.0.254 Which Mac OS X frameworks are 64bit only?

Plugin Version: all, Platform: macOS.

Answer: Some frameworks from Mac OS X do not support 32 bit applications, so we can't provide plugins for Xojo until 64bit target is available.

Notes: For Mac OS X 10.8:

- Accounts
- EventKit
- GLKit
- Social

and in 10.9:

- Accounts
- AVKit
- EventKit
- GameController
- GLKit
- MapKit
- MediaLibrary
- Social
- SpriteKit

In general Apple makes all new frameworks being 64 bit only.

8.0.255 Which plugins are 64bit only?

Plugin Version: all, Platform: macOS.

Answer: Some of our plugins work only in 64 bit modes as operation systems do not provide 32 bit code.

Notes: This effects currently: EventKit, Accounts, Social frameworks from Apple and our matching plugins.

8.0.256 Why application doesn't launch because of a missing ddraw.dll!?

Plugin Version: all, Platform: Windows.

Answer: Some RB versions require that you install DirectX from Microsoft on your Windows.

8.0.257 Why application doesn't launch because of a missing shlwapi.dll!?

Plugin Version: all, Platform: Windows.

Answer: Some RB versions require that you install the Internet Explorer from Microsoft on your Windows.

Notes: This bug is for several older Windows 95 editions.

8.0.258 Why do I hear a beep on keydown?

Plugin Version: all, Platform: Windows.

Answer: When the user presses a key, RB goes through all keydown event handlers till on returns true.

Notes: If no keydown event handler returns true for the key, a beep is performed.

8.0.259 Why does folderitem.item return nil?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Because Xojo fails to make a folderitem for you. Reason may be an alias file which can't be resolved or simply that you don't have enough access rights to read the folder content.

Notes: A more rarely reason is that the directory changed and the file with the given index or name does no longer exist.

8.0.260 Why doesn't showurl work?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

There are three main reasons:

1. showurl is not supported by Xojo in 68k applications.
2. there is now application defined for the protocol (e.g. http) in the Internet Control panel.
3. You don't have Internet Config installed.

You can use the InternetConfigMBS class to check for this stuff.

8.0.261 Why don't the picture functions not work on Linux?

Plugin Version: all, Platform: macOS.

Answer: Please make sure libcairo is installed.

Notes: For accessing pictures on Linux, the MBS Plugin relays on the cairo library.

Please install the package if you don't have it already.

Our plugin looks for library called libcairo.so or libcairo.so.2.

8.0.262 Why have I no values in my chart?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You have no data points visible, there may be several reasons:

Notes: For example one of the data values may be infinite or invalid.

Or the scaling may be out of range, so you simply see nothing.

8.0.263 Will application size increase with using plugins?

Plugin Version: all, Platform: Windows.

Answer: All plugins used by your application will be included in the application.

Notes: If you use no plugins, your application will not change size.

And if you use one class from the plugins, your application size will increase by a few kilobytes.

The documentation of the plugins include a list of all plugin parts and their sizes for the different platforms.

8.0.264 XLS: Custom format string guidelines

Plugin Version: all, Platform: macOS.

Answer: You have to download the source code and compile a static version of the library.

Notes: Up to four sections of format codes can be specified. The format codes, separated by semicolons, define the formats for positive numbers, negative numbers, zero values, and text, in that order. If only two sections are specified, the first is used for positive numbers and zeros, and the second is used for negative numbers. If only one section is specified, it is used for all numbers. Four sections example:

```
#,###.00_); [ Red ] (#,###.00);0.00;"sales "@
```

The following table describes the different symbols that are available for use in custom number formats.

Specify colors

To set the text color for a section of the format, type the name of one of the following eight colors in square brackets in the section. The color code must be the first item in the section.

Instead of using the name of the color, the color index can be used, like this [Color3] for Red. Valid numeric indexes for color range from 1 to 56, which reference by index to the legacy color palette.

Specify conditions

To set number formats that will be applied only if a number meets a specified condition, enclose the condition in square brackets. The condition consists of a comparison operator and a value. Comparison operators include: = Equal to; >Greater than; <Less than; >= Greater than or equal to, <= Less than or equal to, and <>Not equal to. For example, the following format displays numbers that are less than or equal to 100 in a red font and numbers that are greater than 100 in a blue font.

```
[ Red ] [ <=100 ] ; [ Blue ] [ >100 ]
```

If the cell value does not meet any of the criteria, then pound signs ("##") are displayed across the width of the cell.

Dates and times

Examples

8.0.265 Xojo doesn't work with your plugins on Windows 98.

Plugin Version: all, Platform: Windows.

Answer: Please upgrade your Windows version.

**8.0.266 Xojo or my RB application itself crashes on launch on Mac OS Classic.
Why?**

Plugin Version: all.

Answer:

You may check if the application has enough memory to be loaded.

RB should have on Mac OS Classic more than 20 MB of RAM.

I preferred to use 50 MB and for an application a 10 MB partition is a good way to start.

Parameter	Description
x	The x value of the data point. For an enumerated x-axis (see <code>Axis.setLabels</code> on what is an enumerated axis), the first data point is 0, and the nth data point is (n-1).
xLabel	The bottom x-axis label of the data point.
x2Label	The top x-axis label of the data point.
value	The value of the data point.
accValue	The sum of values of all data points that are in the same x position and same data group as the current data point, and with data set number less than or equal to the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
totalValue	The sum of values of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
percent	The percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
accPercent	The accumulated percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
gpercent	The percentage of the data point based on the total value of all data points in a layer.
dataSet	The data set number to which the data point belongs. The first data set is 0. The nth data set is (n-1).
dataSetName	The name of the data set to which the data point belongs.
dataItem	The data point number within the data set. The first data point is 0. The nth data point is (n-1).
dataGroup	The data group number to which the data point belongs. The first data group is 0. The nth data group is (n-1).
dataGroupName	The name of the data group to which the data point belongs.
layerId	The layer number to which the data point belongs. The first layer is 0. The nth layer is (n-1).
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using <code>Layer.addExtraField</code> , <code>Layer.addExtraField2</code> , <code>BaseChart.addExtraField</code> or <code>BaseChart.addExtraField2</code> .

diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by data set number. The Pth data set corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth data set corresponds to the Pth element of the (N + Q)th extra field.

Parameter	Description
zx	The symbol scale in the x dimension. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .
zy	The symbol scale in the y dimension. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .
z	The symbol scale without distinguishing the dimension to use. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .

Parameter	Description
slope	The slope of the trend line.
intercept	The y-intercept of the trend line.
corr	The correlation coefficient in linear regression analysis.
stderr	The standard error in linear regression analysis.

Parameter	Description
top	The value of the top edge of the box-whisker symbol.
bottom	The value of the bottom edge of the box-whisker symbol.
max	The value of the maximum mark of the box-whisker symbol.
min	The value of the minimum mark of the box-whisker symbol.
med	The value of the median mark of the box-whisker symbol.

Parameter	Description
high	The high value.
low	The low value.
open	The open value.
close	The close value.

Parameter	Description
dir	The direction of the vector.
len	The length of the vector.

Parameter	Description
radius	The radial value of the data point.
value	Same as { radius } . See above.
angle	The angular value of the data point.
x	Same as { angle } . See above.
label	The angular label of the data point.
xLabel	Same as { label } . See above.
name	The name of the layer to which the data point belongs.
dataSetName	Same as { name } . See above.
i	The data point number. The first data point is 0. The nth data point is (n-1).
dataItem	Same as { i } . See above.
z	The symbol scale. Applicable for layers with symbol scales set by Polar-Layer.setSymbolScale.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using Layer.addExtraField, Layer.addExtraField2, BaseChart.addExtraField or BaseChart.addExtraField2.
diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by layer index. The Pth layer corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth layer corresponds to the Pth element of the (N + Q)th extra field.
Parameter	Description
dir	The direction of the vector.
len	The length of the vector.
Parameter	Description
value	The axis value at the tick position.
label	The axis label at the tick position.
Parameter	Description
[param]	The name of the parameter
[a]	If this field a number, it specifies the number of decimal places (digits to the right of the decimal point).

[b]	The thousand separator. Should be a non-alphanumeric character (not 0-9, A-Z, a-z). Use '.
textasciitilde ' for no thousand separator. The default is 'textasciitilde ', which can be modified using BaseChart.setNumberFormat.	
[c]	The decimal point character. The default is '.', which can be modified using BaseChart.setNumberFormat.
[d]	The negative sign character. Use '-'
textasciitilde ' for no negative sign character. The default is '-', which can be modified using BaseChart.setNumberFormat.	

Parameter	Description
yyyy	The year in 4 digits (e.g. 2002)
yyy	The year showing only the least significant 3 digits (e.g. 002 for the year 2002)
yy	The year showing only the least significant 2 digits (e.g. 02 for the year 2002)
y	The year showing only the least significant 1 digits (e.g. 2 for the year 2002)
mmm	The month formatted as its name. The default is to use the first 3 characters of the english month name (Jan, Feb, Mar ...). The names can be configured using BaseChart.setMonthNames.
mm	The month formatted as 2 digits from 01 - 12, adding leading zero if necessary.
m	The month formatted using the minimum number of digits from 1 - 12.
MMM	The first 3 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
MM	The first 2 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
M	The first character of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
dd	The day of month formatted as 2 digits from 01 - 31, adding leading zero if necessary.
d	The day of month formatted using the minimum number of digits from 1 - 31.
w	The name of the day of week. The default is to use the first 3 characters of the english day of week name (Sun, Mon, Tue ...). The names can be configured using BaseChart.setWeekDayNames.
hh	The hour of day formatted as 2 digits, adding leading zero if necessary. The 2 digits will be 00 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
h	The hour of day formatted using the minimum number of digits. The digits will be 0 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
nn	The minute formatted as 2 digits from 00 - 59, adding leading zero if necessary.
n	The minute formatted using the minimum number of digits from 00 - 59.
ss	The second formatted as 2 digits from 00 - 59, adding leading zero if necessary.
s	The second formatted using the minimum number of digits from 00 - 59.
a	Display either 'am' or 'pm', depending on whether the time is in the morning or afternoon. The text 'am' and 'pm' can be modified using BaseChart.setAMPM.

Shape Id	Value	Description
SquareShape	1	Square shape. See (1, 1) above.
DiamondShape	2	Diamond shape. See (2, 1) above.
TriangleShape	3	Triangle shape pointing upwards. See (3, 1) above.
RightTriangleShape	4	Triangle shape pointing rightwards. See (4, 1) above.
LeftTriangleShape	5	Triangle shape pointing leftwards. See (5, 1) above.
InvertedTriangleShape	6	Triangle shape pointing downwards. See (1, 2) above.
CircleShape	7	Circle shape. See (2, 2) above.
StarShape	[Method]	Star shapes of various points. See (2, 3), (2, 4), (2, 5), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5) above for stars with 3 to 10 points.
PolygonShape	[Method]	Polygon shapes symmetrical about a vertical axis with a vertex at the top center position. See (4, 1), (4, 3), (4, 5), (5, 1) for polygons of 5 to 8 sides.
Polygon2Shape	[Method]	Polygon shapes symmetrical about a vertical axis but without any vertex at the top center position. See (4, 2), (4, 4) for polygons of 5 and 6 sides.
CrossShape	[Method]	'+' shapes. See (5, 2), (5, 3), (5, 4), (5, 5), (6, 1), (6, 2), (6, 3) for '+' shape with arm width of 0.1 - 0.7.
Cross2Shape	[Method]	'X' shapes. See (6, 4), (6, 5), (7, 1), (7, 2), (7, 3), (7, 4), (7, 5) for 'X' shapes with arm width of 0.1 - 0.7.

langEnglish	0	Roman script
langFrench	1	Roman script
langGerman	2	Roman script
langItalian	3	Roman script
langDutch	4	Roman script
langSwedish	5	Roman script
langSpanish	6	Roman script
langDanish	7	Roman script
langPortuguese	8	Roman script
langNorwegian	9	Roman script
langHebrew	10	Hebrew script
langJapanese	11	Japanese script
langArabic	12	Arabic script
langFinnish	13	Roman script
langGreek	14	Greek script using smRoman script code
langIcelandic	15	modified smRoman/Icelandic script
langMaltese	16	Roman script
langTurkish	17	modified smRoman/Turkish script
langCroatian	18	modified smRoman/Croatian script
langTradChinese	19	Chinese (Mandarin) in traditional characters
langUrdu	20	Arabic script
langHindi	21	Devanagari script
langThai	22	Thai script
langKorean	23	Korean script

Nan	Meaning
1	Invalid square root (negative number, usually)
2	Invalid addition (indeterminate such as infinity + (-infinity))
4	Invalid division (indeterminate such as 0/0)
8	Invalid multiplication (indeterminate such as 0*infinity)
9	Invalid modulo such as (a mod 0)
17	Try to convert invalid string to a number like val("x7")
33	Invalid argument in a trig function
34	Invalid argument in an inverse trig function
36	Invalid argument in a log function
37	Invalid argument in Pow function
38	Invalid argument in toolbox financial function
40	Invalid argument in hyperbolic function
42	Invalid argument in a gamma function

Symbol	Description and result
0	Digit placeholder. For example, if the value 8.9 is to be displayed as 8.90, use the format #.00
#	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall not display extra zeros when the number typed has fewer digits on either side of the decimal than there are # symbols in the format. For example, if the custom format is #.##, and 8.9 is in the cell, the number 8.9 is displayed.
?	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall put a space for insignificant zeros on either side of the decimal point so that decimal points are aligned in the column. For example, the custom format 0.0? aligns the decimal points for the numbers 8.9 and 88.99 in a column.
. (period)	Decimal point.
%	Percentage. If the cell contains a number between 0 and 1, and the custom format 0% is used, the application shall multiply the number by 100 and add 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,,