MBS Encryption 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 Encryption Plugin

0.2 Content

Chapter 1

List of Topics

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List of all global methods

Chapter 5

Base 64

5.1 Globals

5.1.1 DecodeBase64MBS(s as string) as string

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

Function: Decodes the base 64 text string into its original binary data.
Notes: Improved in MBS Plugin 2.7. Memory needed is around lenb(s)*2.
Text returned has chr(13) as newline character. If you need different one, you can use ReplaceLineEndings() function in Xojo.

If you need yielding for better threading, please use method in Base64MBS class.

5.1.2 EncodeBase64MBS(s as string, breakposition as integer = 0, breakstring as string = "") as string

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

Function: Encodes the binary data in the string into a base64 text string.
Notes: Improved in MBS Plugin 2.7 to support breakposition and breakstring. If you don't need them, just pass 0 and "". Memory needed is around lenb(s)*2.8.

If you need yielding for better threading, please use method in Base64MBS class.

5.1.3 DecodeBase64URLMBS(s as string) as string

Plugin Version: 20.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decodes Base64URL encoded data.
Example:

```
Dim s As String = "Hello World. Just a test!"

TextArea1.Text = EncodeBase64URLMBS(s)
TextArea2.Text = DecodeBase64URLMBS(TextArea1.Text)
```

Blog Entries

- MBS Xojo Plugins, version 20.3pr9
- JWT RS256 authentication in Xojo

5.1.4 EncodeBase64URLMBS(s as string, breakposition as integer = 0, breakstring as string = "") as string

Plugin Version: 20.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Base64 encodes some data with URL safe encoding.
Example:

```
Dim s As String = "Hello World. Just a test!"

TextArea1.Text = EncodeBase64URLMBS(s)
TextArea2.Text = DecodeBase64URLMBS(TextArea1.Text)
```

Notes: Similar to normal Base64, but + replaced by - and / by _ and the = on the end are omitted.
Blog Entries

- MBS Xojo Plugins, version 20.3pr9
- JWT RS256 authentication in Xojo

5.1.5 uuDecodeMBS(data as string, byref name as string, byref mode as Integer) as string

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: UU Decoding.
Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.uu")
dim b as BinaryStream = BinaryStream.Open(f)

dim name as string
dim mode as Integer

dim s as String = b.Read(b.Length)
dim d as string = uuDecodeMBS(s, name, mode)

dim p as Picture = Picture.FromData(d)

Backdrop = p
```

Notes: Decodes UU encoded data. name and mode properties are filled.
Returns empty text if something goes wrong.
Raises out of memory exception in case of low memory situation.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 15.5pr4

5.1.6 uuEncodeMBS(data as string, name as string, mode as Integer = &o755) as string

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: UU Encoding.
Example:

```
dim f as FolderItem = SpecialFolder.Desktop.Child("test.jpg")
dim b as BinaryStream = BinaryStream.Open(f)
dim s as string = b.Read(b.Length)

dim d as string = uuEncodeMBS(s, "test")

f = SpecialFolder.Desktop.Child("test.txt")
b = BinaryStream.Create(f, true)

b.Write d
```

Notes: Encodes binary data as text similar to Base64.
The data is prefixed with file name and mode.

Returns empty text if something goes wrong.
Raises out of memory exception in case of low memory situation.

Blog Entries

- MBS Xojo / Real Studio Plugins, version 15.5pr4

5.2 class Base64MBS

5.2.1 class Base64MBS

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encodes and decodes Base64 with events.
Notes: The global functions may be faster as they don't use events.
Blog Entries

- MBS Real Studio Plugins, version 12.3pr6
- MBS REALbasic Plugins Version 10.4 release notes
- MBS REALbasic Plugins, version 10.4pr8

5.2.2 Methods

5.2.3 DecodeBase64(s as string) as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decodes the base 64 text string into its original binary data.
Notes: Memory needed is around lenb(s)*2.

5.2.4 EncodeBase64(s as string, breakposition as Integer, breakstring as string) as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encodes the binary data in the string into a base64 text string.
Notes: Improved in MBS Plugin 2.7 to support breakposition and breakstring. If you don't need them, just pass 0 and "". Memory needed is around lenb(s)*2.8.

5.2.5 Properties

5.2.6 Yield as Boolean

Plugin Version: 3.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether the class should give CPU time to Xojo so windows can be updated and other threads go on.
Notes: Default is false.
(Read and Write property)

5.2.7 Events

5.2.8 Finished(wascanceled as boolean)

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: .

Function: Called when the encoding function returns.
Notes: wascanceled is true if the Working Event got a true returned.

5.2.9 Start

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: .

Function: Called when encoding or decoding is started.

5.2.10 Working(percent as Double) as boolean

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: .

Function: Called after each 4 KB chunk.
Notes: You can return true to cancel the process.

Chapter 6

Encryption and Hash

6.1 class AESMBS

6.1.1 class AESMBS

Plugin Version: 4.1, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. You can use CipherMBS instead.
Function: A class for AES encryption.
Example:

```
dim a as AESMBS
dim key as MemoryBlock
dim data as MemoryBlock

key=NewMemoryBlock(20)
key.CString(0)="Hello World!1234" // 16 byte key for 128bit

a=new AESMBS

if a.SetKey(key, 128) then

data=NewMemoryBlock(20)
data.StringValue(0,16)="Hello World!"
MsgBox "Before: "+data.StringValue(0,16)
a.Encrypt(data)
MsgBox "After encryption: "+data.StringValue(0,16)
a.Decrypt(data)
MsgBox "After decryption: "+data.StringValue(0,16)
else
MsgBox "Failed"
end if
```

Notes: For newer projects we recommend switching to CipherMBS class.

This class has low level functions like Encrypt. It also has mid level functions like EncryptCFB/CBC. For your convenience, we also have high level functions like EncryptString.
Blog Entries

- MBS Xojo Plugins, version 22.0pr6
- MBS Xojo / Real Studio Plugins, version 13.5pr10
- MBS Xojo / Real Studio plug-ins in version 13.4
- MBS Xojo / Real Studio Plugins, version 13.4pr5
- MBS Xojo / Real Studio Plugins, version 13.4pr3
- Encryption Interoperability
- MBS Real Studio Plugins, version 12.0fc1
- MBS REALbasic plug-ins version 9.4

Xojo Developer Magazine

- 10.1, page 74: Using Plugins, Working with the Monkeybread Plugins by Marc Zeedar
- 10.1, page 72: Using Plugins, Working with the Monkeybread Plugins by Marc Zeedar

6.1.2 Methods

6.1.3 Decrypt(idata as memoryblock, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 9.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decryptes the first 16 bytes in the input memoryblock at the given offset and stores the result in the output memoryblock at the given offset.
Notes: If odata is nil, idata is used for output.
This is ECB mode.

6.1.4 DecryptCBC(idata as memoryblock, LengthBytes as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 9.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decryptes the 16 byte data blocks within LengthBytes bytes in the data.
Notes: If odata is nil, idata is used for output.
If IVector is nil, a vector filled with zeros is used.

6.1.5 DecryptCFB1(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decryptes the data in CFB1 mode.
Notes: If odata is nil, idata is used for output.
If IVector is nil, a vector filled with zeros is used.
IVectorOffset safes the position in the IVector for the next call to this method.
iOffset: offset in idata.
oOffset: offset in odata.
LengthBytes: Length of data in idata and odata.
See also:

- 6.1.6 DecryptCFB1(idata as string, IVector as memoryblock=nil) as string 33

6.1.6 DecryptCFB1(idata as string, IVector as memoryblock=nil) as string

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decryptes the data in CFB1 mode.
Example:

```
dim a as new AESMBS

if a.SetKey("Hello World") then
dim input as string = "Hello World"
dim encrypted as string = a.EncryptCFB1(input)

if a.SetKey("Hello World") then
dim decrypted as string = a.DecryptCFB1(encrypted)

decrypted = DefineEncoding(decrypted, Encodings.ASCII)

if decrypted = input then
MsgBox "OK"
end if
end if
end if
```

Notes: If IVector is nil, a vector filled with zeros is used.
See also:

- 6.1.5 DecryptCFB1(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0) 33

6.1.7 DecryptCFB128(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decryptes the data in CFB128 mode.
Notes: If odata is nil, idata is used for output.
If IVector is nil, a vector filled with zeros is used.
IVectorOffset safes the position in the IVector for the next call to this method.
iOffset: offset in idata.
oOffset: offset in odata.
LengthBytes: Length of data in idata and odata.

Older plugin version had problems that they didn't use key at all. So if you want to read old data encrypted with them, you need simply to decrypt without setting key.
See also:

- 6.1.8 DecryptCFB128(idata as string, IVector as memoryblock=nil) as string 34

6.1.8 DecryptCFB128(idata as string, IVector as memoryblock=nil) as string

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decryptes the data in CFB128 mode.
Example:

```
dim a as new AESMBS

if a.SetKey("Hello World") then
dim input as string = "Hello World"
dim encrypted as string = a.EncryptCFB128(input)

if a.SetKey("Hello World") then
dim decrypted as string = a.DecryptCFB128(encrypted)

decrypted = DefineEncoding(decrypted, Encodings.ASCII)

if decrypted = input then
```

```
MsgBox "OK"
end if
end if
end if
```

Notes: If IVector is nil, a vector filled with zeros is used.

Older plugin version had problems that they didn't use key at all. So if you want to read old data encrypted with them, you need simply to decrypt without setting key.
See also:

- 6.1.7 DecryptCFB128(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0) 34

6.1.9 DecryptCFB8(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decryptes the data in CFB8 mode.
Notes: If odata is nil, idata is used for output.
If IVector is nil, a vector filled with zeros is used.
IVectorOffset safes the position in the IVector for the next call to this method.
iOffset: offset in idata.
oOffset: offset in odata.
LengthBytes: Length of data in idata and odata.
See also:

- 6.1.10 DecryptCFB8(idata as string, IVector as memoryblock=nil) as string 35

6.1.10 DecryptCFB8(idata as string, IVector as memoryblock=nil) as string

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decryptes the data in CFB8 mode.
Example:

```
dim a as new AESMBS

if a.SetKey("Hello World") then
dim input as string = "Hello World"
dim encrypted as string = a.EncryptCFB8(input)
```

```
if a.SetKey("Hello World") then
dim decrypted as string = a.DecryptCFB8(encrypted)

decrypted = DefineEncoding(decrypted, Encodings.ASCII)

if decrypted = input then
MsgBox "OK"
end if
end if
end if
```

Notes: If IVector is nil, a vector filled with zeros is used.
See also:

- 6.1.9 DecryptCFB8(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0) 35

6.1.11 DecryptECB(idata as memoryblock, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decryptes the 16 byte data block in the data.
Notes: If odata is nil, idata is used for output.

6.1.12 Encrypt(idata as memoryblock, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 9.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the first 16 bytes in the input memoryblock at the given offset and stores the result in the output memoryblock at the given offset.
Notes: If odata is nil, idata is used for output.
This is ECB mode.

6.1.13 EncryptCBC(idata as memoryblock, LengthBytes as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 9.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the 16 byte data blocks within LengthBytes bytes in the data.
Notes: If odata is nil, idata is used for output.
If IVector is nil, a vector filled with zeros is used.

6.1.14 EncryptCFB1(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the data in CFB1 mode.
Notes: If odata is nil, idata is used for output.
If IVector is nil, a vector filled with zeros is used.
IVectorOffset safes the position in the IVector for the next call to this method.
iOffset: offset in idata.
oOffset: offset in odata.
LengthBytes: Length of data in idata and odata.
See also:

- 6.1.15 EncryptCFB1(idata as string, IVector as memoryblock=nil) as string 37

6.1.15 EncryptCFB1(idata as string, IVector as memoryblock=nil) as string

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the data in CFB1 mode.
Example:

```
dim a as new AESMBS

if a.SetKey("Hello World") then
dim input as string = "Hello World"
dim encrypted as string = a.EncryptCFB1(input)

if a.SetKey("Hello World") then
dim decrypted as string = a.DecryptCFB1(encrypted)

decrypted = DefineEncoding(decrypted, Encodings.ASCII)

if decrypted = input then
```

```
MsgBox "OK"
end if
end if
end if
```

Notes: If IVector is nil, a vector filled with zeros is used.

Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.
See also:

- 6.1.14 EncryptCFB1(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0) 37

6.1.16 EncryptCFB128(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the data in CFB128 mode.
Notes: If odata is nil, idata is used for output.
If IVector is nil, a vector filled with zeros is used.
IVectorOffset safes the position in the IVector for the next call to this method.
iOffset: offset in idata.
oOffset: offset in odata.
LengthBytes: Length of data in idata and odata.
See also:

- 6.1.17 EncryptCFB128(idata as string, IVector as memoryblock=nil) as string 38

6.1.17 EncryptCFB128(idata as string, IVector as memoryblock=nil) as string

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the data in CFB128 mode.
Example:

```
dim a as new AESMBS

if a.SetKey("Hello World") then
dim input as string = "Hello World"
```

```
dim encrypted as string = a.EncryptCFB128(input)

if a.SetKey("Hello World") then
dim decrypted as string = a.DecryptCFB128(encrypted)

decrypted = DefineEncoding(decrypted, Encodings.ASCII)

if decrypted = input then
MsgBox "OK"
end if
end if
end if
```

Notes: If IVector is nil, a vector filled with zeros is used.

Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.
See also:

- 6.1.16 EncryptCFB128(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0) 38

6.1.18 EncryptCFB8(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the data in CFB8 mode.
Notes: If odata is nil, idata is used for output.
If IVector is nil, a vector filled with zeros is used.
IVectorOffset safes the position in the IVector for the next call to this method.
iOffset: offset in idata.
oOffset: offset in odata.
LengthBytes: Length of data in idata and odata.
See also:

- 6.1.19 EncryptCFB8(idata as string, IVector as memoryblock=nil) as string 39

6.1.19 EncryptCFB8(idata as string, IVector as memoryblock=nil) as string

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the data in CFB8 mode.
Example:

```
dim a as new AESMBS

if a.SetKey("Hello World") then
dim input as string = "Hello World"
dim encrypted as string = a.EncryptCFB8(input)

if a.SetKey("Hello World") then
dim decrypted as string = a.DecryptCFB8(encrypted)

decrypted = DefineEncoding(decrypted, Encodings.ASCII)

if decrypted = input then
MsgBox "OK"
end if
end if
end if
```

Notes: If IVector is nil, a vector filled with zeros is used.

Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.
See also:

- 6.1.18 EncryptCFB8(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0) 39

6.1.20 EncryptECB(idata as memoryblock, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the 16 byte data block in the data.
Notes: If odata is nil, idata is used for output.

6.1.21 EncryptOFB(idata as memoryblock, LengthBytes as Integer, byref IVectorOffset as Integer, IVector as memoryblock=nil, odata as memoryblock=nil, iOffset as Integer=0, oOffset as Integer=0)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes the data in OFB mode.
Notes: If odata is nil, idata is used for output.
If IVector is nil, a vector filled with zeros is used.
IVectorOffset safes the position in the IVector for the next call to this method.
iOffset: offset in idata.
oOffset: offset in odata.
LengthBytes: Length of data in idata and odata.

6.1.22 SetKey(key as memoryblock, nBits as Integer) as boolean

Plugin Version: 4.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets the key.
Notes: possible values for the bitcount:

128	key is 16 bytes long
192	key is 24 bytes long
256	key is 32 bytes long

Plugin version 13.4 and newer pads this memoryblock with 00 bytes if string is shorter.
See also:

- 6.1.23 SetKey(key as string) as boolean 41

6.1.23 SetKey(key as string) as boolean

Plugin Version: 9.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets the key.
Example:

```
dim x,u,s as string
dim iv as MemoryBlock

s="Hello World"

// encrypt
```

```
s=ConvertEncoding(s,encodings.UTF8)

dim a as new AESMBS

call a.SetKey("1234567890123456")

iv=NewMemoryBlock(16)
x=a.EncryptCFB128(s,iv)

MsgBox x

// decrypt

iv=NewMemoryBlock(16)
u=a.DecryptCFB128(x,iv)

u=DefineEncoding(u,encodings.UTF8)

MsgBox u
```

Notes: Please use 16, 24 or 32 byte long key strings.
Plugin version 13.4 and newer pads this string with 00 bytes if string is shorter.
See also:

- 6.1.22 SetKey(key as memoryblock, nBits as Integer) as boolean 41

6.2 class Argon2MBS

6.2.1 class Argon2MBS

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class to calculate hashes using Argon2.
Example:

```
dim a as new Argon2MBS

a.OutputLength = 24
a.Password = "password"
a.Salt = "somesalt"
a.cost = 2
a.MemoryCost = 65536 // 64 Megabytes
a.Lanes = 4
a.Threads = 4

dim hash as string = a.Calc(a.kTypeI)
dim t as string = EncodeHex(hash)

if t = "45d7ac72e76f242b20b77b9bf9bf9d5915894e669a24e6c6" then
// ok
else
Break // failed
end if
```

Notes: You can use this class to calculate password hashes.
Due to the cost associated to calculate it, the hash is difficult to brute force.

see
https://github.com/p-h-c/phc-winner-argon2
Blog Entries

- MBS Releases the MBS Xojo / Real Studio plug-ins in version 16.4
- MBS Xojo / Real Studio Plugins, version 16.4pr6
- Argon2 password hashing for Xojo

Xojo Developer Magazine

- 14.6, page 10: News

6.2.2 Methods

6.2.3 Calc(type as Integer = 0) as String

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Function that performs memory-hard hashing with certain degree of parallelism.
Example:

```
dim a as new Argon2MBS

a.OutputLength = 24
a.Password = "password"
a.Salt = "somesalt"
a.cost = 2
a.MemoryCost = 65536 // 64 Megabytes
a.Lanes = 4
a.Threads = 4

dim hash as string = a.Calc(a.kTypeI)
dim t as string = EncodeHex(hash)

if t = "45d7ac72e76f242b20b77b9bf9bf9d5915894e669a24e6c6" then
// ok
else
Break // failed
end if
```

Notes: Returns hash on success or empty string in case of error.
Lasterror is set.

6.2.4 Constructor

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The constructor.

6.2.5 Destructor

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Destructor.

6.2.6 Verify(Hash as String, type as Integer = 0) as boolean

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Verifies a password hash.
Example:

```
dim a as new Argon2MBS

a.OutputLength = 24
a.Password = "password"
a.Salt = "somesalt"
a.cost = 2
a.MemoryCost = 65536
a.Lanes = 4
a.Threads = 4

dim h as string = DecodeHex("45d7ac72e76f242b20b77b9bf9bf9d5915894e669a24e6c6")
if a.Verify(h, a.kTypeI) then
// ok
break
else
// failed
break
end if
```

Notes: Returns true on success.
Lasterror is set.

6.2.7 Properties

6.2.8 AssociatedData as String

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The associated data.
Notes: (Read and Write property)

6.2.9 Cost as Integer

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number of passes.

Notes: (Read and Write property)

6.2.10 Flags as Integer

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The flags.
Notes: (Read and Write property)

6.2.11 Lanes as Integer

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Number of lanes.
Notes: (Read and Write property)

6.2.12 LastError as Integer

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The last error code.
Notes: (Read and Write property)

6.2.13 LastErrorMessage as String

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The last error message.
Notes: (Read and Write property)

6.2.14 MemoryCost as Integer

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Amount of memory requested (KB).
Notes: In kilo bytes. Default is 1 MB.
(Read and Write property)

6.2.15 OutputLength as Integer

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The length of the hash.
Notes: (Read and Write property)

6.2.16 Password as String

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The password to hash.
Notes: (Read and Write property)

6.2.17 Salt as String

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The salt.
Notes: (Read and Write property)

6.2.18 Secret as String

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The secret.
Notes: (Read and Write property)

6.2.19 Threads as Integer

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Maximum number of threads.
Notes: (Read and Write property)

6.2.20 Version as Integer

Plugin Version: 16.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The version of argon to use.
Notes: Can be kVersion10 or kVersion13.
(Read and Write property)

6.2.21 Constants

Constants

Constant	Value	Description
kMaxAssociatedDataLength	&hFFFFFFFF	Maximum associated data length in bytes.
kMaxLanes	&hFFFFFF	Maximum number of lanes (degree of parallelism)
kMaxMemory	&hFFFFFFFF	Maximum memory size.
kMaxOutputLength	&hFFFFFFFF	Maximum digest size in bytes.
kMaxPasswordLength	&hFFFFFFFF	Maximum password length in bytes.
kMaxSaltLength	&hFFFFFFFF	Maximum salt length in bytes
kMaxSecretLength	&hFFFFFFFF	Maximum key length in bytes.
kMaxThreads	&hFFFFFF	Maximum number of threads.
kMaxTime	&hFFFFFFFF	Maximum number of passes.
kMinAssociatedDataLength	0	Minimum associated data length in bytes.
kMinLanes	1	Minimum number of lanes (degree of parallelism)
kMinMemory	8	Minimum and maximum number of memory blocks (each of BLOCK_ bytes)
kMinOutputLength	4	Minimum digest size in bytes.
kMinPasswordLength	0	Minimum password length in bytes.
kMinSaltLength	0	Minimum salt length in bytes
kMinSecretLength	0	Minimum key length in bytes.
kMinThreads	1	Minimum number of threads.
kMinTime	1	Minimum number of passes.
kSyncPoints	4	Number of synchronization points between lanes per pass.

Errors

Constant	Value	Description
kErrorAdPtrMismatch	-21	AssociatedData ptr is nil, but size >0.
kErrorAdTooLong	-9	AssociatedData too long.
kErrorAdTooShort	-8	AssociatedData too short.
kErrorAllocateMemoryCbkNull	-24	Allocation failed.
kErrorDecodingFail	-32	Decoding failed.
kErrorDecodingLengthFail	-34	Decoding length failed.
kErrorEncodingFail	-31	Encoding failed.
kErrorFreeMemoryCbkNull	-23	Free memory failed.
kErrorIncorrectParameter	-25	Incorrect parameter.
kErrorIncorrectType	-26	Incorrect type.
kErrorLanesTooFew	-16	Lanes too small.
kErrorLanesTooMany	-17	Too many lanes.
kErrorMemoryAllocationError	-22	Memory allocation failed.
kErrorMemoryTooLittle	-14	Memory too little.
kErrorMemoryTooMuch	-15	Memory too big.
kErrorMissingArgs	-30	Missing Argument.
kErrorOk	0	Okay.
kErrorOutPtrMismatch	-27	Output ptr is nil, but size >0.
kErrorOutputPtrNull	-1	Output Ptr is nil.
kErrorOutputTooLong	-3	Output too long.
kErrorOutputTooShort	-2	Output too short.
kErrorPwdPtrMismatch	-18	Password ptr is nil, but size >0.
kErrorPwdTooLong	-5	Password too long.
kErrorPwdTooShort	-4	Password too short.
kErrorSaltPtrMismatch	-19	Salt ptr is nil, but size >0.
kErrorSaltTooLong	-7	Salt too long.
kErrorSaltTooShort	-6	Salt too short.
kErrorSecretPtrMismatch	-20	Secret ptr is nil, but size >0.
kErrorSecretTooLong	-11	Secret too long.
kErrorSecretTooShort	-10	Secret too short.
kErrorThreadFail	-33	Threads failed.
kErrorThreadsTooFew	-28	Threads too small.
kErrorThreadsTooMany	-29	Too many threads.
kErrorTimeTooLarge	-13	Time too large.
kErrorTimeTooSmall	-12	Time too small.
kErrorVerifyMismatch	-35	Verify Mismatch

Flags

Constant	Value	Description
kFlagClearMemory	4	Clear memory.
kFlagClearPassword	1	Clear password.
kFlagClearSecret	2	Clear Secret after hashing.
kFlagDefault	4	Default flags.

Type Codes

Constant	Value	Description
kTypeD	0	Argon2d is faster and uses data-depending memory access, which makes it highly resistant against GPU cracking attacks and suitable for applications with no threats from side-channel timing attacks (eg. cryptocurrencies).
kTypeI	1	Argon2i instead uses data-independent memory access, which is preferred for password hashing and password-based key derivation, but it is slower as it makes more passes over the memory to protect from tradeoff attacks.

Version

Constant	Value	Description
kVersion10	&h10	Version 1.0
kVersion13	&h13	Version 1.3

6.3 module BCryptMBS

6.3.1 module BCryptMBS

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: The module for bcrypt encryption.
Blog Entries

- MBS Xojo Plugins, version 22.0pr5
- MonkeyBread Software Releases the MBS Xojo Plugins in version 20.1
- MBS Xojo Plugins, version 20.1pr7

Xojo Developer Magazine

- 18.3, page 10: News

6.3.2 Methods

6.3.3 BCrypt(Pass as String, Salt as String) as String

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Hashes password with bcrypt based on given salt.
Example:

```
Dim salt As String = BCryptMBS.BCryptSalt(11)
Dim hash As String = BCryptMBS.BCrypt("password", salt)

Break
```

6.3.4 BCryptSalt(Rounds as Integer) as String

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates salt based on given numbers of rounds.

6.3.5 Verify(Pass as String, Hash as String) as Boolean

Plugin Version: 20.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Verifies a hash to be right.
Example:

```
// check various levels
For i As Integer = 4 To 15
Dim salt As String = BCryptMBS.BCryptSalt(i)
Dim hash As String = BCryptMBS.BCrypt("password", salt)

Dim b As Boolean = BCryptMBS.Verify("password", hash)

System.DebugLog Str(i)+" "+Str(b)+" "+hash

If Not b Then Break
Next
```

Notes: Check is case sensitive!
Returns true on success.

6.4 class BlowfishMBS

6.4.1 class BlowfishMBS

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: A class for blowfish encryption.
Example:

```
dim s as string

// create string with known encoding so we can later define encoding after decryption!
s=ConvertEncoding("Hello",Encodings.UTF8)

// encrypt with a key
s=BlowfishMBS.Encrypt("MyKey",s)

// encoding is not set for the result string, still RB can guess the encoding when displaying
MsgBox s

// decrypt with same key
s=BlowfishMBS.Decrypt("MyKey",s)

// encoding is not set for the result string, so change it back:
s=DefineEncoding(s,encodings.UTF8)

// show original Hello
MsgBox s
```

Notes: For newer projects we recommend switching to CipherMBS class.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 14.4pr3
- MBS Xojo / Real Studio plug-ins in version 13.4
- MBS Xojo / Real Studio Plugins, version 13.4pr3
- MBS Real Studio Plugins, version 12.1pr10
- Studio Stable Database 2.2
- MonkeyBread Software Releases the MBS REALbasic plug-ins 8.4

6.4.2 Methods

6.4.3 Decrypt(iodata as memoryblock)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Lowest level function to decrypt data in a memoryblock.
Notes: input and output are in host endian format.
memoryblock must be not nil and has a size of 8 bytes.
See also:

- 6.4.4 Decrypt(key as string, data as string) as string 54

6.4.4 Decrypt(key as string, data as string) as string

Plugin Version: 8.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts the data using blowfish and the given key.
Example:

```
dim s as string

// create string with known encoding so we can later define encoding after decryption!
s=ConvertEncoding("Hello",Encodings.UTF8)

// encrypt with a key
s=BlowfishMBS.Encrypt("MyKey",s)

// encoding is not set for the result string, still RB can guess the encoding when displaying
MsgBox s

// decrypt with same key
s=BlowfishMBS.Decrypt("MyKey",s)

// encoding is not set for the result string, so change it back:
s=DefineEncoding(s,encodings.UTF8)

// show original Hello
MsgBox s
```

Notes: This is our convenience function to encode a string quickly. Using CFB64 mode and an all zero initializing vector.
If the lenb(result) is zero and lenb(data) is not zero, the memory was not sufficient.

Key can have any length, but 32 bytes (256 bits) are quite good.

The length of data is limited by the amount of available memory.
See also:

- 6.4.3 Decrypt(iodata as memoryblock) 54

6.4.5 DecryptCBC(data as string, byref temp as memoryblock) as string

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish decryption function.
Example:

```
dim b as new BlowfishMBS

dim s as string = "UTYbBEZSMLfa0kvNDSla/n/GSUcA/545gp7LcA330Nw="
dim x as string = DecodeBase64(s)

dim m as MemoryBlock = nil
b = new BlowfishMBS
b.SetKey "geheim"
dim t1 as string = b.DecryptCBC(x,m)

// shows SD10003$ $ 2012.03.16 11:00
MsgBox t1
```

Notes: data: data to be decrypted
temp: memoryblock for temporary data. Is created when called with nil value. Pass on following calls to allow data to be shared between function calls.

Returns "" on invalid input.
You can create yourself an eight byte memoryblock with a starting value you want.
Be aware that this CBC method works with data in 8 byte blocks, so you need to unpad data if needed.
See also:

- 6.4.6 DecryptCBC(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock) 55

6.4.6 DecryptCBC(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish decryption function.
Notes: idata: memoryblock for input data, 8 bytes in size and not nil.

odata: memoryblock for output data, 8 bytes in size and not nil.
offset: offset in input and output memoryblocks
length: length of data in memoryblock in bytes. Multiply of 8.
ivec: memoryblock for temporary data, 8 bytes in size and not nil.

ivec should be a memoryblock of 8 bytes size which you create before calling the function for the first time. On the next time you passed the same block, so the function can store data inside this memoryblock between function calls.
Be aware that this CBC method works with data in 8 byte blocks, so you need to unpad data if needed.
See also:

- 6.4.5 DecryptCBC(data as string, byref temp as memoryblock) as string 55

6.4.7 DecryptCFB64(data as string, byref temp as memoryblock) as string

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish decryption function.
Notes: data: data to be decrypted
temp: memoryblock for temporary data. Is created when called with nil value. Pass on following calls to allow data to be shared between function calls.

Returns "" on invalid input.
You can create yourself a twelve byte memoryblock with a starting value you want. First four bytes are position and next 8 bytes the current vector.
See also:

- 6.4.8 DecryptCFB64(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock, byref num as Integer) 56

6.4.8 DecryptCFB64(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock, byref num as Integer)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish decryption function.
Example:

```
dim b as BlowfishMBS

b=new BlowfishMBS
b.SetKey "Key"

dim temp as MemoryBlock
dim s as string
```

```
s=b.EncryptCFB64("Hello World",temp)

MsgBox s

temp=nil // reset
s=b.DecryptCFB64(s,temp)

MsgBox s
```

Notes: idata: memoryblock for input data, 8 bytes in size and not nil.
odata: memoryblock for output data, 8 bytes in size and not nil.
offset: offset in input and output memoryblocks
length: length of data in memoryblock in bytes. Multiply of 8.
ivec: memoryblock for temporary data, 8 bytes in size and not nil.
num: current position in ivec. Pass 0 as start value and pass the value you get back to the next function call.

Returns "" on invalid input.
You can create yourself a twelve byte memoryblock with a starting value you want. First four bytes are position and next 8 bytes the current vector.
See also:

- 6.4.7 DecryptCFB64(data as string, byref temp as memoryblock) as string 56

6.4.9 DecryptECB(data as string) as string

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The basic Blowfish decryption function.
Notes: This function decrypts only 8 bytes. For more, please use other functions!

data: data to be decrypted
Returns "" on invalid input.
See also:

- 6.4.10 DecryptECB(idata as memoryblock, odata as memoryblock, offset as Integer) 57

6.4.10 DecryptECB(idata as memoryblock, odata as memoryblock, offset as Integer)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The basic Blowfish encryption function.
Notes: idata: memoryblock for input data, 8 bytes in size and not nil.
odata: memoryblock for output data, 8 bytes in size and not nil.
offset: offset in input and output memoryblocks
See also:

- 6.4.9 DecryptECB(data as string) as string 57

6.4.11 DecryptOFB64(data as string, byref temp as memoryblock) as string

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish decryption function.
Notes: data: data to be decrypted
temp: memoryblock for temporary data. Is created when called with nil value. Pass on following calls to allow data to be shared between function calls.

Returns "" on invalid input.
You can create yourself a twelve byte memoryblock with a starting value you want. First four bytes are position and next 8 bytes the current vector.

This is output feedback mode. Encryption is the same a decryption.
See also:

- 6.4.12 DecryptOFB64(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock, byref num as Integer) 58

6.4.12 DecryptOFB64(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock, byref num as Integer)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish decryption function.
Example:

```
dim b as BlowfishMBS

b=new BlowfishMBS
b.SetKey "Key"

dim temp as MemoryBlock
dim s as string

s=b.EncryptCFB64("Hello World",temp)
```

```
MsgBox s

temp=nil // reset
s=b.DecryptCFB64(s,temp)

MsgBox s
```

Notes: idata: memoryblock for input data, 8 bytes in size and not nil.
odata: memoryblock for output data, 8 bytes in size and not nil.
offset: offset in input and output memoryblocks
length: length of data in memoryblock in bytes. Multiply of 8.
ivec: memoryblock for temporary data, 8 bytes in size and not nil.
num: current position in ivec. Pass 0 as start value and pass the value you get back to the next function call.

Returns "" on invalid input.
You can create yourself a twelve byte memoryblock with a starting value you want. First four bytes are position and next 8 bytes the current vector.

This is output feedback mode. Encryption is the same a decryption.
See also:

- 6.4.11 DecryptOFB64(data as string, byref temp as memoryblock) as string 58

6.4.13 Encrypt(iodata as memoryblock)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Lowest level function to encrypt data in a memoryblock.
Notes: input and output are in host endian format.
memoryblock must be not nil and has a size of 8 bytes.
See also:

- 6.4.14 Encrypt(key as string, data as string) as string 59

6.4.14 Encrypt(key as string, data as string) as string

Plugin Version: 8.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts the data using blowfish and the given key.
Example:

```
dim v as string = "Hello World, this is just a test string"
```

```
// encrypt CFB64 with BlowfishMBS
dim b as new BlowfishMBS
dim Key as string = "1234567812345678"
dim r as string = b.Encrypt( key , v )
dim h as string = EncodeHex( r )

// and decrypt with OpenSSL
dim c as CipherMBS = CipherMBS.bf_cfb64

c.DecryptInit key
dim d as string = c.ProcessString(r)
d = d + c.FinalizeAsString

Break // see in debugger, v and d have same content
```

Notes: This is our convenience function to decode a string quickly. Using CFB64 mode and an all zero initializing vector.
If the lenb(result) is zero and lenb(data) is not zero, the memory was not sufficient.

Key can have any length, but 32 bytes (256 bits) are quite good.
The length of data is limited by the amount of available memory.

Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.
See also:

- 6.4.13 Encrypt(iodata as memoryblock) 59

6.4.15 EncryptCBC(data as string, byref temp as memoryblock) as string

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish encryption function.
Example:

```
dim m as memoryblock // temporary storage of current state
dim b as blowfishmbs
dim s as string

b=new blowfishmbs
b.SetKey "EinKey1234567890" // some key

s=b.EncryptCBC("Hallo",m)
```

```
s=s+b.EncryptCBC(" ",m)
s=s+b.EncryptCBC("Leute",m)
s=s+b.EncryptCBC("!",m)
```

Notes: data: data to be encrypted
temp: memoryblock for temporary data. Is created when called with nil value. Pass on following calls to allow data to be shared between function calls.

Returns "" on invalid input.
You can create yourself an eight byte memoryblock with a starting value you want.
Be aware that this CBC method works with data in 8 byte blocks, so you need to pad data if needed.

Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.
See also:

- 6.4.16 EncryptCBC(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock) 61

6.4.16 EncryptCBC(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish encryption function.
Notes: idata: memoryblock for input data, at least 8 bytes in size and not nil.
odata: memoryblock for output data, at least 8 bytes in size and not nil.
offset: offset in input and output memoryblocks
length: length of data in memoryblock in bytes. Multiply of 8.
ivec: memoryblock for temporary data, 8 bytes in size and not nil.

ivec should be a memoryblock of 8 bytes size which you create before calling the function for the first time. On the next time you passed the same block, so the function can store data inside this memoryblock between function calls.
Be aware that this CBC method works with data in 8 byte blocks, so you need to pad data if needed.
See also:

- 6.4.15 EncryptCBC(data as string, byref temp as memoryblock) as string 60

6.4.17 EncryptCFB64(data as string, byref temp as memoryblock) as string

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish encryption function.
Notes: data: data to be encrypted
temp: memoryblock for temporary data. Is created when called with nil value. Pass on following calls to allow data to be shared between function calls.

Returns "" on invalid input.
You can create yourself a twelve byte memoryblock with a starting value you want. First four bytes are position and next 8 bytes the current vector.

Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.
See also:

- 6.4.18 EncryptCFB64(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock, byref num as Integer) 62

6.4.18 EncryptCFB64(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock, byref num as Integer)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish encryption function.
Notes: idata: memoryblock for input data, 8 bytes in size and not nil.
odata: memoryblock for output data, 8 bytes in size and not nil.
offset: offset in input and output memoryblocks
length: length of data in memoryblock in bytes. Multiply of 8.
ivec: memoryblock for temporary data, 8 bytes in size and not nil.
num: current position in ivec. Pass 0 as start value and pass the value you get back to the next function call.

Returns "" on invalid input.
You can create yourself a twelve byte memoryblock with a starting value you want. First four bytes are position and next 8 bytes the current vector.
See also:

- 6.4.17 EncryptCFB64(data as string, byref temp as memoryblock) as string 61

6.4.19 EncryptECB(data as string) as string

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The basic Blowfish encryption function.
Notes: This function encrypts only 8 bytes. For more, please use other functions!

data: data to be encrypted
Returns "" on invalid input.

Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.
See also:

- 6.4.20 EncryptECB(idata as memoryblock, odata as memoryblock, offset as Integer) 63

6.4.20 EncryptECB(idata as memoryblock, odata as memoryblock, offset as Integer)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The basic Blowfish decryption function.
Notes: This function encrypts only 8 bytes. For more, please use other functions!

idata: memoryblock for input data, 8 bytes in size and not nil.
odata: memoryblock for output data, 8 bytes in size and not nil.
offset: offset in input and output memoryblocks
length: length of data in memoryblock in bytes. Multiply of 8.
See also:

- 6.4.19 EncryptECB(data as string) as string 62

6.4.21 EncryptOFB64(data as string, byref temp as memoryblock) as string

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish encryption function.
Notes: data: data to be encrypted
temp: memoryblock for temporary data. Is created when called with nil value. Pass on following calls to allow data to be shared between function calls.

Returns "" on invalid input.
You can create yourself a twelve byte memoryblock with a starting value you want. First four bytes are position and next 8 bytes the current vector.

This is output feedback mode. Encryption is the same a decryption.

Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text

string.
See also:

- 6.4.22 EncryptOFB64(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock, byref num as Integer) 64

6.4.22 EncryptOFB64(idata as memoryblock, odata as memoryblock, offset as Integer, length as Integer, ivec as memoryblock, byref num as Integer)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The continuing Blowfish encryption function.
Notes: idata: memoryblock for input data, 8 bytes in size and not nil.
odata: memoryblock for output data, 8 bytes in size and not nil.
offset: offset in input and output memoryblocks
length: length of data in memoryblock in bytes. Multiply of 8.
ivec: memoryblock for temporary data, 8 bytes in size and not nil.
num: current position in ivec. Pass 0 as start value and pass the value you get back to the next function call.

Returns "" on invalid input.
You can create yourself a twelve byte memoryblock with a starting value you want. First four bytes are position and next 8 bytes the current vector.

This is output feedback mode. Encryption is the same a decryption.
See also:

- 6.4.21 EncryptOFB64(data as string, byref temp as memoryblock) as string 63

6.4.23 SetKey(key as string)

Plugin Version: 6.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets the key to be used.
Notes: The longer the key, the better. Suggested is at least 16 bytes.

6.5 class CipherMBS

6.5.1 class CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The high level cipher class using OpenSSL encryption.
Example:

```
dim c as CipherMBS = CipherMBS.aes_128_cfb128
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

dim a as new AESMBS

call a.SetKey CKey, 128
dim output2 as string = a.EncryptCFB128(data, CIV)

MsgBox EncodeHex(output1)+EndOfLine+EncodeHex(output2)
```

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

- MonkeyBread Software Releases the MBS Xojo Plugins in version 23.3
- Decrypt data from PHP in Xojo
- Xojo News
- MacOSX plugin for iOS
- Multithreaded plugin functions can increase speed of Xojo application
- Tip of the day: AES 256 CBC on iOS for Xojo
- MBS Xojo plug-ins in version 16.0
- AES in Xojo and PHP
- Doing hash or encryption on several CPUs in Xojo
- MBS Xojo / Real Studio plug-ins in version 13.5

Xojo Developer Magazine

- 21.5, page 9: News
- 15.5, page 9: News
- 14.2, page 10: News
- 12.1, page 9: News

6.5.2 Methods

6.5.3 aes_128_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim key as string = "mysecretkey"
dim encrypted as string = "6IcB9bpDwOjjONErhYQ6c7+Fb4qszsUNZVU0iThLYqOu7chJ7MG2nwSpRBUY0ZC3"

encrypted = DecodeBase64(encrypted)

dim c as CipherMBS = CipherMBS.aes_128_cbc
call c.DecryptInit key

dim s as string = c.ProcessString(Encrypted)+c.FinalizeAsString

Break // "In welcher Stadt steht das Bundeshaus?" is now in s.
```

6.5.4 aes_128_cbc_hmac_sha256 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.5 aes_128_ccm as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.6 aes_128_cfb1 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.7 aes_128_cfb128 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.aes_128_cfb128
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

dim a as new AESMBS

call a.SetKey CKey, 128
dim output2 as string = a.EncryptCFB128(data, CIV)

MsgBox EncodeHex(output1)+EndOfLine+EncodeHex(output2)
```

6.5.8 aes_128_cfb8 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.9 aes_128_ctr as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.10 aes_128_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.11 aes_128_gcm as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.12 aes_128_ocb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.13 aes_128_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.14 aes_128_wrap as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.15 aes_128_wrap_pad as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.16 aes_128_xts as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

dim c as CipherMBS = CipherMBS.aes_128_xts
call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

CIV = nil
c = CipherMBS.aes_128_xts
call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Encrypred via "+c.Name+" as hex: "+EncodeHex(output1)+EndOfLine+"Decrypted: "+output2
```

6.5.17 aes_192_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.18 aes_192_ccm as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.19 aes_192_cfb1 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.20 aes_192_cfb128 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.21 aes_192_cfb8 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.22 aes_192_ctr as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.23 aes_192_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.24 aes_192_gcm as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.25 aes_192_ocb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.26 aes_192_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.27 aes_192_wrap as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.28 aes_192_wrap_pad as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.29 aes_256_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

dim c as CipherMBS = CipherMBS.aes_256_cbc
call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

CIV = nil
c = CipherMBS.aes_256_cbc
call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Encrypred via "+c.Name+" as hex: "+EncodeHex(output1)+EndOfLine+"Decrypted: "+output2
```

6.5.30 aes_256_cbc_hmac_sha256 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.31 aes_256_ccm as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.32 aes_256_cfb1 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.33 aes_256_cfb128 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

dim c as CipherMBS = CipherMBS.aes_256_cfb128
call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

CIV = nil
c = CipherMBS.aes_256_cfb128
call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
```

```
output2 = output2 + c.FinalizeAsString

MsgBox "Encrypred via "+c.Name+" as hex: "+EncodeHex(output1)+EndOfLine+"Decrypted: "+output2
```

6.5.34 aes_256_cfb8 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.35 aes_256_ctr as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.36 aes_256_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.aes_256_ecb
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

c = CipherMBS.aes_256_ecb
CIV = nil

call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString
```

```
MsgBox "Encrypred as hex: "+EncodeHex(output1)+EndOfLine+"Decrypted: "+output2
```

6.5.37 aes_256_gcm as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.38 aes_256_ocb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.39 aes_256_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.40 aes_256_wrap as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.41 aes_256_wrap_pad as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.42 aes_256_xts as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.43 aria_128_cbc as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.44 aria_128_ccm as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.45 aria_128_cfb1 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.46 aria_128_cfb128 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.47 aria_128_cfb8 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.48 aria_128_ctr as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.49 aria_128_ecb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.50 aria_128_gcm as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.51 aria_128_ofb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.52 aria_192_cbc as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.53 aria_192_ccm as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.54 aria_192_cfb1 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.55 aria_192_cfb128 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.56 aria_192_cfb8 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.57 aria_192_ctr as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.58 aria_192_ecb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.59 aria_192_gcm as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.60 aria_192_ofb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.61 aria_256_cbc as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.62 aria_256_ccm as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.63 aria_256_cfb1 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.64 aria_256_cfb128 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.65 aria_256_cfb8 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.66 aria_256_ctr as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.67 aria_256_ecb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.68 aria_256_gcm as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.69 aria_256_ofb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.70 bf_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for Blowfish with CBC mode.
Example:

```
Dim key As String = "Hello World"
Dim iv As MemoryBlock = "12345678"

// encrypt it
Dim c As CipherMBS = CipherMBS.bf_cbc

Call c.EncryptInit(key, iv)
Dim Input As String = "Hello World. Just a test."

Dim encrypted As String = c.ProcessString(Input) + c.FinalizeAsString

// decrypt it
Dim d As CipherMBS = CipherMBS.bf_cbc

Call d.DecryptInit(key, iv)
Dim unencrypted As String = d.ProcessString(encrypted) + d.FinalizeAsString

break // check in debugger
```

6.5.71 bf_cfb64 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for Blowfish with CFB64 mode.
Example:

```
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

dim c as CipherMBS = CipherMBS.bf_cfb64
call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

CIV = nil
c = CipherMBS.bf_cfb64
call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Encrypred via "+c.Name+" as hex: "+EncodeHex(output1)+EndOfLine+"Decrypted: "+output2
```

6.5.72 bf_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for Blowfish with ECB mode.

6.5.73 bf_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for Blowfish with OFB mode.

6.5.74 BytesToKey(cipher as CipherMBS, digest as DigestMBS, Salt as MemoryBlock, InputKey as Memoryblock, IterationCount as Integer, byref OutputKey as memoryblock, byref IV as memoryblock) as boolean

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Derives a key and IV from a given input data.
Notes: Returns true on success or false on failure.

BytesToKey() derives a key and IV from various parameters. type is the cipher to derive the key and IV for. md is the message digest to use. The salt paramter is used as a salt in the derivation: it should point to an 8 byte buffer or nil if no salt is used. data is a buffer containing datal bytes which is used to derive the keying data. count is the iteration count to use. The derived key and IV will be written to key and iv respectively.

A typical application of this function is to derive keying material for an encryption algorithm from a password in the data parameter.

Increasing the count parameter slows down the algorithm which makes it harder for an attacker to peform a brute force attack using a large number of candidate passwords.

If the total key and IV length is less than the digest length and MD5 is used then the derivation algorithm is compatible with PKCS#5 v1.5 otherwise a non standard extension is used to derive the extra data.

Newer applications should use more standard algorithms such as PBKDF2 as defined in PKCS#5v2.1 for key derivation.

Key Derivation Algorithm

The key and IV is derived by concatenating D_1, D_2, etc until enough data is available for the key and IV. D_i is defined as:

D_i = HASH^count(D_(i-1) | | data | | salt)

where | | denotes concatentaion, D_0 is empty, HASH is the digest algorithm in use, HASH^1(data) is simply HASH(data), HASH^2(data) is HASH(HASH(data)) and so on.

The initial bytes are used for the key and the subsequent bytes for the IV.

6.5.75 camellia_128_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.76 camellia_128_cfb1 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.77 camellia_128_cfb128 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.78 camellia_128_cfb8 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.79 camellia_128_ctr as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.80 camellia_128_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.81 camellia_128_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.82 camellia_192_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.83 camellia_192_cfb1 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.84 camellia_192_cfb128 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.85 camellia_192_cfb8 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.86 camellia_192_ctr as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.87 camellia_192_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.88 camellia_192_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.89 camellia_256_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

dim c as CipherMBS = CipherMBS.camellia_256_cbc
call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

CIV = nil
c = CipherMBS.camellia_256_cbc
call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Encrypred via "+c.Name+" as hex: "+EncodeHex(output1)+EndOfLine+"Decrypted: "+output2
```

6.5.90 camellia_256_cfb1 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.91 camellia_256_cfb128 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.92 camellia_256_cfb8 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.93 camellia_256_ctr as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.94 camellia_256_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.95 camellia_256_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.96 cast5_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.97 cast5_cfb64 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.98 cast5_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.99 cast5_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.100 chacha20 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.101 chacha20_poly1305 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.102 CipherByName(name as string) as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Finds a cipher by name.
Notes: Possible names:
AES-128-CFB, BF-CBC, BF-CFB, BF-ECB, BF-OFB, AES-128-CBC, id-aes128-CCM, AES-128-CFB1, AES-128-CFB8, AES-128-CTR, AES-128-ECB, id-aes128-GCM, AES-128-OFB, AES-128-XTS, AES-192-CBC, id-aes192-CCM, AES-192-CFB1, AES-192-CFB8, AES-192-CFB, AES-192-CTR, AES-192-ECB, id-aes192-GCM, AES-192-OFB, AES-256-CBC, id-aes256-CCM, AES-256-CFB1, AES-256-CFB8, AES-256-

CFB, AES-256-CTR, AES-256-ECB, id-aes256-GCM, AES-256-OFB, AES-256-XTS, CAMELLIA-128-CBC, CAMELLIA-128-CFB1, CAMELLIA-128-CFB8, CAMELLIA-128-CFB, CAMELLIA-128-ECB, CAMELLIA-128-OFB, CAMELLIA-192-CBC, CAMELLIA-192-CFB1, CAMELLIA-192-CFB8, CAMELLIA-192-CFB, CAMELLIA-192-ECB, CAMELLIA-192-OFB, CAMELLIA-256-CBC, CAMELLIA-256-CFB1, CAMELLIA-256-CFB8, CAMELLIA-256-CFB, CAMELLIA-256-ECB, CAMELLIA-256-OFB, CAST5-CBC, CAST5-CFB, CAST5-ECB, CAST5-OFB, DES-EDE, DES-EDE-CBC, DES-EDE-CFB, DES-EDE, DES-EDE-OFB, DES-EDE3, DES-EDE3-CBC, DES-EDE3-CFB1, DES-EDE3-CFB8, DES-EDE3-CFB, DES-EDE3, DES-EDE3-OFB, RC2-40-CBC, RC2-64-CBC, RC2-CBC, RC2-CFB, RC2-ECB, RC2-OFB, RC4, RC4-40, RC4-HMAC-MD5, IDEA-CFB, IDEA-ECB, IDEA-OFB, IDEA-CBC, DES-CFB1, DES-CFB8, DES-CFB, DES-OFB, DES-ECB, DES-CBC or DESX-CBC.

6.5.103 CipherInit(key as memoryblock, IV as memoryblock, Encrypt as boolean) as Boolean

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initializes the cipher for encryption or decryption.
Notes: We added for 17.3 a new boolean result:

Returns true in case of success and key length is okay.
Returns false in case of failures like out of memory, wrong key length.

Even if key length is wrong, we initialize (as with older versions before) but may crop the key length to default length.
AES 128 uses 16 byte key length, AES 256 uses 32 byte key length.
Key and IV are both filled with zeros to reach the minimum length.

key: The key to use.
IV: Optional, the initial vector.

You can use IVLength and KeyLength properties to learn how long those should be.

6.5.104 CipherNames as String()

Plugin Version: 18.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries list of all ciphers.
Example:

```
// see hash and encryption algorithms available
dim CipherNames() as string = CipherMBS.CipherNames
dim DigestNames() as string = DigestMBS.DigestNames
Break
```

Notes: The list may not be the same for Mac, Windows and Linux.

Current list:

aes-128-cbc, aes-128-cbc-hmac-sha1, aes-128-ccm, aes-128-cfb, aes-128-cfb1, aes-128-cfb8, aes-128-ctr, aes-128-ecb, aes-128-gcm, aes-128-ocb, aes-128-ofb, aes-128-xts, aes-192-cbc, aes-192-ccm, aes-192-cfb, aes-192-cfb1, aes-192-cfb8, aes-192-ctr, aes-192-ecb, aes-192-gcm, aes-192-ocb, aes-192-ofb, aes-256-cbc, aes-256-cbc-hmac-sha1, aes-256-ccm, aes-256-cfb, aes-256-cfb1, aes-256-cfb8, aes-256-ctr, aes-256-ecb, aes-256-gcm, aes-256-ocb, aes-256-ofb, aes-256-xts, aes128, aes128-wrap, aes192, aes192-wrap, aes256, aes256-wrap, aria-

128-cbc, aria-128-ccm, aria-128-cfb, aria-128-cfb1, aria-128-cfb8, aria-128-ctr, aria-128-ecb, aria-128-gcm, aria-128-ofb, aria-192-cbc, aria-192-ccm, aria-192-cfb, aria-192-cfb1, aria-192-cfb8, aria-192-ctr, aria-192-ecb, aria-192-gcm, aria-192-ofb, aria-256-cbc, aria-256-ccm, aria-256-cfb, aria-256-cfb1, aria-256-cfb8, aria-256-ctr, aria-256-ecb, aria-256-gcm, aria-256-ofb, aria128, aria192, aria256, bf, bf-cbc, bf-cfb, bf-ecb, bf-ofb, blowfish, camellia-128-cbc, camellia-128-cfb, camellia-128-cfb1, camellia-128-cfb8, camellia-128-ctr, camellia-128-ecb, camellia-128-ofb, camellia-192-cbc, camellia-192-cfb, camellia-192-cfb1, camellia-192-cfb8, camellia-192-ctr, camellia-192-ecb, camellia-192-ofb, camellia-256-cbc, camellia-256-cfb, camellia-256-cfb1, camellia-256-cfb8, camellia-256-ctr, camellia-256-ecb, camellia-256-ofb, camellia128, camellia192, camellia256, cast, cast-cbc, cast5-cbc, cast5-cfb, cast5-ecb, cast5-ofb, chacha20, chacha20-poly1305, des, des-cbc, des-cfb, des-cfb1, des-cfb8, des-ecb, des-ede, des-ede-cbc, des-ede-cfb, des-ede-ecb, des-ede-ofb, des-ede3, des-ede3-cbc, des-ede3-cfb, des-ede3-cfb1, des-ede3-cfb8, des-ede3-ecb, des-ede3-ofb, des-ofb, des3, des3-wrap, desx, desx-cbc, id-aes128-CCM, id-aes128-GCM, id-aes128-wrap, id-aes128-wrap-pad, id-aes192-CCM, id-aes192-GCM, id-aes192-wrap, id-aes192-wrap-pad, id-aes256-CCM, id-aes256-GCM, id-aes256-wrap, id-aes256-wrap-pad, id-smime-alg-CMS3DESwrap, idea, idea-cbc, idea-cfb, idea-ecb, idea-ofb, rc2, rc2-128, rc2-40, rc2-40-cbc, rc2-64, rc2-64-cbc, rc2-cbc, rc2-cfb, rc2-ecb, rc2-ofb, rc4, rc4-40, rc4-hmac-md5, RC5, rc5-cbc, rc5-cfb, rc5-ecb, rc5-ofb, seed, seed-cbc, seed-cfb, seed-ecb, seed-ofb, sm4, sm4-cbc, sm4-cfb, sm4-ctr, sm4-ecb, sm4-ofb

6.5.105 Clear

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Clears the current state.

6.5.106 Constructor

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

6.5.107 Control(Type as Integer, Arg as Integer, Data as Ptr)

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Allows various cipher specific parameters to be determined and set.
Notes: See OpenSSL documentation for EVP_CIPHER_CTX_ctrl function.

6.5.108 DecryptInit(key as memoryblock, IV as memoryblock = nil) as Boolean

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initializes the cipher for decrypting.
Example:

```
dim key as string = "mysecretkey"
dim encrypted as string = "6IcB9bpDwOjjONErhYQ6c7+Fb4qszsUNZVU0iThLYqOu7chJ7MG2nwSpRBUY0ZC3"

encrypted = DecodeBase64(encrypted)

dim c as CipherMBS = CipherMBS.aes_128_cbc
call c.DecryptInit key

dim s as string = c.ProcessString(Encrypted)+c.FinalizeAsString

Break // "In welcher Stadt steht das Bundeshaus?" is now in s.
```

Notes: We added for 17.3 a new boolean result:

Returns true in case of success and key length is okay.
Returns false in case of failures like out of memory, wrong key length.

Even if key length is wrong, we initialize (as with older versions before) but may crop the key length to default length.
AES 128 uses 16 byte key length, AES 256 uses 32 byte key length.
Key and IV are both filled with zeros to reach the minimum length.

key: The key to use.
IV: Optional, the initial vector.

You can use IVLength and KeyLength properties to learn how long those should be.

For AES the length of the key defines whether you get 128, 192 or 256 bit encryption. Pass some other key length will return an error. Best is usually to put a hashing algorithm before to make sure the key has the required bit length, e.g. use SHA256MBS class.

6.5.109 desx_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for DESX algorithm in CBC mode.

6.5.110 des_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for DES in CBC.

6.5.111 des_cfb1 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for DES in CFB.

6.5.112 des_cfb64 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for DES in CFB.

6.5.113 des_cfb8 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for DES in CFB.

6.5.114 des_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for DES in ECB.

6.5.115 des_ede as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.116 des_ede3 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.117 des_ede3_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.118 des_ede3_cfb1 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.119 des_ede3_cfb64 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.120 des_ede3_cfb8 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.121 des_ede3_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.122 des_ede3_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.123 des_ede3_wrap as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.124 des_ede_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.125 des_ede_cfb64 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.126 des_ede_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.127 des_ede_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.128 des_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for DES in OFB.

6.5.129 EncryptInit(key as memoryblock, IV as memoryblock = nil) as Boolean

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initializes the cipher for encrypting.
Example:

```
dim c as CipherMBS = CipherMBS.aes_128_cfb128
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output as string = c.ProcessString(data)
output = output + c.FinalizeAsString

MsgBox EncodeHex(output)
```

Notes: We added for 17.3 a new boolean result:

Returns true in case of success and key length is okay.
Returns false in case of failures like out of memory, wrong key length.

Even if key length is wrong, we initialize (as with older versions before) but may crop the key length to default length.
AES 128 uses 16 byte key length, AES 256 uses 32 byte key length.
Key and IV are both filled with zeros to reach the minimum length.

key: The key to use.
IV: Optional, the initial vector.

You can use IVLength and KeyLength properties to learn how long those should be.

For AES the length of the key defines whether you get 128, 192 or 256 bit encryption. Pass some other key length will return an error. Best is usually to put a hashing algorithm before to make sure the key has the

required bit length, e.g. use SHA256MBS class.

6.5.130 FinalizeAsMemory as memoryblock

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Finalizes en/decryption and returns last data.

6.5.131 FinalizeAsString as String

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Finalizes en/decryption and returns last data.
Example:

```
dim c as CipherMBS = CipherMBS.aes_128_cfb128
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output as string = c.ProcessString(data)
output = output + c.FinalizeAsString

MsgBox EncodeHex(output)
```

Notes: Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.

6.5.132 GetGCMTag(Size as Integer = 16) as MemoryBlock

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries tag value for AES GCM.
Example:

```
Dim c As CipherMBS = CipherMBS.aes_256_gcm

// encrypt it
Dim key As String = "12345678"
```

```
Call c.EncryptInit(key)

Dim p1 As String = c.ProcessString("Hello World")
Dim p2 As String = c.FinalizeAsString
Dim encrypted As String = p1 + p2
Dim TagValue As MemoryBlock = c.GetGCMTag

Break

// decrypt it
Dim d As CipherMBS = CipherMBS.aes_256_gcm
Call d.DecryptInit key

Dim d1 As String = d.ProcessString(encrypted)

d.SetGCMTag TagValue

Dim d2 As String = d.FinalizeAsString
Dim decrypted As String = d1 + d2

Break
```

Notes: Calls the Control method with type EVP_CTRL_GCM_GET_TAG (16).
Raises exception in case of an error.

6.5.133 idea_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for IDEA encryption algorithm in CBC.

6.5.134 idea_cfb64 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for IDEA encryption algorithm in CFB.

6.5.135 idea_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for IDEA encryption algorithm in ECB.

6.5.136 idea_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for IDEA encryption algorithm in OFB.

6.5.137 MaxBlockLength as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Maximum possible block length size for any cipher.

6.5.138 MaxIVLength as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Maximum possible IV vector size for any cipher.

6.5.139 MaxKeyLength as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Maximum possible key length size for any cipher.

6.5.140 ProcessFile(InputFile as FolderItem, OutputFile as FolderItem) as boolean

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Processes content of file.
Notes: Plugin will start a preemptive thread to read in file and process all data in chunks and write to output file.
Returns true on success or false on failure. May raise OutOfMemoryException or IOException.
This function works best if called from a thread.

6.5.141 ProcessMemory(data as memoryblock) as MemoryBlock

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Processes data in a memory block.
Notes: due to block sizes, the result may be longer or shorter than the input size.

6.5.142 ProcessString(data as String) as string

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Processes data in a string.
Example:

```
dim key as string = "mysecretkey"
dim encrypted as string = "6IcB9bpDwOjjONErhYQ6c7+Fb4qszsUNZVU0iThLYqOu7chJ7MG2nwSpRBUY0ZC3"

encrypted = DecodeBase64(encrypted)

dim c as CipherMBS = CipherMBS.aes_128_cbc
call c.DecryptInit key

dim s as string = c.ProcessString(Encrypted)+c.FinalizeAsString

Break // "In welcher Stadt steht das Bundeshaus?" is now in s.
```

Notes: due to block sizes, the result may be longer or shorter than the input size.

Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.

6.5.143 rc2_40_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.144 rc2_64_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.145 rc2_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

dim c as CipherMBS = CipherMBS.rc2_cbc
call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

CIV = nil
c = CipherMBS.rc2_cbc
call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)+EndOfLine+"Decrypted: "+output2
```

6.5.146 rc2_cfb64 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

dim c as CipherMBS = CipherMBS.rc2_cfb64
call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString
```

```
CIV = nil
c = CipherMBS.rc2_cfb64
call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)+EndOfLine+"Decrypted: "+output2
```

6.5.147 rc2_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

dim c as CipherMBS = CipherMBS.rc2_ecb
call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

CIV = nil
c = CipherMBS.rc2_ecb
call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)+EndOfLine+"Decrypted: "+output2
```

6.5.148 rc2_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.rc2_ofb
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)

c = CipherMBS.rc2_ofb
CIV = nil

call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Decrypted: "+output2
```

6.5.149 rc4 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.rc4
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)

c = CipherMBS.rc4
CIV = nil

call c.DecryptInit Ckey, CIV
```

```
dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Decrypted: "+output2
```

6.5.150 rc4_40 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.rc4_40
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)

c = CipherMBS.rc4_40
CIV = nil

call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Decrypted: "+output2
```

6.5.151 rc4_hmac_md5 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.rc4_hmac_md5
dim CKey as MemoryBlock = "1234567812345678"
```

```
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)

c = CipherMBS.rc4_hmac_md5
CIV = nil

call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Decrypted: "+output2
```

6.5.152 rc5_32_12_16_cbc as CipherMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.rc5_32_12_16_cbc
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)

c = CipherMBS.rc5_32_12_16_cbc
CIV = nil

call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString
```

```
MsgBox "Decrypted: "+output2
```

Notes: RC5 with CBC. 32 bit word size, 12 rounds, 16 byte key.

6.5.153 rc5_32_12_16_cfb64 as CipherMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.rc5_32_12_16_cfb64
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)

c = CipherMBS.rc5_32_12_16_cfb64
CIV = nil

call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Decrypted: "+output2
```

Notes: RC5 with CFB64. 32 bit word size, 12 rounds, 16 byte key.

6.5.154 rc5_32_12_16_ecb as CipherMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.rc5_32_12_16_ecb
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)

c = CipherMBS.rc5_32_12_16_ecb
CIV = nil

call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Decrypted: "+output2
```

Notes: RC5 with ECB. 32 bit word size, 12 rounds, 16 byte key.

6.5.155 rc5_32_12_16_ofb as CipherMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.
Example:

```
dim c as CipherMBS = CipherMBS.rc5_32_12_16_ofb
dim CKey as MemoryBlock = "1234567812345678"
dim CIV as MemoryBlock
dim data as string = "Hello World. Just a test!"

call c.EncryptInit Ckey, CIV

dim output1 as string = c.ProcessString(data)
output1 = output1 + c.FinalizeAsString

MsgBox "Encrypred as hex: "+EncodeHex(output1)

c = CipherMBS.rc5_32_12_16_ofb
CIV = nil
```

```
call c.DecryptInit Ckey, CIV

dim output2 as string = c.ProcessString(output1)
output2 = output2 + c.FinalizeAsString

MsgBox "Decrypted: "+output2
```

Notes: RC5 with OFB. 32 bit word size, 12 rounds, 16 byte key.

6.5.156 seed_cbc as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The cipher for a Seed CBC.

6.5.157 seed_cfb128 as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Seed cipher for CFB128 mode.

6.5.158 seed_ecb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Cipher for seed ECB.

6.5.159 seed_ofb as CipherMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Seed cipher for OFB mode.

6.5.160 SetGCMTag(Data as MemoryBlock)

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets tag value for AES GCM.
Example:

```
Dim c As CipherMBS = CipherMBS.aes_256_gcm

// encrypt it
Dim key As String = "12345678"

Call c.EncryptInit(key)

Dim p1 As String = c.ProcessString("Hello World")
Dim p2 As String = c.FinalizeAsString
Dim encrypted As String = p1 + p2
Dim TagValue As MemoryBlock = c.GetGCMTag

Break

// decrypt it
Dim d As CipherMBS = CipherMBS.aes_256_gcm
Call d.DecryptInit key

Dim d1 As String = d.ProcessString(encrypted)

d.SetGCMTag TagValue

Dim d2 As String = d.FinalizeAsString
Dim decrypted As String = d1 + d2

Break
```

Notes: Calls the Control method with type EVP_CTRL_GCM_SET_TAG (17).
Raises exception in case of an error.

6.5.161 SetPadding(padding as boolean)

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Enables padding.
Notes: On by default.

6.5.162 sm4_cbc as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.163 sm4_cfb128 as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.164 sm4_ctr as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.165 sm4_ecb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.166 sm4_ofb as CipherMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher.

6.5.167 Properties

6.5.168 BlockSize as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the block size for this cipher.
Notes: (Read only property)

6.5.169 Encrypting as Boolean

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether the class is encrypting or decrypting.
Notes: True if encrypting or false for decrypting.
(Read only property)

6.5.170 Flags as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the flags for the cipher.
Notes: (Read only property)

6.5.171 HasVariableKeyLength as Boolean

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether this cipher has variable key length.
Notes: (Read only property)

6.5.172 IVLength as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the size of the initialization vector.
Notes: (Read only property)

6.5.173 KeyLength as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The key length.
Notes: (Read and Write property)

6.5.174 Mode as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries cipher mode.
Notes: (Read only property)

6.5.175 Name as String

Plugin Version: 14.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: The name of the cipher engine.
Notes: (Read only property)

6.5.176 Padding as Boolean

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether to apply padding or not.
Example:

```
dim c as CipherMBS = CipherMBS.aes_256_ctr

call c.EncryptInit "Hello"

MsgBox "default: "+str(c.Padding)
c.Padding = false

MsgBox "set to false: "+str(c.Padding)
c.Padding = true

MsgBox "set to true: "+str(c.Padding)
```

Notes: On by default.
(Read and Write property)

6.5.177 RC2KeyBits as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number of bits for RC2.
Notes: (Read and Write property)

6.5.178 RC5Rounds as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number of rounds for RC5.
Notes: (Read and Write property)

6.5.179 ZeroPaddingKey as Boolean

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether to do zero padding for the key to reach minimum/default length.
Example:

```
Var AESCipher As CipherMBS = CipherMBS.aes_128_cbc
Var BFCipher As CipherMBS = CipherMBS.bf_cbc
Break // look in debugger
```

Notes: Defaults to true, if key is not of variable length for the cipher.
e.g. AES 128 has a 16 byte key size, so we fill up with zeros to reach that.
(Read and Write property)

6.6 class DigestMBS

6.6.1 class DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The OpenSSL class for calculating hashes.
Example:

```
dim d as DigestMBS = DigestMBS.MD5
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

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

- News from the MBS Xojo Plugins Version 23.3
- MonkeyBread Software Releases the MBS Xojo Plugins in version 23.3
- MBS Xojo Plugins, version 23.3pr3
- MacOSX plugin for iOS
- News from the MBS Xojo Plugins Version 20.3
- MBS Xojo Plugins, version 20.3pr5
- Multithreaded plugin functions can increase speed of Xojo application
- MBS Xojo Plugins, version 18.5pr1
- Doing hash or encryption on several CPUs in Xojo
- MBS Xojo / Real Studio plug-ins in version 13.5

Xojo Developer Magazine

- 21.5, page 9: News
- 12.1, page 9: News

6.6.2 Methods

6.6.3 blake2b512 as DigestMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for Black 2b 512.
Example:

```
Dim d As DigestMBS = DigestMBS.blake2b512

d.Process "The quick brown fox jumps over the lazy dog"

Dim hash As String = d.FinalText

Break
// A8ADD4BDDDFD93E4877D2746E62817B116364A1FA7BC148D95090BC7333B3673F82401CF7AA2E4CB1ECD90296E3
```

Notes: see
https://en.wikipedia.org/wiki/BLAKE_(hash_function)

6.6.4 blake2s256 as DigestMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for Black 2s 256.
Example:

```
Dim d As DigestMBS = DigestMBS.blake2s256

d.Process "The quick brown fox jumps over the lazy dog"

Dim hash As String = d.FinalText

Break
// 606BEEEC743CCBEFF6CBCDF5D5302AA855C256C29B88C8ED331EA1A6BF3C8812
```

6.6.5 Clear

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Clears the current state.

6.6.6 Constructor

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

6.6.7 DigestByName(name as string) as DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries a digest by name.
Example:

```
dim d as DigestMBS = DigestMBS.DigestByName("md5")
MsgBox str(d.Size)
```

Notes: Returns nil if name is not registered.
May need string to be in upper case.

6.6.8 DigestNames as String()

Plugin Version: 18.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries list of all digest algorithms.
Example:

```
// see hash and encryption algorithms available
dim CipherNames() as string = CipherMBS.CipherNames
dim DigestNames() as string = DigestMBS.DigestNames
Break
```

Notes: The list may not be the same for Mac, Windows and Linux.

Current list:

blake2b512, blake2s256, id-rsassa-pkcs1-v1_5-with-sha3-224, id-rsassa-pkcs1-v1_5-with-sha3-256, id-rsassa-pkcs1-v1_5-with-sha3-384, id-rsassa-pkcs1-v1_5-with-sha3-512, md4, md4WithRSAEncryption, md5, md5-sha1, md5WithRSAEncryption, mdc2, mdc2WithRSA, ripemd, ripemd160, ripemd160WithRSA, rmd160, RSA-MD4, RSA-MD5, RSA-MDC2, RSA-RIPEMD160, RSA-SHA1, RSA-SHA1-2, RSA-SHA224, RSA-SHA256, RSA-SHA3-224, RSA-SHA3-256, RSA-SHA3-384, RSA-SHA3-512, RSA-SHA384, RSA-SHA512, RSA-SHA512/224, RSA-SHA512/256, RSA-SM3, sha1, sha1WithRSAEncryption, sha224, sha224WithRSAEncryption, sha256, sha256WithRSAEncryption, sha3-224, sha3-256, sha3-384, sha3-512, sha384, sha384WithRSAEncryption, sha512, sha512-224, sha512-224WithRSAEncryption, sha512-256, sha512-256WithRSAEncryption, sha512WithRSAEncryption, shake128, shake256, sm3, sm3WithRSAEncryption, ssl3-md5, ssl3-sha1, whirlpool

6.6.9 Final as memoryblock

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Finalizes the hash and returns it.

6.6.10 FinalText as String

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Finalizes the hash and returns it.
Notes: Returns text with hex encoding.

6.6.11 MD5 as DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for MD5.
Example:

```
dim d as DigestMBS = DigestMBS.MD5
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.12 MDC2 as DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for MDC2.
Example:

```
dim d as DigestMBS = DigestMBS.MDC2
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.13 Process(data as memoryblock)

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Adds more data to the hash.
See also:

- 6.6.14 Process(data as string) 116
- 6.6.15 Process(file as FolderItem) as boolean 116

6.6.14 Process(data as string)

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Adds more data to the hash.
See also:

- 6.6.13 Process(data as memoryblock) 115
- 6.6.15 Process(file as FolderItem) as boolean 116

6.6.15 Process(file as FolderItem) as boolean

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Processes content of file.
Notes: Plugin will start a preemptive thread to read in file and process all data in chunks.
Returns true on success or false on failure. May raise OutOfMemoryException or IOException.
This function works best if called from a thread.
See also:

- 6.6.13 Process(data as memoryblock) 115
- 6.6.14 Process(data as string) 116

6.6.16 RipeMD160 as DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for RipeMD160.
Example:

```
dim d as DigestMBS = DigestMBS.RipeMD160
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.17 SHA1 as DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA 1.
Example:

```
dim d as DigestMBS = DigestMBS.SHA1
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.18 SHA224 as DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA 224.
Example:

```
dim d as DigestMBS = DigestMBS.SHA224
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.19 SHA256 as DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA 256.
Example:

```
dim d as DigestMBS = DigestMBS.SHA256
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.20 SHA384 as DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA 384.

Example:

```
dim d as DigestMBS = DigestMBS.SHA384
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.21 SHA3_224 as DigestMBS

Plugin Version: 20.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA-3 with 224 bits.
Example:

```
dim d as DigestMBS = DigestMBS.SHA3_224
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.22 SHA3_256 as DigestMBS

Plugin Version: 20.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA-3 with 256 bits.
Example:

```
dim d as DigestMBS = DigestMBS.SHA3_256
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.23 SHA3_384 as DigestMBS

Plugin Version: 20.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA-3 with 384 bits.
Example:

```
dim d as DigestMBS = DigestMBS.SHA3_384
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.24 SHA3_512 as DigestMBS

Plugin Version: 20.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA-3 with 512 bits.
Example:

```
dim d as DigestMBS = DigestMBS.SHA3_512
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.25 SHA512 as DigestMBS

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA512.
Example:

```
dim d as DigestMBS = DigestMBS.SHA512
d.Process "Hello World"
dim result as string = EncodeHex(d.Final)
MsgBox result
```

6.6.26 SHA512_224 as DigestMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA 512 with 224 bit.
Example:

```
Dim d As DigestMBS = DigestMBS.SHA512_224

d.Process "The quick brown fox jumps over the lazy dog"

Dim hash As String = d.FinalText

Break
// 944CD2847FB54558D4775DB0485A50003111C8E5DAA63FE722C6AA37
```

6.6.27 SHA512_256 as DigestMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for SHA 512 with 256 bit.
Example:

```
Dim d As DigestMBS = DigestMBS.SHA512_256

d.Process "The quick brown fox jumps over the lazy dog"

Dim hash As String = d.FinalText

Break
// DD9D67B371519C339ED8DBD25AF90E976A1EEEFD4AD3D889005E532FC5BEF04D
```

6.6.28 shake128 as DigestMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for shake 128 bit.
Example:

```
Dim d As DigestMBS = DigestMBS.shake128

d.Process "The quick brown fox jumps over the lazy dog"

Dim hash As String = d.FinalText

Break
// F4202E3C5852F9182A0430FD8144F0A7
```

6.6.29 shake256 as DigestMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for shake 256.
Example:

```
Dim d As DigestMBS = DigestMBS.shake256

d.Process "The quick brown fox jumps over the lazy dog"

Dim hash As String = d.FinalText

Break
```

// 2F671343D9B2E1604DC9DCF0753E5FE15C7C64A0D283CBBF722D411A0E36F6CA

6.6.30 sm3 as DigestMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for sm3.
Example:

```
Dim d As DigestMBS = DigestMBS.sm3

d.Process "The quick brown fox jumps over the lazy dog"

Dim hash As String = d.FinalText

Break
// 5FDFE814B8573CA021983970FC79B2218C9570369B4859684E2E4C3FC76CB8EA
```

6.6.31 whirlpool as DigestMBS

Plugin Version: 23.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the cipher for whirlpool.
Example:

```
Dim d As DigestMBS = DigestMBS.whirlpool

d.Process "The quick brown fox jumps over the lazy dog"

Dim hash As String = d.FinalText

Break
// B97DE512E91E3828B40D2B0FDCE9CEB3C4A71F9BEA8D88E75C4FA854DF36725FD2B52EB6544ED-
CACD6F8BEDDFEA403CB55AE31F03AD62A5EF54E42EE82C3FB35
```

Notes: see
https://en.wikipedia.org/wiki/Whirlpool_(hash_function)

6.6.32 Properties

6.6.33 BlockSize as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries block size.
Example:

```
dim d as DigestMBS = DigestMBS.DigestByName("md5")
MsgBox str(d.BlockSize)
```

Notes: (Read only property)

6.6.34 Name as String

Plugin Version: 14.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: The name of the digest engine.
Notes: (Read only property)

6.6.35 Size as Integer

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries size of digest.
Example:

```
dim d as DigestMBS = DigestMBS.SHA512
MsgBox str(d.Size)
```

Notes: (Read only property)

6.7 Globals

6.7.1 MD5MBS(data as memoryblock) as string

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the MD5 message digest value of a memoryblock as 16 byte string.

6.7.2 MD5StringMBS(data as memoryblock) as string

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the MD5 message digest value of a string as hex string.

6.7.3 MD5MBS(data as string) as string

Plugin Version: 3.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the MD5 message digest value of a string.
Example:

```
// Compare RB5 MD5 to the one from MBS

dim a,b as String

a=MD5("Hallo")

b=MD5MBS("Hallo")

msgbox str(StrComp(a,b,0))
```

Notes: Same as the MD5 function in RB5.
Blog Entries

- MBS Xojo Plugins, version 19.4pr3
- MBS Real Studio Plugins, version 12.5pr12
- Encryption Interoperability
- MBS SQLite Extension 0.9
- REAL Server Plugin 0.2

6.7.4 MD5StringMBS(data as string) as string

Plugin Version: 10.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the MD5 message digest value of a string as hex string.
Example:

```
// Compare RB5 MD5 to the one from MBS

dim a,b as String

a=EncodingToHexMBS(MD5("Franz jagt im komplett verwahrlosten Taxi quer durch Bayern"))
b=MD5StringMBS("Franz jagt im komplett verwahrlosten Taxi quer durch Bayern")

msgbox a+EndOfLine+b+EndOfLine+str(StrComp(a,b,0))
```

Blog Entries

- REAL Server Plugin 0.2

6.8 class ECDHEMBS

6.8.1 class ECDHEMBS

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for ECDH key creation.
Notes: Elliptic Curve Diffie Hellman (ECDH) is an Elliptic Curve variant of the standard Diffie Hellman algorithm. See Elliptic Curve Cryptography for an overview of the basic concepts behind Elliptic Curve algorithms. ECDH is used for the purposes of key agreement.

Constructor to create and map functions into the struct.
EC_Curve_NID An Elliptical Curve ID specified in the openssl header <openssl/obj_mac.h>. (e.g. NID_X9_62_prime256v1)
Blog Entries

- MBS Xojo Plugins, version 19.1pr1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 17.5
- MBS Xojo Plugins, version 17.5pr5
- MBS Xojo Plugins, version 17.5pr4
- MBS Xojo Plugins, version 17.2pr2

- MBS Xojo / Real Studio Plugins, version 14.2pr10
- MBS Xojo / Real Studio plug-ins in version 13.4
- MBS Xojo / Real Studio Plugins, version 13.4pr2

Xojo Developer Magazine

- 16.1, page 10: News
- 11.6, page 8: News

6.8.2 Methods

6.8.3 Constructor(CurveID as Integer)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The constructor.
Notes: Creates a new key with the given CurveID, e.g. NID_X9_62_prime256v1.

6.8.4 DeriveSecretKey(peerKey as string) as string

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: After receiving a public key from your peer, derive the secret key by combining the peer key with yours.
Notes: Returns a string (i.e. shared secret) that is the result of the EC DHE secret derivation.
Never use a derived secret directly. Typically it is passed through some hash function to produce a key (e.g. SHA512).
peerKey: A string containing the peer's public key.

6.8.5 Destructor

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The destructor.
Notes: Public keys and shared secrets should be copied before freeing memory as ecdhe owns the public key and shared secret.

6.8.6 LastError as String

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The last error string.

6.8.7 PublicKey as string

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the public key.
Example:

```
dim EC_Curve_ID as Integer = 415 // NID_X9_62_prime256v1
dim ec_dhe as new ECDHEMBS(EC_Curve_ID)
dim publicKey as string = ec_dhe.PublicKey

MsgBox publicKey
```

Notes: Returns a string (i.e. public key) to be shared with your peer; this can be accomplished over the network or by file.
Encoding is PEM, so you can write to a file with .pem file name extension.

6.8.8 Properties

6.8.9 CurveID as Integer

Plugin Version: 17.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The Curve ID used in constructor.
Notes: (Read only property)

6.8.10 CurveIDName as String

Plugin Version: 17.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The textual name of the used curve ID.
Notes: (Read only property)

6.8.11 ParamsInfo as String

Plugin Version: 17.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Debug Information on the parameters used.
Notes: (Read only property)

6.8.12 PeerKeyInfo as String

Plugin Version: 17.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Debug Information on the peer key used.
Notes: (Read only property)

6.8.13 PrivateKeyInfo as String

Plugin Version: 17.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Debug Information on the private key used.
Notes: (Read only property)

6.8.14 Constants

Curve IDs

Constant	Value	Description
NID_secp112r1	704	
NID_secp112r2	705	
NID_secp128r1	706	
NID_secp128r2	707	
NID_secp160k1	708	
NID_secp160r1	709	
NID_secp160r2	710	
NID_secp192k1	711	
NID_secp224k1	712	
NID_secp224r1	713	
NID_secp256k1	714	
NID_secp384r1	715	
NID_secp521r1	716	
NID_sect113r1	717	
NID_sect113r2	718	
NID_sect131r1	719	
NID_sect131r2	720	
NID_sect163k1	721	
NID_sect163r1	722	
NID_sect163r2	723	
NID_sect193r1	724	
NID_sect193r2	725	
NID_sect233k1	726	
NID_sect233r1	727	
NID_sect239k1	728	
NID_sect283k1	729	
NID_sect283r1	730	
NID_sect409k1	731	
NID_sect409r1	732	
NID_sect571k1	733	
NID_sect571r1	734	
NID_wap_wsg_idm_ecid_wtls1	735	
NID_wap_wsg_idm_ecid_wtls10	743	
NID_wap_wsg_idm_ecid_wtls11	744	
NID_wap_wsg_idm_ecid_wtls12	745	
NID_wap_wsg_idm_ecid_wtls3	736	
NID_wap_wsg_idm_ecid_wtls4	737	
NID_wap_wsg_idm_ecid_wtls5	738	
NID_wap_wsg_idm_ecid_wtls7	740	
NID_wap_wsg_idm_ecid_wtls8	741	
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NID_X9_62_c2pnb163v1	684	
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NID_X9_62_c2pnb176v1	687	
NID_X9_62_c2pnb208w1	693	
NID_X9_62_c2pnb272w1	699	
NID_X9_62_c2pnb304w1	700	
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NID_X9_62_c2tnb191v1	688	
NID_X9_62_c2tnb191v2	689	
NID_X9_62_c2tnb191v3	690	
NID_X9_62_c2tnb239v1	694	
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NID_X9_62_c2tnb239v3	696	
NID_X9_62_c2tnb359v1	701	
NID_X9_62_c2tnb431r1	703	
NID_X9_62_prime256v1	415	

6.9 class ECKeyMBS

6.9.1 class ECKeyMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for Elliptic Curve Digital Signature Algorithm.
Example:

```
const NID_secp192k1 = 711
dim key as ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)

MsgBox key.Description
```

Blog Entries

- New in the MBS Xojo Plugins Version 20.2
- MonkeyBread Software Releases the MBS Xojo Plugins in version 20.2
- MBS Xojo Plugins, version 20.2pr6
- MBS Xojo / Real Studio plug-ins in version 15.4

6.9.2 Methods

6.9.3 BuiltInCurves as Dictionary

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries built in curves.
Example:

```
// show curve IDs with description in listbox
dim d as Dictionary = ECKeyMBS.BuiltInCurves

for each key as Variant in d.keys
Listbox1.AddRow key, d.Value(key)
next
```

Notes: The dictionary returned has as key the ID and the description as value.

The list looks like this:

6.9.4 Constructor

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The constructor.

6.9.5 Copy as ECKeyMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a copy of the key.

6.9.6 Generate as Boolean

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Generates new key and stores in the current object.
Notes: Returns true on success or false on failure.

6.9.7 GetPrivateKey(Hex as Boolean) as String

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries priv key.
Example:

```
// make a key
Const NID_secp192k1 = 711
Dim e As ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)

// show private key
MsgBox e.GetPrivateKey(True)+_
EndOfLine+_
e.GetPrivateKey(False)
```

Notes: The private key is a big number, which can be returned as decimal or hexadecimal value.

6.9.8 GetPublicKey(byref x as String, byref y as String, Hex as Boolean) as Boolean

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries X and Y of public key.
Example:

```
// make a key
Const NID_secp192k1 = 711
Dim e As ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)

// show public key
dim x,y as string
If e.GetPublicKey(x, y, False) Then
MsgBox x+EndOfLine+y
End If
```

Notes: The public key is made up with two big numbers, which can be returned as decimal or hexadecimal value.
Returns true on success or false on failure.

6.9.9 GetPublicKeyPoint as String

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries Public key as hex string.
Example:

```
// make a key
Const NID_secp192k1 = 711
Dim e As ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)

// show public key
msgbox e.GetPublicKeyPoint
```

Notes: Can be queried to save/send and later be assigned with SetPublicKeyPoint.

6.9.10 KeyByCurveName(CurveID as Integer, Generate as Boolean = true) as ECKeyMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Generates a new pair of private and public keys.
Example:

```
const NID_secp192k1 = 711
dim key as ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)

MsgBox key.Description
```

Notes: You can use ReadPrivateKey and ReadPublicKey functions to get the keys.
If Generate is false, we create an empty object with private and public keys.

Some possible curve IDs:

6.9.11 OpenPrivateKey(Data as String) as ECKeyMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Opens a private key.
Example:

```
const NID_secp192k1 = 711
dim key as ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)
dim PrivateKeyData as string = key.PrivateKey

// read again
dim pub as ECKeyMBS = ECKeyMBS.OpenPrivateKey(PrivateKeyData)
MsgBox pub.Description
```

Notes: The key is in binary format and you may need to use EncodeBase64/DecodeBase64.

6.9.12 OpenPublicKey(Data as String, CurveID as Integer) as ECKeyMBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Opens a public key.
Example:

```
const NID_secp192k1 = 711
dim key as ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)
dim pubKeyData as string = key.PublicKey

// read again
```

```
dim pub as ECKeyMBS = ECKeyMBS.OpenPublicKey(pubKeyData, NID_secp192k1)
MsgBox pub.Description
```

6.9.13 PrivateKey as String

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the priv key.
Example:

```
const NID_secp192k1 = 711
dim key as ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)
dim Data as string = key.PrivateKey
MsgBox EncodeBase64(data)
```

6.9.14 PublicKey as String

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the public key.
Example:

```
const NID_secp192k1 = 711
dim key as ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)
dim Data as string = key.PublicKey
MsgBox EncodeBase64(data)
```

6.9.15 SetPrivateKey(Value as String, Hex as Boolean) as Boolean

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets the key.
Example:

```
// make a key
Const NID_secp192k1 = 711
Dim e As ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)

MsgBox e.Description

// get hex
```

```
Dim pubk As String = e.GetPublicKeyPoint
Dim priv As String = e.GetPrivateKey(False)


// make new empty key and put in the data
Dim ee As ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1, False)

If ee.SetPrivateKey(priv, False) Then
If ee.SetPublicKeyPoint(pubk) Then
MsgBox ee.Description
Else
Break // failed?
End If
Else
Break // failed?
End If
```

Notes: Returns true on success or false on failure.

6.9.16 SetPublicKey(x as String, y as String, Hex as Boolean) as Boolean

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets X and Y of public key.
Example:

```
// make a key
Const NID_secp192k1 = 711
Dim e As ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)

MsgBox e.Description

// get hex
Dim pubk As String = e.GetPublicKeyPoint
Dim priv As String = e.GetPrivateKey(False)


// make new empty key and put in the data
Dim ee As ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1, False)

If ee.SetPrivateKey(priv, False) Then
If ee.SetPublicKeyPoint(pubk) Then
MsgBox ee.Description
Else
Break // failed?
```

```
End If
Else
Break // failed?
End If
```

Notes: Returns true on success or false on failure.

6.9.17 SetPublicKeyPoint(Value as String) as Boolean

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets public key.
Notes: Returns true on success or false on failure.

6.9.18 Sign(Data as String) as String

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Signs the given data.
Example:

```
const NID_secp192k1 = 711
dim key as ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)
dim text as string = "Hello World"
dim data as string = SHA512MBS.Hash(text)
dim sig as string = key.Sign(data)

if key.Verify(data, sig) then
MsgBox "Signature ok"
end if
```

Notes: We highly recommend to use a hash like SHA-512 to preprocess the data.
Returns the signature as string on success.

6.9.19 Verify(SignatureData as String, Data as String) as Boolean

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Verifies the digital signature.
Example:

```
const NID_secp192k1 = 711
dim key as ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)
dim text as string = "Hello World"
dim data as string = SHA512MBS.Hash(text)
dim sig as string = key.Sign(data)

if key.Verify(data, sig) then
MsgBox "Signature ok"
end if
```

Notes: Returns true on success. Returns false if data, signature and public key don't belong together. We highly recommend to use a hash like SHA-512 to preprocess the data.

6.9.20 Properties

6.9.21 CanSign as Boolean

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Indicates if an ECKey can be used for signing.
Notes: Returns true if can can sign and false otherwise.
(Read only property)

6.9.22 Description as String

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns an user readable description text for the current key.
Example:

```
const NID_secp192k1 = 711
dim key as ECKeyMBS = ECKeyMBS.KeyByCurveName(NID_secp192k1)

MsgBox key.Description
```

Notes: (Read only property)

6.9.23 Flags as Integer

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The flag field.
Notes: see OpenSSL for details.
(Read and Write property)

6.9.24 Size as Integer

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns size of key.
Notes: (Read only property)

6.9.25 Valid as Boolean

Plugin Version: 20.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Verifies that a private and/or public key is valid.
Notes: Returns true on success and false otherwise.
(Read only property)

704 SECG/WTLS curve over a 112 bit prime field
705 SECG curve over a 112 bit prime field
706 SECG curve over a 128 bit prime field
707 SECG curve over a 128 bit prime field
708 SECG curve over a 160 bit prime field
709 SECG curve over a 160 bit prime field
710 SECG/WTLS curve over a 160 bit prime field
711 SECG curve over a 192 bit prime field
712 SECG curve over a 224 bit prime field
713 NIST/SECG curve over a 224 bit prime field
714 SECG curve over a 256 bit prime field
715 NIST/SECG curve over a 384 bit prime field
716 NIST/SECG curve over a 521 bit prime field
409 NIST/X9.62/SECG curve over a 192 bit prime field
410 X9.62 curve over a 192 bit prime field
411 X9.62 curve over a 192 bit prime field
412 X9.62 curve over a 239 bit prime field
413 X9.62 curve over a 239 bit prime field
414 X9.62 curve over a 239 bit prime field
415 X9.62/SECG curve over a 256 bit prime field
717 SECG curve over a 113 bit binary field
718 SECG curve over a 113 bit binary field
719 SECG/WTLS curve over a 131 bit binary field
720 SECG curve over a 131 bit binary field
721 NIST/SECG/WTLS curve over a 163 bit binary field
722 SECG curve over a 163 bit binary field
723 NIST/SECG curve over a 163 bit binary field
724 SECG curve over a 193 bit binary field
725 SECG curve over a 193 bit binary field
726 NIST/SECG/WTLS curve over a 233 bit binary field
727 NIST/SECG/WTLS curve over a 233 bit binary field
728 SECG curve over a 239 bit binary field
729 NIST/SECG curve over a 283 bit binary field
730 NIST/SECG curve over a 283 bit binary field
731 NIST/SECG curve over a 409 bit binary field
732 NIST/SECG curve over a 409 bit binary field
733 NIST/SECG curve over a 571 bit binary field
734 NIST/SECG curve over a 571 bit binary field
684 X9.62 curve over a 163 bit binary field
685 X9.62 curve over a 163 bit binary field
686 X9.62 curve over a 163 bit binary field
687 X9.62 curve over a 176 bit binary field
688 X9.62 curve over a 191 bit binary field
689 X9.62 curve over a 191 bit binary field
690 X9.62 curve over a 191 bit binary field
693 X9.62 curve over a 208 bit binary field
694 X9.62 curve over a 239 bit binary field
695 X9.62 curve over a 239 bit binary field

secp112r1	704
secp112r2	705
secp128r1	706
secp128r2	707
secp160k1	708
secp160r1	709
secp160r2	710
secp192k1	711
secp224k1	712
secp224r1	713
secp256k1	714
secp384r1	715
secp521r1	716
sect113r1	717
sect113r2	718
sect131r1	719
sect131r2	720
sect163k1	721
sect163r1	722
sect163r2	723
sect193r1	724
sect193r2	725
sect233k1	726
sect233r1	727
sect239k1	728
sect283k1	729
sect283r1	730
sect409k1	731
sect409r1	732
sect571k1	733
sect571r1	734

6.10 class MD5DigestMBS

6.10.1 class MD5DigestMBS

Plugin Version: 3.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: A class to calculate the message-digest of a string.
Notes: Same class as the one in RB5, so the same documentation:

The MD5Digest class enables you to process a string in segments. Pass each string segment to the Process method. The value property contains the current message digest and the clear method clears the MD5Digest object so that you can repeat the process.

The MD5 message digest algorithm takes a message of any length and produces a 128-bit "fingerprint" or message digest of the input string. The MD5 algorithm is useful for digital signature applications, where a large file must be processed in a secure manner before being encrypted with a secret key under a system such as RSA.
Blog Entries

- Multithreaded plugin functions can increase speed of Xojo application
- MBS Xojo / Real Studio Plugins, version 14.2pr8
- Doing hash or encryption on several CPUs in Xojo
- MBS Real Studio Plugins, version 13.1pr15
- MBS Real Studio Plugins, version 11.3pr11

6.10.2 Methods

6.10.3 clear

Plugin Version: 3.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Resets the MD5Digest object so that you can start with a new data stream.

6.10.4 HashFile(file as FolderItem, Hex as boolean = true) as string

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Calculates hash from whole file.
Notes: Plugin will start a preemptive thread to read in file and process all data in chunks.
Returns hash on success or empty string on failure. May raise OutOfMemoryException or IOException.
This function works best if called from a thread.

If hex is true, the result is encoded as hex string.

The work is performed on a preemptive thread, so this function does not block the application and can yield time to other Xojo threads. Must be called in a Xojo thread to enjoy benefits. If called in main thread will block, but keep other background threads running.
If you run several threads calling MT methods, you can get all CPU cores busy while main thread shows GUI with progress window.

6.10.5 HMAC(key as string, data as string) as string

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the a specific HASH based on the key and the data string.

6.10.6 MD5(data as memoryblock) as string

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the MD5 message digest value of a string.
See also:

- 6.10.7 MD5(data as string) as string 141

6.10.7 MD5(data as string) as string

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the MD5 message digest value of a string.
Example:

```
// Compare RB5 MD5 to the one from MBS

dim a,b as String

a=MD5("Hallo")

b=MD5DigestMBS.MD5("Hallo")

msgbox str(StrComp(a,b,0))
```

Notes: Same as the MD5 function in RB5.
See also:

6.10.8 MD5String(data as memoryblock) as string

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the MD5 message digest value of a memoryblock as hex string.
See also:

6.10.9 MD5String(data as string) as string

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the MD5 message digest value of a string as hex string.
Example:

```
// Compare RB5 MD5 to the one from MBS

dim a,b as String

a=EncodingToHexMBS(MD5("Franz jagt im komplett verwahrlosten Taxi quer durch Bayern"))
b=MD5DigestMBS.MD5String("Franz jagt im komplett verwahrlosten Taxi quer durch Bayern")

msgbox a+EndOfLine+b+EndOfLine+str(StrComp(a,b,0))
```

See also:

6.10.10 Process(data as memoryblock)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Processes the given data.
See also:

6.10.11 Process(Data as string)

Plugin Version: 3.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Processes the given data.
Example:

```
dim f as FolderItem
dim b as BinaryStream
dim s as string
dim m as new MD5DigestMBS
dim lines(-1) as string

// process file part by part (big files)

f=SpecialFolder.Desktop.Child("test.jpg")
b=f.OpenAsBinaryFile(False)

while not b.eof
s=b.Read(1000000)
m.Process s
wend

lines.append EncodingToHexMBS(m.Value)+" using plugin with MD5DigestMBS"

dim d as new MD5Digest

f=SpecialFolder.Desktop.Child("test.jpg")
b=f.OpenAsBinaryFile(False)

while not b.eof
s=b.Read(1000000)
d.Process s
wend

lines.append EncodingToHexMBS(d.Value)+" using RB with MD5Digest"

// process file in one chunk (small files)

f=SpecialFolder.Desktop.Child("test.jpg")
b=f.OpenAsBinaryFile(False)

s=b.Read(b.Length)

lines.append EncodingToHexMBS(MD5MBS(s))+" using plugin with MD5MBS()"

f=SpecialFolder.Desktop.Child("test.jpg")
b=f.OpenAsBinaryFile(False)

s=b.Read(b.length)

lines.append EncodingToHexMBS(MD5(s))+" using RB with MD5()"
```

MsgBox Join(lines,EndOfLine)

See also:

- 6.10.10 Process(data as memoryblock) 142

6.10.12 Properties

6.10.13 Value as string

Plugin Version: 3.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Contains the current message digest.
Notes: (Read only property)

6.11 class OpenSSLExceptionMBS

6.11.1 class OpenSSLExceptionMBS

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: The OpenSSL class for error exceptions.
Notes: Subclass of the RuntimeException class.
Blog Entries

- MBS Xojo / Real Studio Plugins, version 15.1pr7

6.12 module OpenSSLMBS

6.12.1 module OpenSSLMBS

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: A module for OpenSSL functions.
Notes: Please request what you miss here.
Blog Entries

- MBS Xojo Plugins, version 20.5pr7
- JWT RS256 authentication in Xojo
- MBS Xojo Plugins, version 20.0pr6
- MonkeyBread Software Releases the MBS Xojo Plugins in version 19.3
- MBS Xojo Plugins, version 19.3pr5
- MBS Xojo Plugins, version 18.4pr1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 18.0
- MBS Xojo Plugins, version 18.0pr7
- Sign PDF with DynaPDF and your custom signature
- MBS Xojo Plugins, version 17.5pr2

Xojo Developer Magazine

- 17.5, page 9: News

6.12.2 Methods

6.12.3 ErrorString(ErrorCode as Integer) as string

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the human readable error string for an OpenSSL error.
Example:

```
MsgBox OpenSSLMBS.ErrorString(336109761)
```

6.12.4 GeneratePrivateKey(Bits as Integer = 4096, Exp as Integer = 65537, Password as string = "", Algorithm as string = "") as string

Plugin Version: 16.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Generates a new private key.
Example:

```
dim privateKey as string = OpenSSLMBS.GeneratePrivateKey
dim publicKey as string = OpenSSLMBS.GetPublicKey(privateKey)

break // got key pair
```

Notes: Bit size of key should be high.
See RSA key documentation on the web about details.

In Plugin version 16.2 and later this function yields time to other Xojo threads.
Algorithm specifies the encryption algorithm for key encryption. See CipherMBS for cipher names, e.g. "AES-128-CBC". (new in 17.5)

6.12.5 GetPublicKey(PrivateKey as String, PrivateKeyPassword as string = "") as string

Plugin Version: 16.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extracts public key from private key.
Example:

```
dim privateKey as string = OpenSSLMBS.GeneratePrivateKey
dim publicKey as string = OpenSSLMBS.GetPublicKey(privateKey)

break // got key pair
```

Notes: Optionally you can define a password for private key.

6.12.6 OpenSSLVersion as String

Plugin Version: 16.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries version of OpenSSL version.
Example:

MsgBox OpenSSLMBS.OpenSSLVersion

6.12.7 PKCS7Sign(flags as Integer, InputData as string, SignKey as string, PrivateKey as String, PrivateKeyPassword as string, intermediaCertsData() as string, OutputBinary as boolean) as string

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Signs with SMIME.
Example:

```
dim testPrivKey as string = ReadFile("passkey.pem")
dim testCertificate as string = ReadFile("passcertificate.pem")
dim data as string = ReadFile("test.txt")
dim privKeyPassword as string = "12345"

dim intermediateCertificates() as string
intermediateCertificates.Append ReadFile("WWDR.pem")
dim Sign as string = OpenSSLMBS.PKCS7Sign(0, data, testCertificate, testPrivKey, privKeyPassword, intermediateCertificates, true)

// write result
dim f as FolderItem = SpecialFolder.Desktop.Child("output")
dim b as BinaryStream = BinaryStream.Create(f, true)
b.Write sign
```

Notes: Returns the signature. If OutputBinary is true, we use DER output, else text based output.
intermediaCertsData array can be empty if you have no intermediate certificates.

6.12.8 PKCS7SignData(Certificate as X509MBS, PrivateKey as PKeyMBS, certs() as X509MBS = nil, data as string, flags as Integer = 0) as string

Plugin Version: 18.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Signs with PKCS7.
Notes: Returns the signature (binary format = DER).
intermediaCertsData array can be empty or nil if you have no intermediate certificates.

6.12.9 PKCS7SignedData(DataP7M as String) as String

Plugin Version: 19.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Reads content of signed data in PKCS7 file.
Example:

```
// get a file
Dim f As FolderItem = GetFolderItem("/Users/cs/Desktop/p7m/work.xml.p7m", FolderItem.PathTypeNative)

// read
Dim b As BinaryStream = BinaryStream.Open(f)
Dim s As String = b.Read(b.Length)

// decode
Dim data As String = OpenSSLMBS.PKCS7SignedData(s)

Break
```

Notes: Please pass content of a P7M file, so we can read signed content.
Returns data or empty string if this failed.

6.12.10 RandomBytes(count as Integer) as MemoryBlock

Plugin Version: 20.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Generates random bytes.
Example:

```
Dim m As MemoryBlock = OpenSSLMBS.RandomBytes(16)
MsgBox EncodeHex(m)
```

Notes: Puts count cryptographically strong pseudo-random bytes into MemoryBlock.

6.12.11 RandomBytesString(count as Integer) as String

Plugin Version: 20.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Generates random bytes.
Example:

```
Dim p As String = OpenSSLMBS.RandomBytesString(16)
```

```
MsgBox EncodeHex(p)
```

Notes: Puts count cryptographically strong pseudo-random bytes into string.

6.12.12 RSAPrivateDecrypt(data as string, PrivateKey as string, padding as Integer = 1, Password as string = "") as String

Plugin Version: 16.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts data using private key.
Example:

```
// encrypt with public, decrypt with private key

dim f1 as FolderItem = GetFolderItem("test.pem")
dim b1 as BinaryStream = BinaryStream.Open(f1)
dim PrivKey as string = B1.Read(b1.Length)

dim f2 as FolderItem = GetFolderItem("test.pub")
dim b2 as BinaryStream = BinaryStream.Open(f2)
dim PubKey as string = B2.Read(b2.Length)

dim UnencryptedData as string = "Hello World. This is just a test."
dim EncryptedData as string = OpenSSLMBS.RSAPublicEncrypt(UnencryptedData, PubKey)
dim decryptedData as string = OpenSSLMBS.RSAPrivateDecrypt(EncryptedData, PrivKey)

Break // check in debugger
```

Notes: See kPadding constants for Padding parameter.
Password is optional for decrypting encrypted keys.
Returns empty string on failure or raises exceptions.

RSA can only decrypt data if it's <= length of key.

6.12.13 RSAPrivateEncrypt(data as string, PrivateKey as string, padding as Integer = 1, Password as string = "") as String

Plugin Version: 16.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts data using private key.
Example:

```
// encrypt with private, decrypt with public key

dim f1 as FolderItem = GetFolderItem("test.pem")
dim b1 as BinaryStream = BinaryStream.Open(f1)
dim PrivKey as string = B1.Read(b1.Length)

dim f2 as FolderItem = GetFolderItem("test.pub")
dim b2 as BinaryStream = BinaryStream.Open(f2)
dim PubKey as string = B2.Read(b2.Length)

dim UnencryptedData as string = "Hello World. This is just a test."
dim EncryptedData as string = OpenSSLMBS.RSAPrivateEncrypt(UnencryptedData, PrivKey)
dim decryptedData as string = OpenSSLMBS.RSAPublicDecrypt(EncryptedData, PubKey)

Break // check in debugger
```

Notes: See kPadding constants for Padding parameter.
Password is optional for decrypting encrypted keys.
Returns empty string on failure or raises exceptions.

RSA can only encrypt data if it's <= length of key.

6.12.14 RSAPublicDecrypt(data as string, PublicKey as string, padding as Integer = 1, Password as string = "") as String

Plugin Version: 16.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts data using public key.
Example:

```
// encrypt with private, decrypt with public key

dim f1 as FolderItem = GetFolderItem("test.pem")
dim b1 as BinaryStream = BinaryStream.Open(f1)
dim PrivKey as string = B1.Read(b1.Length)

dim f2 as FolderItem = GetFolderItem("test.pub")
dim b2 as BinaryStream = BinaryStream.Open(f2)
dim PubKey as string = B2.Read(b2.Length)

dim UnencryptedData as string = "Hello World. This is just a test."
dim EncryptedData as string = OpenSSLMBS.RSAPrivateEncrypt(UnencryptedData, PrivKey)
dim decryptedData as string = OpenSSLMBS.RSAPublicDecrypt(EncryptedData, PubKey)
```

```
Break // check in debugger
```

Notes: See kPadding constants for Padding parameter.
Password is optional for decrypting encrypted keys.
Returns empty string on failure or raises exceptions.

RSA can only decrypt data if it's <= length of key.

6.12.15 RSAPublicEncrypt(data as string, PublicKey as string, padding as Integer = 1, Password as string = "") as String

Plugin Version: 16.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts data using public key.
Example:

```
// encrypt with public, decrypt with private key

dim f1 as FolderItem = GetFolderItem("test.pem")
dim b1 as BinaryStream = BinaryStream.Open(f1)
dim PrivKey as string = B1.Read(b1.Length)

dim f2 as FolderItem = GetFolderItem("test.pub")
dim b2 as BinaryStream = BinaryStream.Open(f2)
dim PubKey as string = B2.Read(b2.Length)

dim UnencryptedData as string = "Hello World. This is just a test."
dim EncryptedData as string = OpenSSLMBS.RSAPublicEncrypt(UnencryptedData, PubKey)
dim decryptedData as string = OpenSSLMBS.RSAPrivateDecrypt(EncryptedData, PrivKey)

Break // check in debugger
```

Notes: See kPadding constants for Padding parameter.
Password is optional for decrypting encrypted keys.
Returns empty string on failure or raises exceptions.

RSA can only encrypt data if it's <= length of key.

6.12.16 SignData(data as string, key as string, Password as string = "") as string

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Signs a piece of data with a given private key.
Example:

```
dim data as string // some data
dim test as string // the private key PEM file content
dim Signature as string = OpenSSLMBS.SignData(data, test)
msgbox EncodeHex(Signature)
```

Notes: Returns signature. Use EncodeHex or EncodeBase64 to make a text representation.

Internally we make a SHA1 hash of the data, open the private RSA key and do a RSA sign operation. We return the raw key as a string bytes.
On any error, we return an empty string.
Optional you can pass a password to read password protected keys.
See also:

- 6.12.17 SignData(data as string, key as string, Password as string = "", Algorithm as Integer) as string 153

6.12.17 SignData(data as string, key as string, Password as string = "", Algorithm as Integer) as string

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Signs a piece of data with a given private key.
Example:

```
dim test_pem as string = ReadFile("test.pem")
dim test_pub as string = ReadFile("test.pub")
dim data as string = ReadFile("Create Keys.rtf") // some data file
dim signature as string

// create signature

Signature = OpenSSLMBS.SignData(data, test_pem, OpenSSLMBS.kAlgorithmSHA512)
if Signature = "" then
// failed
break
end if

// verify with private key
```

```
dim r1 as Boolean = OpenSSLMBS.VerifyData(data, signature, test_pem, OpenSSLMBS.kAlgorithmSHA256)

// verify with public key
dim r2 as Boolean = OpenSSLMBS.VerifyData(data, signature, test_pub, OpenSSLMBS.kAlgorithmSHA256)
```

Notes: Returns signature. Use EncodeHex or EncodeBase64 to make a text representation.

Internally we make a hash of the data with given algorithm, open the private RSA key and do a RSA sign operation. We return the raw signature as a string bytes.
On any error, we return an empty string.
Optional you can pass a password to read password protected keys.
See also:

- 6.12.16 SignData(data as string, key as string, Password as string = "") as string 153

6.12.18 SMimePKCS7Decrypt(InputData as string, Certificate as X509MBS, SignKey as PKeyMBS) as String

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts S/Mime PKCS#7 encrypted data.
Notes: Raises nil object exception if certificate or key is nil.
Returns empty text on error.

6.12.19 SMimePKCS7Encrypt(InputData as string, Certificate as X509MBS) as String

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts data with S/Mime PKCS#7.
Notes: Raises nil object exception if certificate is nil.
Returns empty text on error.

6.12.20 SMimePKCS7Sign(InputData as string, Certificate as X509MBS, SignKey as PKeyMBS) as String

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Signs data with S/Mime PKCS#7.
Notes: Raises nil object exception if certificate or key is nil.

Returns empty text on error.

6.12.21 SMimePKCS7Verify(InputData as string, Certificate as X509MBS) as String

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Verifies S/Mime PKCS#7 signature.
Notes: Raises nil object exception if certificate is nil.
Returns empty text on error.

6.12.22 VerifyData(data as string, Signature as string, Key as string, Password as string = "") as boolean

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Verifies a signature with given data and public key.
Notes: Key can be the public or private key, but of course normally you use the public key.
Data is the raw data to compare agains. A SHA1 hash is performed and verified with the signature.
Signature must be the string returned like from SignData function. If you used EncodeHex on it, you now need to do DecodeHex.
Returns true if signature is valid and false on any other error.
Optional you can pass a password to read password protected keys.
See also:

- 6.12.23 VerifyData(data as string, Signature as string, Key as string, Password as string = "", Algorithm as Integer) as boolean 155

6.12.23 VerifyData(data as string, Signature as string, Key as string, Password as string = "", Algorithm as Integer) as boolean

Plugin Version: 16.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Verifies a signature with given data and public key.
Example:

```
dim test_pem as string = ReadFile("test.pem")
dim test_pub as string = ReadFile("test.pub")
dim data as string = ReadFile("Create Keys.rtf") // some data file
dim signature as string

// create signature

Signature = OpenSSLMBS.SignData(data, test_pem, OpenSSLMBS.kAlgorithmSHA512)
```

```
if Signature = "" then
// failed
break
end if

// verify with private key
dim r1 as Boolean = OpenSSLMBS.VerifyData(data, signature, test_pem, OpenSSLMBS.kAlgorithmSHA512)

// verify with public key
dim r2 as Boolean = OpenSSLMBS.VerifyData(data, signature, test_pub, OpenSSLMBS.kAlgorithmSHA512)
```

Notes: Key can be the public or private key, but of course normally you use the public key.
Data is the raw data to compare agains. A hash is performed with given algorithm and verified with the signature.
Signature must be the string returned like from SignData function. If you used EncodeHex on it, you now need to do DecodeHex.
Returns true if signature is valid and false on any other error.
Optional you can pass a password to read password protected keys.
See also:

- 6.12.22 VerifyData(data as string, Signature as string, Key as string, Password as string = "") as boolean 155

6.12.24 Constants

Hash Algorithms

Constant	Value	Description
kAlgorithmSHA1	1	SHA 1.
kAlgorithmSHA224	2	SHA 2 with 224bit.
kAlgorithmSHA256	3	SHA 2 with 256bit.
kAlgorithmSHA384	4	SHA 2 with 384bit.
kAlgorithmSHA512	5	SHA 2 with 512bit.

Padding Options

Constant	Value	Description
kPaddingNone	3	Raw RSA encryption. This mode should only be used to implement cryptographically sound padding modes in the application code. Encrypting user data directly with RSA is insecure.
kPaddingPKCS1	1	PKCS #1 v1.5 padding. This currently is the most widely used mode.
kPaddingPKCS1OAEP	4	EME-OAEP as defined in PKCS #1 v2.0 with SHA-1, MGF1 and an empty encoding parameter. This mode is recommended for all new applications.
kPaddingSSLv23	2	PKCS #1 v1.5 padding with an SSL-specific modification that denotes that the server is SSL3 capable.
kPaddingX931	5	X931 padding.

6.13 class PKeyMBS

6.13.1 class PKeyMBS

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for a public/private key.
Notes: Currently this class only implements a part of the PKey functionality of OpenSSL. If needed, we could add more.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo Plugins in version 18.4
- MBS Xojo Plugins, version 18.4pr1
- Sign PDF with DynaPDF and your custom signature
- MonkeyBread Software Releases the MBS Xojo plug-ins in version 17.0
- MBS Xojo / Real Studio Plugins, version 17.0pr2
- MBS Xojo / Real Studio Plugins, version 17.0pr1

Videos

- Presentation from London conference about MBS Plugins.

Xojo Developer Magazine

- 17.1, page 11: News
- 16.6, page 9: News
- 15.2, page 9: News

6.13.2 Methods

6.13.3 Constructor

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.
Notes: Creates a new empty key.
This constructor is private to make sure you don't create an object from this class by error. Please use designated functions to create objects.

6.13.4 Copy as PKeyMBS

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a copy of the key.

6.13.5 Open(Data as MemoryBlock) as PKeyMBS

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Opens a private or public key.
Notes: Returns key or nil in case of error.
See also:

- 6.13.6 Open(Data as String) as PKeyMBS 159

6.13.6 Open(Data as String) as PKeyMBS

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Opens a private or public key.
Notes: Returns key or nil in case of error.
See also:

- 6.13.5 Open(Data as MemoryBlock) as PKeyMBS 159

6.13.7 PrivateKeyData as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The key as binary representation.
Notes: You can write this to a pem file.

6.13.8 PublicKeyData as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The key as binary representation.
Notes: You can write this to a pem file.

6.13.9 Properties

6.13.10 Bits as Integer

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Number of bits of key.
Notes: (Read only property)

6.13.11 DescriptionParams as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The description of the parameters.
Notes: This is only for human to read.
(Read only property)

6.13.12 DescriptionPrivateKey as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The description of private/public key.
Notes: If no private key is there, you only get the public key part here.
This is only for human to read.
(Read only property)

6.13.13 DescriptionPublicKey as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The description of public key.
Notes: This is only for human to read.
(Read only property)

6.13.14 Handle as Integer

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The handle to the key.
Notes: (Read and Write property)

6.13.15 ID as Integer

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The ID (type) of the key.
Notes: (Read only property)

6.13.16 PrivateKey as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extracts the private key.
Notes: This is the binary representation.
(Read only property)

6.13.17 PublicKey as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extracts the public key.
Notes: This is the binary representation.
(Read only property)

6.13.18 Size as Integer

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The size of the key in bytes.
Notes: (Read only property)

6.13.19 Type as Integer

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The type of key.
Notes: (Read only property)

6.13.20 TypeString as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The type of key as string.
Notes: EC, DSA, RSA or DH.
(Read only property)

6.14 class RC4MBS

6.14.1 class RC4MBS

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: An implementation of the RC4 algorithem.
Example:

```
dim r as RC4MBS

// Encrypt:
r = new RC4MBS("Key")

dim OriginalData as string = ConvertEncoding("Hello World!", encodings.UTF8)
dim EncryptedData as string = r.Crypt(OriginalData)
MsgBox EncodeHex(EncryptedData)

// Same for decrypt:
r = new RC4MBS("Key")

dim UnencryptedData as string = r.Crypt(EncryptedData)
UnencryptedData = DefineEncoding(UnencryptedData, encodings.UTF8)
MsgBox UnencryptedData
```

Notes: The source in RB is in the examples folder (see Crypto 1.5 via RB). This implementation inside the plugin is only to make the calculation faster.
In case RS will improve RB more to produce faster code, the plugin may be no longer needed.

6.14.2 Methods

6.14.3 Constructor(key as MemoryBlock)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initializes the class with the given key.
See also:

- 6.14.4 Constructor(key as string) 163

6.14.4 Constructor(key as string)

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initializes the class with the given key.
Example:

```
dim r as new RC4MBS("MyKey")
dim s as string = r.Crypt("MyData")

MsgBox EncodeHex(s)
```

Notes: Please make sure the key has right text encoding to avoid unexpected results.
See also:

- 6.14.3 Constructor(key as MemoryBlock) 163

6.14.5 Crypt(data as Memoryblock) as Memoryblock

Plugin Version: 13.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes or decryptes the given Memoryblock.
See also:

- 6.14.6 Crypt(data as string) as string 164

6.14.6 Crypt(data as string) as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encryptes or decryptes the given string.
Example:

```
dim r as RC4MBS

// Encrypt:
r = new RC4MBS("Key")

dim OriginalData as string = ConvertEncoding("Hello World!", encodings.UTF8)
dim EncryptedData as string = r.Crypt(OriginalData)
MsgBox EncodeHex(EncryptedData)

// Same for decrypt:
r = new RC4MBS("Key")

dim UnencryptedData as string = r.Crypt(EncryptedData)
UnencryptedData = DefineEncoding(UnencryptedData, encodings.UTF8)
MsgBox UnencryptedData
```

Notes: Returned string does not contain text, but binary data.
Please do not store in text fields in database without using EncodeHex or EncodeBase64 to make it a text string.
See also:

- 6.14.5 Crypt(data as Memoryblock) as Memoryblock 164

6.15 class RC5MBS

6.15.1 class RC5MBS

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for RC5 encryption.
Example:

```
dim r as RC5MBS

// Encrypt:
r = new RC5MBS("Key")

dim iv as MemoryBlock
dim num as Integer
dim OriginalData as string = ConvertEncoding("Hello World!", encodings.UTF8)
dim EncryptedData as string = r.encryptCFB64(OriginalData, iv, num)
MsgBox EncodeHex(EncryptedData)

// Same for decrypt:
r = new RC5MBS("Key")

iv = nil
num = 0
dim UnencryptedData as string = r.decryptCFB64(EncryptedData, iv, num)
UnencryptedData = DefineEncoding(UnencryptedData, encodings.UTF8)
MsgBox UnencryptedData
```

Notes: Do use to read existing RC5 encrypted things.
New projects may better use a better encryption.

6.15.2 Methods

6.15.3 Constructor(key as MemoryBlock, rounds as Integer = 16)

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The constructor.
Example:

```
dim r as new RC5MBS("MyKey")
dim s as string = r.Encrypt("MyData")

MsgBox EncodeHex(s)
```

See also:

- 6.15.4 Constructor(key as string, rounds as Integer = 16) 167

6.15.4 Constructor(key as string, rounds as Integer = 16)

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The constructor.
Example:

```
dim r as new RC5MBS("MyKey")
dim s as string = r.Encrypt("MyData")

MsgBox EncodeHex(s)
```

Notes: Please make sure the key has right text encoding to avoid unexpected results.
See also:

- 6.15.3 Constructor(key as MemoryBlock, rounds as Integer = 16) 166

6.15.5 decrypt(data as Memoryblock) as Memoryblock

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts some data.
Notes: Low level variant without any block mode.
See also:

- 6.15.6 decrypt(data as string) as string 167

6.15.6 decrypt(data as string) as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts some data.
Notes: Please make sure the key has right text encoding to avoid unexpected results.
Low level variant without any block mode.
See also:

- 6.15.5 decrypt(data as Memoryblock) as Memoryblock 167

6.15.7 decryptCBC(data as Memoryblock, iv as memoryblock = nil) as Memoryblock

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts some data.
Notes: With Cipher Block Chaining mode.
See also:

- 6.15.8 decryptCBC(data as string, iv as memoryblock = nil) as string 168

6.15.8 decryptCBC(data as string, iv as memoryblock = nil) as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts some data.
Notes: Please make sure the key has right text encoding to avoid unexpected results.
With Cipher Block Chaining mode.
See also:

- 6.15.7 decryptCBC(data as Memoryblock, iv as memoryblock = nil) as Memoryblock 168

6.15.9 decryptCFB64(data as Memoryblock, iv as memoryblock, byref num as Integer) as Memoryblock

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts some data.
Example:

```
dim r as RC5MBS

// Encrypt:
r = new RC5MBS("Key")

dim iv as MemoryBlock
dim num as Integer
dim OriginalData as string = ConvertEncoding("Hello World!", encodings.UTF8)
dim EncryptedData as string = r.encryptCFB64(OriginalData, iv, num)
MsgBox EncodeHex(EncryptedData)

// Same for decrypt:
r = new RC5MBS("Key")

iv = nil
num = 0
dim UnencryptedData as string = r.decryptCFB64(EncryptedData, iv, num)
```

```
UnencryptedData = DefineEncoding(UnencryptedData, encodings.UTF8)
MsgBox UnencryptedData
```

Notes: with Cipher Feedback mode.
See also:

- 6.15.10 decryptCFB64(data as string, iv as memoryblock, byref num as Integer) as string 169

6.15.10 decryptCFB64(data as string, iv as memoryblock, byref num as Integer) as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts some data.
Notes: Please make sure the key has right text encoding to avoid unexpected results.
with Cipher Feedback mode.
See also:

- 6.15.9 decryptCFB64(data as Memoryblock, iv as memoryblock, byref num as Integer) as Memoryblock 168

6.15.11 encrypt(data as Memoryblock) as Memoryblock

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts some data.
Notes: Low level variant without any block mode.
See also:

- 6.15.12 encrypt(data as string) as string 169

6.15.12 encrypt(data as string) as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts some data.
Notes: Please make sure the key has right text encoding to avoid unexpected results.
Low level variant without any block mode.
See also:

- 6.15.11 encrypt(data as Memoryblock) as Memoryblock 169

6.15.13 encryptCBC(data as Memoryblock, iv as memoryblock = nil) as Memoryblock

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts some data.
Notes: With Cipher Block Chaining mode.
See also:

- 6.15.14 encryptCBC(data as string, iv as memoryblock = nil) as string 170

6.15.14 encryptCBC(data as string, iv as memoryblock = nil) as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts some data.
Notes: Please make sure the key has right text encoding to avoid unexpected results.
With Cipher Block Chaining mode.
See also:

- 6.15.13 encryptCBC(data as Memoryblock, iv as memoryblock = nil) as Memoryblock 170

6.15.15 encryptCFB64(data as Memoryblock, iv as memoryblock, byref num as Integer) as Memoryblock

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts some data.
Example:

```
dim r as RC5MBS

// Encrypt:
r = new RC5MBS("Key")

dim iv as MemoryBlock
dim num as Integer
dim OriginalData as string = ConvertEncoding("Hello World!", encodings.UTF8)
dim EncryptedData as string = r.encryptCFB64(OriginalData, iv, num)
MsgBox EncodeHex(EncryptedData)

// Same for decrypt:
r = new RC5MBS("Key")

iv = nil
num = 0
dim UnencryptedData as string = r.decryptCFB64(EncryptedData, iv, num)
```

```
UnencryptedData = DefineEncoding(UnencryptedData, encodings.UTF8)
MsgBox UnencryptedData
```

Notes: with Cipher Feedback mode.
See also:

- 6.15.16 encryptCFB64(data as string, iv as memoryblock, byref num as Integer) as string 171

6.15.16 encryptCFB64(data as string, iv as memoryblock, byref num as Integer) as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts some data.
Notes: Please make sure the key has right text encoding to avoid unexpected results.
with Cipher Feedback mode.
See also:

- 6.15.15 encryptCFB64(data as Memoryblock, iv as memoryblock, byref num as Integer) as Memoryblock 170

6.15.17 encryptOFB64(data as Memoryblock, iv as memoryblock, byref num as Integer) as Memoryblock

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts some data.
Notes: with Output Feedback mode.
See also:

- 6.15.18 encryptOFB64(data as string, iv as memoryblock, byref num as Integer) as string 171

6.15.18 encryptOFB64(data as string, iv as memoryblock, byref num as Integer) as string

Plugin Version: 15.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts some data.
Notes: Please make sure the key has right text encoding to avoid unexpected results.
with Output Feedback mode.
See also:

- 6.15.17 encryptOFB64(data as Memoryblock, iv as memoryblock, byref num as Integer) as Memoryblock 171

6.16 class SHA1MBS

6.16.1 class SHA1MBS

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: An implementation of the SHA1 algorithem to calculate hash values.
Example:

```
dim f as FolderItem
dim b as BinaryStream
dim s as string
dim m as new SHA1MBS

// process file part by part (big files)

f=SpecialFolder.Desktop.Child("test.jpg")
b=f.OpenAsBinaryFile(False)

while not b.eof
s=b.Read(1000000)
m.Add s

wend

MsgBox EncodingToHexMBS(m.Result)+" using plugin with SHA1MBS"
```

Notes: The source in RB is in the examples folder (see Crypto 1.5 via RB). This implementation inside the plugin is only to make the calculation faster.
In case RS will improve RB more to produce faster code, the plugin may be no longer needed.
Blog Entries

- Multithreaded plugin functions can increase speed of Xojo application
- MBS Xojo Plugins, version 19.4pr3
- Sign PDF with DynaPDF and your custom signature
- MBS Xojo / Real Studio Plugins, version 14.2pr8
- Doing hash or encryption on several CPUs in Xojo
- MBS Xojo / Real Studio Plugins, version 13.5pr1
- MBS Real Studio Plugins, version 13.1pr15

Xojo Developer Magazine

- 10.4, page 44: HOTP Authentication, Generate one-time passwords with Google Authenticator App and validate them in Real Studio by Mattias Sandstr√m

6.16.2 Methods

6.16.3 Add(data as string)

Plugin Version: 4.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Adds more input bytes to the current hash.
Example:

```
dim s as new SHA1MBS
s.Reset
s.Add "Hello"
s.Add "World"
dim e as string=s.Result
```

Notes: Lasterror is set.

6.16.4 Hash(data as string) as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the hash string for the given key.
Example:

```
MsgBox EncodeHex(SHA1MBS.Hash("Hello World"))
```

Notes: The string returned is 20 bytes long (if successfull) and has the 5 integer properties stored inside (in big endian format) which make up the key.
Does change the current hash value stored in the class itself.

6.16.5 HashFile(file as FolderItem, Hex as boolean = true) as string

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Calculates hash from whole file.
Notes: Plugin will start a preemptive thread to read in file and process all data in chunks.
Returns hash on success or empty string on failure. May raise OutOfMemoryException or IOException.
This function works best if called from a thread.

If hex is true, the result is encoded as hex string.

The work is performed on a preemptive thread, so this function does not block the application and can yield time to other Xojo threads. Must be called in a Xojo thread to enjoy benefits. If called in main thread will block, but keep other background threads running.
If you run several threads calling MT methods, you can get all CPU cores busy while main thread shows GUI with progress window.

6.16.6 HashText(data as string) as string

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the hash string for the given key.
Example:

```
MsgBox EncodeHex(SHA1MBS.Hash("Hello World"))
```

Notes: The string returned is 20 bytes long (if successfull) and has the 5 integer properties stored inside (in big endian format) which make up the key.
Does change the current hash value stored in the class itself.
Returns the digest as text string with hexadecimal digits.

6.16.7 HMAC(key as string, data as string) as string

Plugin Version: 3.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the a specific HASH based on the key and the data string.
Example:

```
Function HMAC(key as string, data as string) As string
// Implementation by Matthijs van Duin
#pragma DisableBackgroundTasks

dim ikey, okey, k as string
dim temp, i as Integer

if (lenB(key) >64) then
k = Hash(key)
else
k = key
end if

for i = 1 to 64
```

```
temp = ascB(midB(k, i, 1))
ikey = ikey + chrB(BitwiseXor(temp, &h36))
okey = okey + chrB(BitwiseXor(temp, &h5C))
next

return Hash(okey + Hash(ikey + data))
End Function

// test code:

// de7c9b85b8b78aa6bc8a7a36f70a90701c9db4d9
dim s as string = SHA1MBS.HMAC("key", "The quick brown fox jumps over the lazy dog")
MsgBox EncodeHex(s)

// fbdb1d1b18aa6c08324b7d64b71fb76370690e1d
s = SHA1MBS.HMAC("", "")
MsgBox EncodeHex(s)
```

Notes: Above is the source code of this function.

6.16.8 Reset

Plugin Version: 4.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Resets the current hash value.

6.16.9 Result as string

Plugin Version: 4.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the current hash value.
Notes: Returns "" on any error.
Lasterror is set.

6.16.10 ResultText as string

Plugin Version: 13.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the current hash value.
Notes: Returns the digest as text string with hexadecimal digits.
Returns "" on any error.

Lasterror is set.

6.17 class SHA256MBS

6.17.1 class SHA256MBS

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: A class to calculate SHA-256 hashes.
Example:

```
dim s3 as string = SHA256MBS.Hash("")
dim e3 as string = EncodingToHexMBS(s3)
dim e4 as string = SHA256MBS.HashText("")

if e3 <>"e3b0c44298fc1c149afbf4c8996fb92427ae41e4649b934ca495991b7852b855" then
break
elseif e3 <>e4 then
break
else
MsgBox "OK"
end if
```

Blog Entries

- Multithreaded plugin functions can increase speed of Xojo application
- MBS Xojo Plugins, version 19.4pr3
- AES in Xojo and PHP
- MBS Xojo / Real Studio Plugins, version 14.2pr8
- Doing hash or encryption on several CPUs in Xojo
- MBS Xojo / Real Studio Plugins, version 13.5pr10
- MBS Real Studio Plugins, version 13.1pr15
- MBS Real Studio Plugins, version 11.3pr5

6.17.2 Methods

6.17.3 Add(data as string)

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Adds data to the hash calculation.
Example:

```
dim s as new SHA256MBS

s.Add "Franz jagt im komplett"
s.Add " verwahrlosten Taxi quer"
s.Add " durch Bayern"

dim r as string = s.ResultText
if r = "d32b568cd1b96d459e7291ebf4b25d007f275c9f13149beeb782fac0716613f8" then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: Using this method you can process huge amounts of data by passing them in small portions.

6.17.4 Hash(data as string) as string

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to quickly create a hash for a given string.
Example:

```
dim s2 as string = SHA256MBS.Hash("Frank jagt im komplett verwahrlosten Taxi quer durch Bayern")
dim e2 as string = EncodingToHexMBS(s2)

if e2 = "78206a866dbb2bf017d8e34274aed01a8ce405b69d45db30bafa00f5eeed7d5e" then
Msgbox "OK"
else
MsgBox "Failed"
end if
```

Notes: Returns the digest as binary string.
Before you show it to the user, pass it through EncodingToHexMBS.

6.17.5 HashFile(file as FolderItem, Hex as boolean = true) as string

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Calculates hash from whole file.
Notes: Plugin will start a preemptive thread to read in file and process all data in chunks.
Returns hash on success or empty string on failure. May raise OutOfMemoryException or IOException.
This function works best if called from a thread.

If hex is true, the result is encoded as hex string.

The work is performed on a preemptive thread, so this function does not block the application and can yield time to other Xojo threads. Must be called in a Xojo thread to enjoy benefits. If called in main thread will block, but keep other background threads running.
If you run several threads calling MT methods, you can get all CPU cores busy while main thread shows GUI with progress window.

6.17.6 HashText(data as string) as string

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to quickly create a hash for a given string.
Example:

```
dim s1 as string = SHA256MBS.HashText("Franz jagt im komplett verwahrlosten Taxi quer durch Bayern")

if s1 = "d32b568cd1b96d459e7291ebf4b25d007f275c9f13149beeb782fac0716613f8" then
Msgbox "OK"
else
MsgBox "Failed"
end if
```

Notes: Returns the digest as text string with hexadecimal digits.

6.17.7 HMAC(key as string, data as string) as string

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the a specific HASH based on the key and the data string.

6.17.8 Reset

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Resets the hash class so you can reuse it for the SHA-256 hash.

6.17.9 Result as string

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The final hash.
Notes: Returns the digest as binary string.
Before you show it to the user, pass it through EncodingToHexMBS.

6.17.10 ResultText as string

Plugin Version: 11.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The final hash.
Notes: Returns the digest as text string with hexadecimal digits.

6.18 class SHA3MBS

6.18.1 class SHA3MBS

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: A class to calculate SHA-3 hashes.
Example:

```
dim t as string = "The quick brown fox jumps over the lazy dog"
dim s as new SHA3MBS(1088, 512)

s.Add t
dim h as string = s.ResultText(32)

// shows 4d741b6f1eb29cb2a9b9911c82f56fa8d73b04959d3d9d222895df6c0b28aa15
MsgBox h
```

Blog Entries

- MonkeyBread Software Releases the MBS Real Studio plug-ins in version 13.0
- MBS Real Studio Plugins, version 13.0fc2

6.18.2 Methods

6.18.3 Add(data as memoryblock)

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Adds data to the hash calculation.
Notes: Using this method you can process huge amounts of data by passing them in small portions.
See also:

- 6.18.4 Add(data as string) 181

6.18.4 Add(data as string)

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Adds data to the hash calculation.
Notes: Using this method you can process huge amounts of data by passing them in small portions.
See also:

- 6.18.3 Add(data as memoryblock) 181

6.18.5 Constructor(Rate as UInt32, capacity as UInt32)

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The constructor.
Example:

```
dim s as new SHA3MBS(1088, 512) // 256 bit

s.Add "Compute Me"
s.Add "Me too"

dim h as string = s.ResultText(256/8)

Break
```

Notes: See example project or SHA-3 documentation for useful values for Rate and Capacity.

6.18.6 Hash(data as string, Rate as UInt32, capacity as UInt32, outputLength as Integer) as string

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to quickly create a hash for a given string.
Example:

```
dim t as string = "The quick brown fox jumps over the lazy dog"
dim h as string = SHA3MBS.Hash(t, 1088, 512, 32)

// encode as text to display
h = EncodeHex(h)
// shows 4d741b6f1eb29cb2a9b9911c82f56fa8d73b04959d3d9d222895df6c0b28aa15
MsgBox h
```

Notes: Returns the digest as text string with hexadecimal digits.
Or empty string in case of any error.
Before you show it to the user, pass it through EncodingToHexMBS.

6.18.7 HashText(data as string, Rate as UInt32, capacity as UInt32, outputLength as Integer) as string

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to quickly create a hash for a given string.
Example:

```
dim t as string = "The quick brown fox jumps over the lazy dog"
dim h as string = SHA3MBS.HashText(t, 1088, 512, 32)

// shows 4d741b6f1eb29cb2a9b9911c82f56fa8d73b04959d3d9d222895df6c0b28aa15
MsgBox h
```

Notes: Returns the digest as text string with hexadecimal digits.
Or empty string in case of any error.

6.18.8 Reset(Rate as UInt32, capacity as UInt32)

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Resets the hash class so you can reuse it for another SHA-3 hash.

6.18.9 Result(outputLength as Integer) as string

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The final hash in the requested length.
Notes: Returns the digest as binary string.
Before you show it to the user, pass it through EncodingToHexMBS.

6.18.10 ResultText(outputLength as Integer) as string

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The final hash in the requested length.
Example:

```
dim t as string = "The quick brown fox jumps over the lazy dog"
dim s as new SHA3MBS(1088, 512)

s.Add t
dim h as string = s.ResultText(32)

// shows 4d741b6f1eb29cb2a9b9911c82f56fa8d73b04959d3d9d222895df6c0b28aa15
MsgBox h
```

Notes: Returns the digest as text string with hexadecimal digits.

6.19 class SHA512MBS

6.19.1 class SHA512MBS

Plugin Version: 12.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: A class to calculate SHA-512 hashes.
Example:

```
dim s3 as string = SHA512MBS.Hash("")
dim e3 as string = EncodingToHexMBS(s3)

if e3 = "CF83E1357EEFB8BDF1542850D66D8007D620E4050B5715DC83F4A921D36CE9CE47D0D13C5D85F2B0FF8318D2
then
Msgbox "OK"
else
MsgBox "Failed"
end if
```

Blog Entries

- Multithreaded plugin functions can increase speed of Xojo application
- MonkeyBread Software Releases the MBS Xojo Plugins in version 19.4
- MBS Xojo Plugins, version 19.4pr3
- MBS Xojo / Real Studio Plugins, version 14.2pr8
- Doing hash or encryption on several CPUs in Xojo
- MBS Xojo / Real Studio Plugins, version 14.2pr4
- MBS Xojo / Real Studio Plugins, version 13.5pr10
- MBS Real Studio Plugins, version 12.2pr4

6.19.2 Methods

6.19.3 Add(data as string)

Plugin Version: 12.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Adds data to the hash calculation.
Example:

```
dim s as new SHA512MBS
```

```
s.Add "Franz jagt im komplett"
s.Add " verwahrlosten Taxi quer"
s.Add " durch Bayern"

dim r as string = s.ResultText
if r = "AF9ED2DE700433B803240A552B41B5A472A6EF3FE1431A722B2063C75E9F07451F67A28E37D09CDE769424C96A
then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: Using this method you can process huge amounts of data by passing them in small portions.

6.19.4 Hash(data as string) as string

Plugin Version: 12.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to quickly create a hash for a given string.
Example:

```
dim s2 as string = SHA512MBS.Hash("Frank jagt im komplett verwahrlosten Taxi quer durch Bayern")
dim e2 as string = EncodingToHexMBS(s2)

if e2 = "90B30EF9902AE4C4C691D2D78C2F8FA0AA785AFBC5545286B310F68E91DD2299C84A2484F0419FC5EAA7DE5
then
Msgbox "OK"
else
MsgBox "Failed"
end if
```

Notes: Returns the digest as binary string.
Before you show it to the user, pass it through EncodingToHexMBS.

6.19.5 HashFile(file as FolderItem, Hex as boolean = true) as string

Plugin Version: 14.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Calculates hash from whole file.
Notes: Plugin will start a preemptive thread to read in file and process all data in chunks.
Returns hash on success or empty string on failure. May raise OutOfMemoryException or IOException.
This function works best if called from a thread.

If hex is true, the result is encoded as hex string.

The work is performed on a preemptive thread, so this function does not block the application and can yield time to other Xojo threads. Must be called in a Xojo thread to enjoy benefits. If called in main thread will block, but keep other background threads running.
If you run several threads calling MT methods, you can get all CPU cores busy while main thread shows GUI with progress window.

6.19.6 HashText(data as string) as string

Plugin Version: 12.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to quickly create a hash for a given string.
Example:

```
dim s1 as string = SHA512MBS.HashText("Franz jagt im komplett verwahrlosten Taxi quer durch Bayern")

if s1 = "AF9ED2DE700433B803240A552B41B5A472A6EF3FE1431A722B2063C75E9F07451F67A28E37D09CDE769424C96A
then
Msgbox "OK"
else
MsgBox "Failed"
end if
```

Notes: Returns the digest as text string with hexadecimal digits.

6.19.7 HMAC(key as string, data as string) as string

Plugin Version: 19.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the a specific HASH based on the key and the data string.

6.19.8 Reset

Plugin Version: 12.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Resets the hash class so you can reuse it for the SHA-256 hash.

6.19.9 Result as string

Plugin Version: 12.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: The final hash.
Notes: Returns the digest as binary string.
Before you show it to the user, pass it through EncodingToHexMBS.

6.19.10 ResultText as string

Plugin Version: 12.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: The final hash.
Notes: Returns the digest as text string with hexadecimal digits.

6.20 module TwofishMBS

6.20.1 module TwofishMBS

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The module for Twofish encryption.
Notes: You can use this class for compatibility to PHP.
Blog Entries

- MonkeyBread Software Releases the MBS Xojo plug-ins in version 17.0
- MBS Xojo / Real Studio Plugins, version 17.0pr1

Videos

- Presentation from London conference about MBS Plugins.

Xojo Developer Magazine

- 15.2, page 9: News

6.20.2 Methods

6.20.3 DecryptCBC(Key as MemoryBlock, InputData as MemoryBlock, IV as MemoryBlock) as MemoryBlock

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts with CBC mode and memoryblocks.
Example:

```
// key is 16 bytes, so 128 bit
dim key as MemoryBlock = "Hello World 1234"
dim IV as MemoryBlock = "1234567812345678" // 16 byte IV

// some UTF-8 input
dim InputText as string = "Just a test. √§√√º"
dim InputData as MemoryBlock = ConvertEncoding(InputText, encodings.UTF8)

dim EncryptedData as MemoryBlock = TwofishMBS.EncryptCBC(key, InputData, IV)
dim DecryptedData as MemoryBlock = TwofishMBS.DecryptCBC(key, encryptedData, IV)

// restore encoding
dim Decryptedtext as String = DefineEncoding(DecryptedData, encodings.UTF8)
```

```
// remove training zeros
dim p as Integer = instrb(Decryptedtext, chrb(0))
if p >0 then
Decryptedtext = leftb(Decryptedtext, p-1)
end if

// check
if Decryptedtext = InputText then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: IV can be nil for using zeros.
IV size should be 16 bytes.
Key length should be 16 for 128bit, 24 for 192 bit or 32 for 256 bit.
InputData should be aligned to 16byte size. Else the plugin will fill up with zero bytes.
See also:

- 6.20.4 DecryptCBC(Key as String, InputData as String, IV as String) as String 190

6.20.4 DecryptCBC(Key as String, InputData as String, IV as String) as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts with CBC mode and strings.
Example:

```
// key is 16 bytes, so 128 bit
dim key as String = "Hello World 1234"
dim IV as String = "1234567812345678" // 16 byte IV

// some UTF-8 input
dim InputText as string = "Just a test. √§√√º"
dim InputData as String = ConvertEncoding(InputText, encodings.UTF8)

dim EncryptedData as String = TwofishMBS.EncryptCBC(key, InputData, IV)
dim DecryptedData as String = TwofishMBS.DecryptCBC(key, encryptedData, IV)

// restore encoding
dim Decryptedtext as String = DefineEncoding(DecryptedData, encodings.UTF8)

// remove training zeros
dim p as Integer = instrb(Decryptedtext, chrb(0))
if p >0 then
Decryptedtext = leftb(Decryptedtext, p-1)
```

```
end if

// check
if Decryptedtext = InputText then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: IV can be empty for using zeros.
IV size should be 16 bytes.
Key length should be 16 for 128bit, 24 for 192 bit or 32 for 256 bit.
InputData should be aligned to 16byte size. Else the plugin will fill up with zero bytes.
See also:

- 6.20.3 DecryptCBC(Key as MemoryBlock, InputData as MemoryBlock, IV as MemoryBlock) as MemoryBlock 189

6.20.5 DecryptECB(Key as MemoryBlock, InputData as MemoryBlock) as MemoryBlock

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts with ECB mode and memoryblocks.
Example:

```
// key is 16 bytes, so 128 bit
dim key as MemoryBlock = "Hello World 1234"

// some UTF-8 input
dim InputText as string = "Just a test. √§√√º"
dim InputData as MemoryBlock = ConvertEncoding(InputText, encodings.UTF8)

dim EncryptedData as MemoryBlock = TwofishMBS.EncryptECB(key, InputData)
dim DecryptedData as MemoryBlock = TwofishMBS.DecryptECB(key, encryptedData)

// restore encoding
dim Decryptedtext as String = DefineEncoding(DecryptedData, encodings.UTF8)

// remove training zeros
dim p as Integer = instrb(Decryptedtext, chrb(0))
if p >0 then
Decryptedtext = leftb(Decryptedtext, p-1)
end if

// check
```

```
if Decryptedtext = InputText then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: Key length should be 16 for 128bit, 24 for 192 bit or 32 for 256 bit.
InputData should be aligned to 16byte size. Else the plugin will fill up with zero bytes.
See also:

- 6.20.6 DecryptECB(Key as String, InputData as String) as String 192

6.20.6 DecryptECB(Key as String, InputData as String) as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrypts with ECB mode and strings.
Example:

```
// key is 16 bytes, so 128 bit
dim key as string = "Hello World 1234"

// some UTF-8 input
dim InputData as string = "Just a test. √§√√º"
InputData = ConvertEncoding(InputData, encodings.UTF8)

dim Encrypted as string = TwofishMBS.EncryptECB(key, InputData)
dim Decrypted as string = TwofishMBS.DecryptECB(key, encrypted)

// restore encoding
Decrypted = DefineEncoding(Decrypted, encodings.UTF8)

// remove training zeros
dim p as Integer = instrb(Decrypted, chrb(0))
if p >0 then
Decrypted = leftb(Decrypted, p-1)
end if

// check
if Decrypted = InputData then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: Key length should be 16 for 128bit, 24 for 192 bit or 32 for 256 bit.
InputData should be aligned to 16byte size. Else the plugin will fill up with zero bytes.
See also:

- 6.20.5 DecryptECB(Key as MemoryBlock, InputData as MemoryBlock) as MemoryBlock 191

6.20.7 EncryptCBC(Key as MemoryBlock, InputData as MemoryBlock, IV as MemoryBlock) as MemoryBlock

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts with CBC mode and memoryblocks.
Example:

```
// key is 16 bytes, so 128 bit
dim key as MemoryBlock = "Hello World 1234"
dim IV as MemoryBlock = "1234567812345678" // 16 byte IV

// some UTF-8 input
dim InputText as string = "Just a test. √§√√º"
dim InputData as MemoryBlock = ConvertEncoding(InputText, encodings.UTF8)

dim EncryptedData as MemoryBlock = TwofishMBS.EncryptCBC(key, InputData, IV)
dim DecryptedData as MemoryBlock = TwofishMBS.DecryptCBC(key, encryptedData, IV)

// restore encoding
dim Decryptedtext as String = DefineEncoding(DecryptedData, encodings.UTF8)

// remove training zeros
dim p as Integer = instrb(Decryptedtext, chrb(0))
if p >0 then
Decryptedtext = leftb(Decryptedtext, p-1)
end if

// check
if Decryptedtext = InputText then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: IV can be nil for using zeros.
IV size should be 16 bytes.
Key length should be 16 for 128bit, 24 for 192 bit or 32 for 256 bit.
InputData should be aligned to 16byte size. Else the plugin will fill up with zero bytes.
See also:

6.20.8 EncryptCBC(Key as String, InputData as String, IV as String) as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts with CBC mode and string.
Example:

```
// key is 16 bytes, so 128 bit
dim key as String = "Hello World 1234"
dim IV as String = "1234567812345678" // 16 byte IV

// some UTF-8 input
dim InputText as string = "Just a test. √§√√º"
dim InputData as String = ConvertEncoding(InputText, encodings.UTF8)

dim EncryptedData as String = TwofishMBS.EncryptCBC(key, InputData, IV)
dim DecryptedData as String = TwofishMBS.DecryptCBC(key, encryptedData, IV)

// restore encoding
dim Decryptedtext as String = DefineEncoding(DecryptedData, encodings.UTF8)

// remove training zeros
dim p as Integer = instrb(Decryptedtext, chrb(0))
if p >0 then
Decryptedtext = leftb(Decryptedtext, p-1)
end if

// check
if Decryptedtext = InputText then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: IV can be empty for using zeros.
IV size should be 16 bytes.
Key length should be 16 for 128bit, 24 for 192 bit or 32 for 256 bit.
InputData should be aligned to 16byte size. Else the plugin will fill up with zero bytes.
See also:

6.20.9 EncryptECB(Key as MemoryBlock, InputData as MemoryBlock) as MemoryBlock

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts with ECB mode and memoryblocks.
Example:

```
// key is 16 bytes, so 128 bit
dim key as MemoryBlock = "Hello World 1234"

// some UTF-8 input
dim InputText as string = "Just a test. √§√√º"
dim InputData as MemoryBlock = ConvertEncoding(InputText, encodings.UTF8)

dim EncryptedData as MemoryBlock = TwofishMBS.EncryptECB(key, InputData)
dim DecryptedData as MemoryBlock = TwofishMBS.DecryptECB(key, encryptedData)

// restore encoding
dim Decryptedtext as String = DefineEncoding(DecryptedData, encodings.UTF8)

// remove training zeros
dim p as Integer = instrb(Decryptedtext, chrb(0))
if p >0 then
Decryptedtext = leftb(Decryptedtext, p-1)
end if

// check
if Decryptedtext = InputText then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: Key length should be 16 for 128bit, 24 for 192 bit or 32 for 256 bit.
InputData should be aligned to 16byte size. Else the plugin will fill up with zero bytes.
See also:

- 6.20.10 EncryptECB(Key as String, InputData as String) as String 195

6.20.10 EncryptECB(Key as String, InputData as String) as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Encrypts with ECB mode and strings.
Example:

```
// key is 16 bytes, so 128 bit
dim key as string = "Hello World 1234"

// some UTF-8 input
dim InputData as string = "Just a test. √§√√º"
InputData = ConvertEncoding(InputData, encodings.UTF8)

dim Encrypted as string = TwofishMBS.EncryptECB(key, InputData)
dim Decrypted as string = TwofishMBS.DecryptECB(key, encrypted)

// restore encoding
Decrypted = DefineEncoding(Decrypted, encodings.UTF8)

// remove training zeros
dim p as Integer = instrb(Decrypted, chrb(0))
if p >0 then
Decrypted = leftb(Decrypted, p-1)
end if

// check
if Decrypted = InputData then
MsgBox "OK"
else
MsgBox "Failed"
end if
```

Notes: Key length should be 16 for 128bit, 24 for 192 bit or 32 for 256 bit.
InputData should be aligned to 16byte size. Else the plugin will fill up with zero bytes.
See also:

- 6.20.9 EncryptECB(Key as MemoryBlock, InputData as MemoryBlock) as MemoryBlock 195

6.21 class X509MBS

6.21.1 class X509MBS

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for a X509 certificate.
Notes: Currently this class only implements a part of the X509 functionality of OpenSSL. If needed, we could add more.
This is an abstract class. You can't create an instance, but you can get one from various plugin functions.
Blog Entries

- News from the MBS Xojo Plugins Version 22.1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 22.1
- MBS Xojo Plugins, version 22.1pr1
- MonkeyBread Software Releases the MBS Xojo Plugins in version 21.1
- MBS Xojo Plugins, version 21.1pr6
- News from the MBS Xojo Plugins Version 20.3
- MBS Xojo Plugins, version 20.3pr9
- Sign PDF with DynaPDF and your custom signature
- MonkeyBread Software Releases the MBS Xojo plug-ins in version 17.0
- MBS Xojo / Real Studio Plugins, version 17.0pr1

Videos

- Presentation from London conference about MBS Plugins.

Xojo Developer Magazine

- 20.3, page 10: News
- 19.3, page 10: News
- 15.2, page 9: News

6.21.2 Methods

6.21.3 CheckCertificates(rootCertificates() as X509MBS, certificate as X509MBS, intermediates() as X509MBS = nil) as Boolean

Plugin Version: 22.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Validates certificate agains root certificates and may use intermediates for it.
Notes: Returns true if valid or false if not.

This function attempts to discover and validate a certificate chain based on parameters in context. The verification context, is constructed using given root certificates.

6.21.4 Constructor

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

6.21.5 Copy as X509MBS

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a copy of the certificate.

6.21.6 Data as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The data of the certificate.
Notes: You can write this to a PEM file.

6.21.7 Open(Data as MemoryBlock) as X509MBS

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Opens a X509 PEM file.
Notes: Line endings must be LF, not CR.
See also:

- 6.21.8 Open(Data as String) as X509MBS 198

6.21.8 Open(Data as String) as X509MBS

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Opens a X509 PEM file.
Notes: Please read file via binarystream and pass here as string.
Line endings must be LF, not CR.
See also:

- 6.21.7 Open(Data as MemoryBlock) as X509MBS 198

6.21.9 ReadFromPkcs12(Data as String, Pass as String, byref PKey as PKeyMBS, byref Cert as X509MBS, byref certs() as X509MBS) as Boolean

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Reads certificate and private key from a PKCS12 file.
Example:

```
dim f as FolderItem = FindFile("test.p12")
dim b as BinaryStream = BinaryStream.Open(f)
dim s as string = b.Read(b.Length)
dim c as X509MBS
dim p as PKeyMBS
dim others() as X509MBS

if X509MBS.ReadFromPkcs12(s, "HelloWorld", p, c, others) then
MsgBox c.Name
end if
```

Notes: Data is the content of the PKCS12 file.
Returns true on success or false on failure.

6.21.10 ReadFromPkcs7(Data as String, Pass as String, byref certs() as X509MBS) as Boolean

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Reads certificates from PKCS#7 data.
Example:

```
dim contents as string // PKCS#7 file data
Dim certs() As X509MBS
If X509MBS.ReadFromPkcs7(contents, "", certs) Then

Dim x As X509MBS = certs(0)
If x <>Nil Then
// show it
```

```
TextArea1.Text= x.Description
end if
End If
```

Notes: Returns true on success.
Only for PKCS#7 data containing signatures.

6.21.11 Verify(PublicKey as PKeyMBS) as Integer

Plugin Version: 22.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Verifies the signature of certificate using given public key.
Notes: Returns 1 if valid, 0 if key is not valid, but -1 if format of key is invalid.
Calls X509_verify internally in OpenSSL.

6.21.12 Properties

6.21.13 Description as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The textual description of the certificate.
Notes: This is only for human to read.
(Read only property)

6.21.14 Handle as Integer

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

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

6.21.15 IssuerName as Dictionary

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The issuer name.
Notes: (Read only property)

6.21.16 Name as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The name of the certificate.
Notes: (Read only property)

6.21.17 PublicKey as PKeyMBS

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extracts public key.
Notes: (Read only property)

6.21.18 SerialNumber as String

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The serial number as text.
Notes: (Read only property)

6.21.19 SubjectName as Dictionary

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The subject name.
Notes: (Read only property)

6.21.20 ValidNotAfter as Date

Plugin Version: 20.3, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The date where the certificate expires.
Example:

```
// read certificate
Dim f As FolderItem = SpecialFolder.Desktop.Child("test.pem")
Dim b As BinaryStream = BinaryStream.Open(f, False)
Dim s As String = b.Read(b.Length)

// parse the certificate
Dim x As X509MBS = X509MBS.Open(s)
```

```
// check dates
MsgBox x.ValidNotBefore.SQLDateTime + EndOfLine + x.ValidNotAfter.SQLDateTime
```

Notes: In GMT time zone.
(Read only property)

6.21.21 ValidNotAfterDateTime as DateTime

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The date where the certificate expires.
Notes: In GMT time zone.
(Read only property)

6.21.22 ValidNotBefore as Date

Plugin Version: 20.3, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: The date where the certificate was created.
Example:

```
// read certificate
Dim f As FolderItem = SpecialFolder.Desktop.Child("test.pem")
Dim b As BinaryStream = BinaryStream.Open(f, False)
Dim s As String = b.Read(b.Length)

// parse the certificate
Dim x As X509MBS = X509MBS.Open(s)

// check dates
MsgBox x.ValidNotBefore.SQLDateTime + EndOfLine + x.ValidNotAfter.SQLDateTime
```

Notes: In GMT time zone.
(Read only property)

6.21.23 ValidNotBeforeDateTime as DateTime

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The date where the certificate was created.
Notes: In GMT time zone.
(Read only property)

6.21.24 Version as Integer

Plugin Version: 17.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The version of the file.
Notes: Currently usually 2 for version 3.
(Read only property)

Chapter 7

Mac

7.1 module ValidationMBS

7.1.1 module ValidationMBS

Plugin Version: 13.4, Platform: macOS, Targets: All.

Function: This module has helper functions for App Store Validation.
Notes: Please use AppReceiptMBS and AppReceiptVerificatorMBS classes instead.
Blog Entries

- MBS Xojo Plugins, version 19.6pr1

7.1.2 Methods

7.1.3 AppStoreReceipt(file as folderitem) as dictionary

Plugin Version: 13.4, Platform: macOS, Targets: All.

Function: Reads the app store receipt.
Example:

```
// read a receipt file
dim file as FolderItem = SpecialFolder.Desktop.Child("receipt")

// query values
dim dic as Dictionary = ValidationMBS.AppStoreReceipt(file)

// show identifier
MsgBox dic.Value(ValidationMBS.kReceiptBundleIdentifer)
```

Notes: You can use this to get details from your receipt.
Returns nil on any error.
Please pass folderitem to receipt file.

7.1.4 ExitApp(code as Integer = 173)

Plugin Version: 13.4, Platform: macOS, Targets: All.

Function: Quits the application directly.
Example:

```
ValidationMBS.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.

7.1.5 GUID as string

Plugin Version: 13.4, Platform: macOS, Targets: All.

Function: Reads the GUID of the Mac.
Example:

```
dim g as String = ValidationMBS.GUID
MsgBox EncodeHex(g)
```

Notes: This is normally build from the MAC ID of the ethernet card.

7.1.6 locateAppStoreReceipt as folderitem

Plugin Version: 13.4, Platform: macOS, Targets: All.

Function: Locates the App Store Receipt in the application bundle.
Example:

```
dim f as FolderItem = ValidationMBS.locateAppStoreReceipt
MsgBox f.NativePath
```

Notes: Please check result if folderitem is not nil and exists before processing.

7.1.7 Validate(file as folderitem) as boolean

Plugin Version: 13.4, Platform: macOS, Targets: All.

Function: Validates the receipt.
Example:

```
dim file as FolderItem = ValidationMBS.locateAppStoreReceipt

if ValidationMBS.Validate(file) = false then
ValidationMBS.ExitApp 173
else
// ok
end if
```

Notes: Returns true if valid and false if not.

7.1.8 Constants

Dictionary Keys

Constant	Value	Description
kReceiptBundleIdentifer	"BundleIdentifier"	The bundle identifier.
kReceiptBundleIdentiferData	"BundleIdentifierData"	The bundle identifier data.
kReceiptHash	"Hash"	The hash for the receipt.
kReceiptOpaqueValue	"OpaqueValue"	The opaque value used for hashing.
kReceiptVersion	"Version"	The version string.

Chapter 8

List of Questions in the FAQ

Chapter 9

The FAQ

9.0.1 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)

9.0.2 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.

9.0.3 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:

9.0.4 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:

9.0.5 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:

9.0.6 How to delete a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following is the code deletes a folder recursively.
Example:

```
Sub deletefolder(f as folderitem)
dim files(-1) as FolderItem

if f=nil then Return

// delete single file
if f.Directory=false then
f.Delete
Return
end if

// get a list of all items in that folder
dim i,c as Integer
c=F.Count
for i=1 to c
files.Append f.TrueItem(i)
next

// delete each item
for each fo as FolderItem in files
if fo=nil then
' ignore
elseif fo.Directory then
deletefolder fo
fo.delete
else ' file
```

```
fo.Delete
end if
next

f.Delete
End Sub
```

See also:

- 9.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 220
- 9.0.4 How to catch delete key? 221
- 9.0.5 How to convert cmyk to rgb? 222
- 9.0.7 How to detect if CPU if 64bit processor? 224
- 9.0.8 How to query variant type string for a variant? 225
- 9.0.9 How to refresh a htmlviewer on Windows? 226

9.0.7 How to detect if CPU if 64bit processor?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Via CPUID you can ask CPU:
Example:

```
dim c as new CPUIDMBS

if c.Flags(CPUIDMBS.kFeatureLM) then
MsgBox "64-bit CPU"
else
MsgBox "32-bit CPU"
end if
```

Notes: Should work on all intel compatible CPUs.
See also:

- 9.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 220
- 9.0.4 How to catch delete key? 221
- 9.0.5 How to convert cmyk to rgb? 222
- 9.0.6 How to delete a folder? 223
- 9.0.8 How to query variant type string for a variant? 225
- 9.0.9 How to refresh a htmlviewer on Windows? 226

9.0.8 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:

- 9.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 220
- 9.0.4 How to catch delete key? 221
- 9.0.5 How to convert cmyk to rgb? 222
- 9.0.6 How to delete a folder? 223
- 9.0.7 How to detect if CPU if 64bit processor? 224
- 9.0.9 How to refresh a htmlviewer on Windows? 226

9.0.9 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:

- 9.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 220
- 9.0.4 How to catch delete key? 221
- 9.0.5 How to convert cmyk to rgb? 222

9.0.10 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
```

9.0.11 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.

9.0.12 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
```

9.0.13 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.

9.0.14 Can I access Access Database with Java classes?

Plugin Version: all, Platform: Windows.

Answer: You can use ucanaccess to access databases created with Microsoft
Example:

```
dim options(-1) as string

// load all the jar files we have in a folder called java:

dim appFolder as FolderItem = GetFolderItem("")

Dim count as Integer = appFolder.Parent.Child("java").Count
dim libjs() as string
For i as Integer = 1 to count
Dim f As FolderItem = appFolder.Parent.Child("java").item(i)
If f <>Nil and f.Exists Then
libjs.append f.NativePath+";"
End If
Next

// now init virtual machine
dim librery as string = Join(libjs, "")
dim vm as new JavaVMMBS(librery)

if vm.Handle = 0 then
MsgBox "Failed to initialize virtual machine"
else
// now make a new database connection with ucanaccess
dim d as new JavaDatabaseMBS(vm,"net.ucanaccess.jdbc.UcanaccessDriver")
Dim DbFile as FolderItem = appFolder.Parent.Child("Database11.accdb")
dim j as JavaConnectionMBS = d.getConnection("jdbc:ucanaccess://"+DbFile.NativePath)

// select and show values
dim r as JavaResultSetMBS = j.MySelectSQL("Select * From test")
while r.NextRecord
MsgBox r.getString("FirstName") +" "+ r.getString("LastName")
wend

end if
```

```
Exception e as JavaExceptionMBS
MsgBox e.message+" errorcode: "+str(e.ErrorNumber)
```

Notes: see website:
http://ucanaccess.sourceforge.net/site.html

9.0.15 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.

9.0.16 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.

9.0.17 Can I use graphics class with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sorry, no. We can't provide a graphics subclass from plugin.
Notes: The is a feature request to allow graphics subclasses:
Feedback case 11391: feedback://showreport?report_id=11391

9.0.18 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.

9.0.19 Can I use your ChartDirector plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our ChartDirector plugin works just fine on the Xojo Web Edition.
Example:

```
// The data for the pie chart
dim data(-1) as Double=array(55.0, 18.0, 25.0, 22.0, 18.0, 30.0, 35.0)

// The labels for the pie chart, Words are choosen random to check font!
dim labels(-1) as string=array("Germany","Italy","France","Spain","UK","Poland","Russia")

// The colors to use for the sectors
dim colors(-1) as Integer

colors.Append &h66aaee
colors.Append &heebb22
colors.Append &hbbbbbb
colors.Append &h8844ff

if TargetLinux then
CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype/msttcorefonts"
end if

// Create a PieChart object of size 360 x 300 pixels
dim c as new CDPieChartMBS(700, 600)
```

```
c.setBackground(c.linearGradientColor(0, 0, 0, c.getHeight(), &h0000cc, &h000044))
c.setRoundedFrame(&hffffff, 16)
dim tt as CDTextBoxMBS = c.addTitle("ChartDirector Demonstration", "timesbi.ttf", 18)
tt.setMargin(0, 0, 16, 0)
tt.setFontColor(&hFFFFFF)

// Set the center of the pie at (180, 140) and the radius to 100 pixels
c.setPieSize 350,300,150
// Set the sector colors
c.setColors(c.kDataColor, colors)

// Draw the pie in 3D with a pie thickness of 20 pixels
c.set3D(20)

dim t as CDTextBoxMBS = c.setLabelStyle("arialbd.ttf", 10, &h000000)
t.setBackground(CDPieChartMBS.kSameAsMainColor, CDPieChartMBS.kTransparent, CDPieChartMBS.soft-
Lighting(CDPieChartMBS.kRight, 0))
t.setRoundedCorners(8)

// Use local gradient shading for the sectors, with 5 pixels wide
// semi-transparent white (bbffffff) borders
c.setSectorStyle(CDPieChartMBS.kLocalGradientShading, &hbbffffff, 0)

// Set the pie data and the pie labels
c.setData data,labels
call c.setLabelStyle "arialbd.ttf",18

dim pic as picture = c.makeChartPicture
dim wp as new WebPicture(pic, Picture.FormatJPEG) // JPEG makes it smaller and faster

ImageView1.Picture=wp
```

Notes: Be aware that our plugin produces pictures for you, which you assign to ImageViews. Tranfserring those pictures takes time, so you can optimize that with using WebPicture class. There you can decide between different compressions to improve speed (use JPEG instead of PNG).

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with "/usr/share/fonts/truetype/msttcorefonts" as the path. No backslash on the end of a path, please.

9.0.20 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.

9.0.21 Can I use your plugin controls on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: No.

9.0.22 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.

9.0.23 ChartDirector: Alignment Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Alignment Specification
Notes: In many ChartDirector objects, you may specify the alignment of the object's content relative to its boundary. For example, for a TextBox object, you may specify the text's alignment relative to the box boundary by using TextBox.setAlignment.

The ChartDirector API defines several constants for the alignment options.

ConstantValueDescription

BottomLeft	1	The leftmost point on the bottom line.
BottomCenter	2	The center point on the bottom line.
BottomRight	3	The rightmost point on the bottom line.
Left	4	The leftmost point on the middle horizontal line.
Center	5	The center point on the middle horizontal line.
Right	6	The rightmost point on the middle horizontal line.
TopLeft	7	The leftmost point on the top line.
TopCenter	8	The center point on the top line.
TopRight	9	The rightmost point on the top line.
Bottom	2	The center point on the bottom line. Same as BottomCenter.
Top	8	The center point on the top line. Same as TopCenter.
TopLeft2	10	An alternative top-left position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, TopLeft2 refers to refers to the left of the top side, while TopLeft refers to the top of the left side. The reverse applies for a horizontal axis.
TopRight2	11	An alternative top-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, TopRight2 refers to refers to the right of the top side, while TopRight refers to the top of the right side. The reverse applies for a horizontal axis.
BottomLeft2	12	An alternative bottom-left position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomLeft2 refers to refers to the left of the bottom side, while BottomLeft refers to the bottom of the left side. The reverse applies for a horizontal axis.
BottomRight2	13	An alternative bottom-right position used in Axis.setTitlePos for axis title positioning only. For a vertical axis, BottomRight2 refers to refers to the right of the bottom side, while BottomRight refers to the bottom of the right side. The reverse applies for a horizontal axis.

9.0.24 ChartDirector: Color Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Color Specification
Notes: Many functions in the ChartDirector API accept colors as parameters. ChartDirector supports col-

ors specified in web and HTML compatible ARGB format, in which ARGB refers to the Alpha transparency, Red, Green and Blue components of the color.

In addition to ARGB colors, ChartDirector supports ”dynamic” colors. A dynamic color is a color that changes depending on the position of the pixels. The ”dynamic” colors that ChartDirector supports include ”pattern colors”, ”metal colors”, ”gradient colors”, ”zone colors” and ”dash line colors”.

ChartDirector supports specifying colors indirectly using ”palette colors”. When a ”palette color” is used, the color is specified as an index to a palette. The actual color is looked up from the palette.ARGB Color
ARGB color consists of 4 components - alpha transparency, red, green and blue. The four components are encoded as a 32-bit number, with each component occupying 8 bits. In hexadecimal notation, it is AARRGGBB, where AA, RR, GG and BB are the alpha transparency, red, green and blue components.

Each component ranges from 00 - FF (0 - 255), representing its intensity. For example, pure red color is 00FF0000, pure green color is 0000FF00, and pure blue color is 000000FF. White color is 00FFFFFF, and black color is 00000000.

Most programming language requires you to put special prefix in front of hexadecimal characters. For C++, the prefix is ”0x”. For example, the syntax for the hexadecimal number 00FFFFFF is 0x00FFFFFF, or simply 0xFFFFFF.
For the alpha transparency component, a zero value means the color is not transparent all at. This is equivalent to traditional RGB colors. A non-zero alpha transparency means the the color is partially transparent. The larger the alpha transparency, the more transparent the color will be. If a partially transparent color is used to draw something, the underlying background can still be seen.

For example, 80FF0000 is a partially transparent red color, while 00FF0000 is a non-transparent red color.

Note that ChartDirector’s ARGB color is web and HTML compatible. For example, red is FF0000, the same as in HTML. There are many resources on the web that provide tables in which you can click a color and it will show its HTML color code. These color codes can be used in ChartDirector.

If alpha transparency is FF (255), the color is totally transparent. That means the color is invisible. It does not matter what the RGB components are. So in ChartDirector, only one totally transparent color is used - FF000000. All other colors of the form FFnnnnnn are reserved to represent palette colors and dynamic colors, and should not be interpreted as the normal ARGB colors.

The totally transparent color FF000000 is often used in ChartDirector to disable drawing something. For example, if you want to disable drawing the border of a rectangle, you can set the border color to totally transparent.

For convenience, ChartDirector defines a constant called Transparent, which is equivalent to FF000000.Pattern Color

A pattern color is a dynamic color that changes according to a 2D periodic pattern. When it is used to fill an area, the area will look like being tiled with a wallpaper pattern.

Pattern colors are created using BaseChart.patternColor, BaseChart.patternColor2, DrawArea.patternColor and DrawArea.patternColor2. The patternColor method creates pattern colors using an array of colors as a bitmap. The patternColor2 method creates pattern colors by loading the patterns from image files.

These methods return a 32-bit integer acting as a handle to the pattern color. The handle can be used in any ChartDirector API that expects a color as its input.Metal Color
A metal color is a color of which the brightness varies smoothly across the chart surface as to make the surface looks shiny and metallic. ChartDirector supports using any color as the base color of the metal color. In particular, using yellow and grey as the base colors will result in metal colors that look gold and silver.

Metal colors are most often used as background colors of charts. They are created using CDBaseChartMBS.metalColor, CDBaseChartMBS.goldColor and CDBaseChartMBS.silverColor. The first method allows you to specify an arbitrary base color. The second and third methods use yellow and grey as the base colors, resulting in gold and silver metal colors.

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any ChartDirector API that expects a color as its input.Gradient Color
A gradient color is a color that changes progressively across a direction.

Gradient colors are created using BaseChart.gradientColor, BaseChart.gradientColor2, DrawArea.gradientColor and DrawArea.gradientColor2. The gradientColor method creates a 2-point gradient color that changes from color A to color B. The gradientColor2 method creates a multi-point gradient colors that changes from color A to B to C ....

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any ChartDirector API that expects a color as its input.

One common use of multi-point gradient colors is to define colors that have metallic look and feel. Please refer to DrawArea.gradientColor2 for details.Dash Line Colors
A dash line color is a color that switches on and off periodically. When used to draw a line, the line will appear as a dash line.

Dash line colors are created using BaseChart.dashLineColor and DrawArea.dashLineColor. They accept a line color and a dash pattern code as arguments, and return a 32-bit integer acting as a handle to the dash line color. The handle can be used in any ChartDirector API that expects a color as its input.Zone Colors
A zone color is for XY charts only. It is a color that automatically changes upon reaching a data threshold value along the x-axis or y-axis. Zone colors are created using Layer.xZoneColor, Layer.yZoneColor, XYChart.xZoneColor or XYChart.yZoneColor.Palette Colors
Palette colors are colors of the format FFFFnnnn, where the least significant 16 bits (nnnn) are the index to the palette. A palette is simply an array of colors. For a palette color, the actual color is obtained by

looking up the palette using the index. For example, the color FFFF0001 is the second color in the palette (first color is index 0).

The colors in the palette can be ARGB colors or "dynamic" colors (pattern, gradient and dash line colors).

The first eight palette colors have special significance. The first three palette colors are the background color, default line color, and default text color of the chart. The 4th to 7th palette colors are reserved for future use. The 8th color is a special dynamic color that is equal to the data color of the "current data set".

The 9th color (index = 8) onwards are used for automatic data colors. For example, in a pie chart, if the sector colors are not specified, ChartDirector will automatically use the 9th color for the first sector, the 10th color for the second sector, and so on. Similarly, for a multi-line chart, if the line colors are not specified, ChartDirector will use the 9th color for the first line, the 10th color for the second line, and so on.

The ChartDirector API defines several constants to facilitate using palette colors.

ConstantValueDescription

Palette	FFFF0000	The starting point of the palette. The first palette color is (Palette + 0). The nth palette color is (Palette + n - 1).
BackgroundColor	FFFF0000	The background color.
LineColor	FFFF0001	The default line color.
TextColor	FFFF0002	The default text color.
[Reserved]	FFFF0003 - FFFF0006	These palette positions are reserved. Future versions of ChartDirector may use these palette positions for colors that have special significance.
SameAsMainColor	FFFF0007	A dynamic color that is equal to the data color of the current data set. This color is useful for objects that are associated with data sets. For example, in a pie chart, if the sector label background color is SameAsMainColor, its color will be the same as the corresponding sector color.
DataColor	FFFF0008	The starting point for the automatic data color allocation.

When a chart is created, it has a default palette. You may modify the palette using BaseChart.setColor, BaseChart.setColors, or BaseChart.setColors2.

The advantages of using palette colors are that you can change the color schemes of the chart in one place. ChartDirector comes with several built-in palettes represented by the following predefined constants.

ConstantDescription

9.0.25 ChartDirector: Font Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

defaultPalette	An array of colors representing the default palette. This palette is designed for drawing charts on white backgrounds (or lightly colored backgrounds).
whiteOnBlackPalette	An array of colors useful for drawing charts on black backgrounds (or darkly colored backgrounds).
transparentPalette	An array of colors useful drawing charts on white backgrounds (or lightly colored backgrounds). The data colors in this palette are all semi-transparent.

Answer: ChartDirector: Font Specification
Notes: Font Name
In ChartDirector, the font name is simply the file name that contains the font. For example, under the Windows platform, the "Arial" font is "arial.ttf", while the "Arial Bold" font is "arialbd.ttf".

NOTE: Mac OS X Specific Information
In Mac OS X, in addition to ".ttf", ChartDirector also supports Mac OS X font file formats, such as Font Suitcase files and Datafork files (.dfont). These files often contain multiple fonts. For example, the "GillSans.dfont" file contains 6 fonts.

So in addition to the file name, an index is needed to determine the font. The index is specified by appending a " | " character to the font name, followed by the index number. For example, the third font in "GillSans.dfont" is denoted as "GillSans.dfont | 2". (Note: The first font starts at 0.) If no index number is provided, the first font is assumed.

ChartDirector also supports using Mac OS X Font Manager names. For example, one may use "Gill Sans Light Italic" instead of using "GillSans.dfont | 1" as the font name. However, the Mac OS X Font Manager is active only if someone has logged into the Mac GUI console, so this method is only recommended for developing applications that run on the GUI console.

The sample programs that come with ChartDirector are designed to run on all operating systems, so they use generic font file names (eg. "arial.ttf") instead of Mac OS X specific names. To allow them to run on Mac OS X, ChartDirector on Mac OS X has a built-in table to map common font file names to Mac OS X font names:

"arial.ttf", "arialbd.ttf", "ariali.ttf" and "arialbi.ttf" are mapped to "Arial | 0" (Arial), "Arial | 1" (Arial Bold), "Arial | 2" (Arial Italic) and "Arial | 3" (Arial Bold Italic)

"times.ttf", "timesbd.ttf", "timesi.ttf" and "timesbi.ttf" are mapped to "Times New Roman | 0" (Times New Roman), "Times New Roman | 1" (Times New Roman Bold), "Times New Roman | 2" (Times New Roman Italic) and "Times New Roman | 3" (Times New Roman Bold Italic)

"cour.ttf", "courbd.ttf", "couri.ttf" and "courbi.ttf" are mapped to "Courier New | 0" (Courier New), "Courier New | 1" (Courier New Bold), "Courier New | 2" (Courier New Italic) and "Courier New | 3" (Courier New Bold Italic)

Font Location
ChartDirector on Windows does not come with any font files. It relies on the operating system's font files in the " [windows] \Fonts" directory. To see what fonts are installed in your operating system and their file names, use the File Explorer to view that directory.

ChartDirector on Windows will also search for the font files in the "fonts" subdirectory (if it exists) under the directory where the ChartDirector DLL "chartdir.dll" is installed. This is useful for private fonts. Also, for some especially secure web servers, the web anonymous user may not have access to the " [windows] \Fonts" directory. In this case, you may copy the font files to the above subdirectory.

ChartDirector on Mac OS X relies on operating system font files in "/Library/Fonts" and "/System/Library/Fonts".

ChartDirector on Linux, FreeBSD and Solaris assume the fonts files are in the "fonts" subdirectory under the directory where the ChartDirector shared object "libchartdir.so" is installed. ChartDirector on Linux, FreeBSD and Solaris come with a number of font files in the "fonts" subdirectory.

To keep the download size small, ChartDirector on Linux, FreeBSD and Solaris only come with some commonly used fonts. You may download additional fonts from the Internet. In particular, the Microsoft fonts at
http://sourceforge.net/project/showfiles.php?group_id=34153&release_id=105355
is highly recommended. Please refer to
http://www.microsoft.com/typography/faq/faq8.htm
on how you could use the fonts legally in your system.

ChartDirector supports True Type fonts (.ttf), Type 1 fonts (.pfa and .pfb) and Windows bitmap fonts (.fon). On Mac OS X, ChartDirector also supports Font Suitcase and Datafork (.dfont) files. On Linux, FreeBSD and Solaris, ChartDirector also supports Portable Compiled Fonts (.pcf fonts).

If you want ChartDirector to search other directories for the font files, you may list the directories in an environment variable called "FONTPATH".

If you specify an absolute path name for the font file, ChartDirector will use the absolute path name and will not search other directories.Artificial Boldening and Italicizing
Whereas most popular font comes with different styles for "normal", "bold", "italic" and "bold italic", some fonts only come with one style (the normal style). For example, the Monotype Corsiva font that comes with MS Office only has the normal style (mtcorsva.ttf). For these cases, you may append the "Bold" and/or "Italic" words after the font file name (separated with a space) to ask ChartDirector to artificially bolden and/or italicize the font. For example, you may specify the font name as "mtcorsva.ttf Bold".Font List
Instead of specifying a single font file as the font name, you may specify a list of font files as the font name, separated by semi-colons. This is useful when using international characters that are only available in some fonts.

For example, if you would like to use the Arial font ("arial.ttf") for western characters, and the MingLiu font "mingliu.ttc" for Chinese characters (since the Arial font does not have Chinese characters), you may specify the font name as "arial.ttf;mingliu.ttc". In this case, ChartDirector will try the Arial font first. If it cannot find a certain character there, it will try the MingLiu font.Indirect Font Names
ChartDirector supports several special keywords for specifying the font name indirectly. When these keywords are used as font names, ChartDirector will look up the actual font names from a font table. The keywords are as follows:

KeywordsDescription

"normal"	This default normal font, which is the first font in the font table. This is initially mapped to "arial.ttf" (Arial).
"bold"	The default bold font, which is the second font in the font table. This is initially mapped to "arialbd.ttf" (Arial Bold).
"italic"	The default italic font, which is the third font in the font table. This is initially mapped to "ariali.ttf" (Arial Italic).
"boldItalic"	The default bold-italic font, which is the fourth font in the font table. This is initially mapped to "arialbi.ttf" (Arial Bold Italic).
"fontN"	The (N + 1)th font in the font table (the first font is "font0").

The font table can be modified using BaseChart.setFontTable or DrawArea.setFontTable.

The advantage of using indirect font names is that you can change the fonts fonts in your charts in one place.Font Index
Most font files contain one font. However, it is possible a font file contains multiple fonts (that is, a font collection). For example, in True Type fonts, font files with extension ".ttc" may represent a font collection.

If a font file contains multiple font, the font index can be used to specify which font to use. By default, the font index is 0, which means the first font in the font file will be used.Font Size
The font size decides how big a font will appear in the image. The font size is expressed in a font unit called points. This is the same unit used in common word processors.

Instead of specifying font size, some ChartDirector API (eg. TextBox.setFontSize) allow you to specify font height and font width separately. You may use different point sizes for font height and font width to create special effects.Font Color
This is the color to draw the font. (See Color Specification on how colors are represented in ChartDirector.)Font Angle
This is the angle in degrees by which the font should be rotated anti-clockwise.Vertical Layout
By default, text are laid out horizontally, with characters being drawn from left to right.

ChartDirector also supports vertical layout, with characters being drawn from top to bottom. For example, you may use BaseChart.addText to add text that are laid out vertically. Vertical layout is common for

oriental languages such as Chinese, Japanese and Korean.

9.0.26 ChartDirector: Mark Up Language

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Mark Up Language
Notes: ChartDirector Mark Up Language (CDML) is a language for including formatting information in text strings by marking up the text with tags.

CDML allows a single text string to be rendered using multiple fonts, with different colors, and even embed images in the text.Font Styles
You can change the style of the text by using CDML tags. For example, the line:

<*font=timesi.ttf,size=16,color=FF0000>Hello <*font=arial.ttf,size=12,color=8000*>world!
will result in the following text rendered:

In general, all tags in CDML are enclosed by <* and *>. Attributes within the tags determine the styles of the text following the tags within the same block.

If you want to include <* in text without being interpreted as CDML tags, use «* as the escape sequence.

The following table describes the supported font style attributes in CDML. See Font Specification for details on various font attributes.

AttributeDescription

Set the following text to be in superscript style. This attribute does not need to have a value. (You may use ”super” as the attribute instead of ”super=1”.)

Note that unlike HTML tags, no double or single quotes are used in the tags. It is because CDML tags are often embedded as string literals in source code. The double or single quotes, if used, will conflict with the string literal quotes in the source code. Therefore in CDML, no quotes are necessary and they must not be used.

Also, unlike HTML tags, CDML uses the comma character as the delimiter between attributes. It is because certain attributes may contain embed spaces (such as the font file name). So space is not used as the delimiter and the comma character is used instead.

Note the font attribute above starts a new style section, while other attributes just modify the current style

font	Starts a new style section, and sets the font name. You may use this attribute without a value (that is, use "font" instead of "font=arial.ttf") to create a new style section without modifying the font name.
size	The font size.
width	The font width. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
height	The font height. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
color	The text color in hex format.
bgColor	The background color of the text in hex format.
underline	The line width of the line used to underline the following characters. Set to 0 to disable underline.
sub	Set the following text to be in subscript style. This attribute does not need to have a value. (You may use "sub" as the attribute instead of "sub=1".)
super	Set the following text to be in superscript style.

xoffset	Draw the following the text by shifting the text horizontally from the original position by the specified offset in pixels.
yoffset	Draw the following the text by shifting the text vertically from the original position by the specified offset in pixels.
advance	Move the cursor forward (to the right) by the number of pixels as specified by the value this attribute.
advanceTo	Move the cursor forward (to the right) to the position as specified by the value this attribute. The position is specified as the number of pixels to the right of the left border of the block. If the cursor has already passed through the specified position, the cursor is not moved.

section. You may use <*/font*>to terminate a style section, which will restore the font styles to the state before the style section.Blocks and Lines
In CDML, a text string may contain multiple blocks. A block may contain multiple lines of text by separating them with new line characters ("\n") or with <*br*>. The latter is useful for programming languages that cannot represent new line characters easily.

For example, the line:

<*size=15*><*block*><*color=FF*>BLOCK<*br*>ONE<*/*>and <*block*><*color=FF00*>BLOCK<*br*>TWO<
will result in the following text rendered:

The above example contains a line of text. The line contains two blocks with the characters " and " in between. Each block in turn contains two lines. The blocks are defined using <*block*>as the start tag and

<*/*>as the end tag.

When a block ends, font styles will be restored to the state before entering the block.Embedding Images
CDML supports embedding images in text using the following syntax:

<*img=my_image_file.png*>
where my_image_file.png is the path name of the image file.

For example, the line:

<*size=20*>A <*img=sun.png*>day
will result in the following text rendered:

ChartDirector will automatically detect the image file format using the file extension, which must either png, jpg, jpeg, gif, wbmp or wmp (case insensitive).

Please refer to BaseChart.setSearchPath or DrawArea.setSearchPath on the directory that ChartDirector will search for the file.

The <*img*>tag may optionally contain width and height attributes to specify its pixel width and height. In this case, ChartDirector will stretch or compress the image if necessary to the required width and height.Blocks Attributes
CDML supports nesting blocks, that is, a block can contain other sub-blocks. Attributes are supported in the <*block*>tag to control the alignment and orientation of the sub-blocks. The <*img=my_image_file.png*>is treated as a block for layout purposes.

For example, the line:

<*block,valign=absmiddle*><*img=molecule.png*><*block*>Hydrazino\nMolecule<*/*><*/*>
will result in the following text rendered:

The the above starts <*block,valign=absmiddle*>which specifies its content should align with each others in the vertical direction using the absolute middle alignment. The block contains an image, followed by a space characters, and then another block which has two lines of text.

The following table describes the supported attributes inside <*block*>tag:

AttributeDescription

The value baseline means the baseline of sub-blocks should align with the baseline of the block. The baseline

width	The width of the block in pixels. By default, the width is automatically determined to be the width necessary for the contents of the block. If the width attribute is specified, it will be used as the width of the block. If the width is insufficient for the contents, the contents will be wrapped into multiple lines.
height	The height of the block in pixels. By default, the height is automatically determined to be the height necessary for the contents of the block. If the height attribute is specified, it will be used as the height of the block.
maxwidth	The maximum width of the block in pixels. If the content is wider than maximum width, it will be wrapped into multiple lines.
truncate	The maximum number of lines of the block. If the content requires more than the maximum number of lines, it will be truncated. In particular, if truncate is 1, the content will be truncated if it exceeds the maximum width (as specified by maxwidth or width) without wrapping. The last few characters at the truncation point will be replaced with "...".
linespacing	The spacing between lines as a ratio to the default line spacing. For example, a line spacing of 2 means the line spacing is two times the default line spacing. The default line spacing is the line spacing as specified in the font used.
bgColor	The background color of the block in hex format.
valign	The vertical alignment of sub-blocks. This is for blocks that contain sub-blocks. Supported values are baseline, top, bottom, middle and absmiddle.

is the underline position of text. This is normal method of aligning text, and is the default in CDML. For images or blocks that are rotated, the baseline is the same as the bottom.

The value top means the top line of sub-blocks should align with the top line of the block.

The value bottom means the bottom line of sub-blocks should align with the bottom line of the block.

The value middle means the middle line of sub-blocks should align with the the middle line of the block. The middle line is the middle position between the top line and the baseline.

The value absmiddle means the absolute middle line of sub-blocks should align with the absolute middle line of the block. The absolute middle line is the middle position between the top line and the bottom line.

halign	The horizontal alignment of lines. This is for blocks that contain multiple lines. Supported values are left, center and right.

The value left means the left border of each line should align with the left border of the block. This is the default.

The value center means the horizontal center of each line should align with the horizontal center of the block.

The value right means the right border of each line should align with the right border of the block.

angle Rotate the content of the block by an angle. The angle is specified in degrees in counter-clockwise direction.

9.0.27 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.

9.0.28 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

9.0.29 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.

9.0.30 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)

9.0.31 Do you have plugins for X-Rite EyeOne, eXact or i1Pro?

Plugin Version: all.

Answer: Our EyeOne plugin is available on request for licensees of the X-Rite SDKs.
Notes: Please first go to X-Rite and get a SDK license.
Than we can talk about the plugin.

9.0.32 Does SQL Plugin handle stored procedures with multiple result sets?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the plugin can work with multiple recordsets.
Notes: You need to use SQLCommandMBS class. When you get back results, you use FetchNext to walk over all records in the first result set. Than you simply start again with FetchNext to get the second record set.
Even the RecordSet functions should work, just use them twice to get all records from both record sets.

9.0.33 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.

9.0.34 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
```

9.0.35 Has anyone played round with using CoreImage to do things like add dissolve transitions say when changing from one tab to another within a window?

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.

9.0.36 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.

9.0.37 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.

9.0.38 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.

9.0.39 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.

9.0.40 How can i get similar behavior to Roxio Toast or iTunes where clicking a 'burn' button allows the next inserted blank CD-R to bypass the Finder and be accepted by my application?

Plugin Version: all, 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.

9.0.41 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.

9.0.42 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.

9.0.43 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.

9.0.44 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
```

9.0.45 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.

9.0.46 How can I validate an email address?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can try this code:
Example:

```
Dim re As RegEx
re = New RegEx
Dim rm As RegExMatch

re.SearchPattern = " [ a-z0-9!#$ %&'*+/=?^_' { | }
textasciitilde - ] +(?:\. [ a-z0-9!#$ %&'*+/=?^_' { | }
textasciitilde - ] +)*@(?: [ a-z0-9 ] (?: [ a-z0-9- ] * [ a-z0-9 ] )?\.)+ [ a-z0-9 ] (?: [ a-z0-9- ] * [ a-z0-9 ] )?"
rm = re.Search(editField1.Text)

if rm = Nil Then
StaticText2.text = editField1.Text + " not valid email"
Else
StaticText2.Text = editField1.Text + " is valid"
End if
```

Notes: Adapted from:
http://www.regular-expressions.info/email.html

9.0.47 How do I decode correctly an email subject?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following code can be used to decode an email subject including several encodings including Base 64.
Example:

```
dim src as string // input

dim theRegex as Regex
dim theRegexMatch as RegexMatch
dim result, infoCharset, encodedPart as string
dim theStart as Integer

if instr(src, "=?") >0 then
theRegex = new Regex
theRegex.Options.Greedy = false
theRegex.searchPattern = "(.*)=\?(.+)\?(Q | B)\?(.+)\?="
theRegexMatch = theRegex.search(src)
```

```
while theRegexMatch <>nil
theStart = theRegexMatch.subExpressionStartB(0) + len(theRegexMatch.subExpressionString(0))

result = result + theRegexMatch.subExpressionString(1)
infoCharset = theRegexMatch.subExpressionString(2)
encodedPart = theRegexMatch.subExpressionString(4)
if theRegexMatch.subExpressionString(3) = "B" then
encodedPart = DecodeBase64(encodedPart)
elseif theRegexMatch.subExpressionString(3) = "Q" then
encodedPart = DecodeQuotedPrintable(encodedPart)
end if
if right(result, 1) = " " then
result = mid(result, 1, len(result)-1)
end if
encodedPart = encodedPart.DefineEncoding(GetInternetTextEncoding(infoCharset))
result = result + encodedPart

theRegex.SearchStartPosition = theStart
theRegexMatch = theRegex.search()
wend

result = result + mid(src, theStart+1)

else
result = src
end if
// theRegexMatch = theRegex.search

msgbox result
```

Notes: May not look nice depending on the controls used.
This is no longer needed when using MimeEmailMBS class which decodes for you.

9.0.48 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.

9.0.49 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
```

9.0.50 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.

9.0.51 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.

9.0.52 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.

9.0.53 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.

9.0.54 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.

9.0.55 How do I read the applications in the dock app?

Plugin Version: all, Platform: macOS.

Answer: Use CFPreferencesMBS class like in this example:
Example:

```
// Reads file names from persistent dock applications and puts them into the list

dim pref as new CFPreferencesMBS

dim persistentapps as CFStringMBS = NewCFStringMBS("persistent-apps")
dim ApplicationID as CFStringMBS = NewCFStringMBS("com.apple.dock")
dim tiledata as CFStringMBS = NewCFStringMBS("tile-data")
dim filelabel as CFStringMBS = NewCFStringMBS("file-label")

// get the array of persistent applications from dock preferences
dim o as CFObjectMBS = pref.CopyValue(persistentapps, ApplicationID, pref.kCFPreferencesCurrentUser,
pref.kCFPreferencesAnyHost)

if o isa CFArrayMBS then
dim a as CFArrayMBS = CFArrayMBS(o)

// walk over all items in array
dim c as Integer = a.Count-1
for i as Integer = 0 to c

// get dictionary describing item
o = a.Item(i)

if o isa CFDictionaryMBS then
dim d as CFDictionaryMBS = CFDictionaryMBS(o)
```

```
// and pick tile data dictionary
o = d.Value(tiledata)
if o isa CFDictionaryMBS then
d = CFDictionaryMBS(o)

// and pick there the file label
o = d.Value(filelabel)
if o isa CFStringMBS then
// and display it
dim name as string = CFStringMBS(o).str
List.AddRow name
end if
end if
end if

next

else
MsgBox "Failed to read dock preferences."
end if
```

Notes: You can use the CFPreferencesMBS.SetValue to change a value and CFPreferencesMBS.Synchronize to write the values to disc. You may need to restart the Dock.app if you modified things.

9.0.56 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.

9.0.57 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.

9.0.58 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.

9.0.59 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.

9.0.60 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).

9.0.61 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.

9.0.62 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.

9.0.63 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>
```

9.0.64 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

9.0.65 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.

9.0.66 How to bring my application to front?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code ttxt) to the frontmost application:
Example:

```
Dim A As AppleEvent
A = NewAppleEvent("misc","actv","")
If Not A.Send then
Beep
end if
```

Notes: (Code is Mac only)

9.0.67 How to catch Control-C on Mac or Linux in a console app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use SignalHandlerMBS class for this.
Example:

```
// watch for Control-C on Mac
call SignalHandlerMBS.SetFlagHandler(2)

dim ende as boolean = false
do
if SignalHandlerMBS.IsFlagSet(2) then
Print "Flag 2 set. Existing..."
ende = true
end if

DoEvents 1
loop until ende
```

Notes: The signal is catched, a flag is set and you can ask later in your normal application flow for the result.

9.0.68 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.

9.0.69 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/ .

9.0.70 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.

9.0.71 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.

9.0.72 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
```

9.0.73 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.

9.0.74 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.

9.0.75 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.

9.0.76 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.

9.0.77 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.

9.0.78 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
```

9.0.79 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
```

9.0.80 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
```

9.0.81 How to convert a text to iso-8859-1 using the TextEncoder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you althrough it's not perfect.
You need to set lc to the current color you use.
Example:

```
dim outstring as string
dim theMac, thePC as textencoding
dim Mac2PC as textconverter

theMac = getTextEncoding(0) // MacRoman
thePC = getTextEncoding(&h0201) // ISOLatin1

Mac2PC = getTextConverter(theMac, thePC)
// if you wanted to do the opposite just create a converter
// PC2Mac = getTextConverter(thePC, theMac)

outstring = Mac2PC.convert("Bj√rn, this text should be converted")
Mac2PC.clear
```

Notes:

You have to call Mac2PC.clear after every conversion to reset the encoding engine.
See also newer TextConverterMBS class.

9.0.82 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.

9.0.83 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.

9.0.84 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

9.0.85 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.

9.0.86 How to copy an dictionary?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy a dictionary:
Example:

```
Function CopyDictionary(d as Dictionary) As Dictionary
dim r as new Dictionary
for each key as Variant in d.keys
r.Value(key) = d.Value(key)
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double.
For a deep copy of an dictionary of objects, you need to change code to also make a copy of those objects.

9.0.87 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.

9.0.88 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.

9.0.89 How to create a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the UUIDMBS class for this.

9.0.90 How to create a Mac picture clip file?

Plugin Version: all, Platform: Windows.

Answer: You can use code like this one.
Example:

```
dim f As FolderItem
dim p As Picture

f=SpecialFolder.Desktop.Child("Test.pictClipping")
if f=nil then Return

p=new Picture(300,200,32) 'Make a sample picture
p.Graphics.ForeColor=RGB(0,255,255)
p.Graphics.FillOval 0,0,99,99
```

```
p.Graphics.ForeColor=RGB(255,0,0)
p.Graphics.DrawOval 0,0,99,99

dim r As ResourceFork 'ResourceFork is needed for a clip file

// Please define a file type Any
r=f.CreateResourceFork("Any")

// get PICT data using plugin function
dim pictdata as string = p.PicHandleDataMBS
r.AddResource(pictdata,"PICT",256,"Picture")

dim m as new MemoryBlock(8)

m.LittleEndian = false
m.Int16Value(0) = 0
m.Int16Value(2) = 0
m.Int16Value(4) = p.Width
m.Int16Value(6) = p.Height

r.AddResource(m,"RECT",256,"")

'Values taken from a sample file and irrelevant to the problem
dim data as string = DecodeBase64("AQAAAAAAAAAAAAAAAAACAFRDRVIAAAABAAAAAAAAAABUQ0lQAAAAA
r.AddResource(data,"drag",128,"") 'ditto
r.Close
```

Notes: In general Apple has deprecated this, but a few application still support clippings.

9.0.91 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.

9.0.92 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.

9.0.93 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.

9.0.94 How to CURL Options translate to Plugin Calls?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a few tips on how to translate command line CURL calls to plugin calls.
Notes: curl -vX PUT http://localhost:5984/appserials/78569238475/DocumentRegister.docx?rev=3-25634563456 –data-binary @DocumentRegister.docx -H ”Content-Type: application/msword”

- The option -v means verbose. You can use OptionVerbose and listen for messages in the DebugMessage event.
- The option -X PUT means we want to do a HTTP PUT Request. So set OptionPut to true. Also you will want to set OptionUpload to true as you upload data.
- We have the URL which you put into OptionURL property.

- The –data-binary option tells CURL to pass the given data. With the @ before the data, it is intrepreted as a file name, so the data is read from the given file. You'll need to open this file and pass data with the Read event as needed. (See CURLS ftp file upload example project)
- The last option -H specifies an additional header for the upload. Pas this additional header with the SetOptionHTTPHeader method.

curl -X PUT http://127.0.0.1:5984/appserials/f2f4e540bf8bb60f61cfcd4328001c59 -d ' { "type":"Product","description":"Application Serial","acronym":"AppSerial","dateAdded":"2011-03-21 14:57:36" } '

- Option -X PUT like above.
- Pass the URL again in OptionURL
- This time data is passed in command line for CURL. You'd put this data in the quotes into a string and make it available in the Read event. (See CURLS ftp upload example project)

9.0.95 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.

9.0.96 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".

9.0.97 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)

9.0.98 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.

9.0.99 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.

9.0.100 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.

9.0.101 How to do a lottery in RB?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Try this function:
Example:

```
Sub Lotto(max as Integer,count as Integer,z() as Integer)
// Lotto count numbers of max put into the array z beginning at index 0
dim n(0) as Integer ' all the numbers
dim m as Integer ' the highest field in the current array
dim i,a,b,d as Integer ' working variables

'fill the array with the numbers
m=max-1
redim n(m)

for i=0 to m
n(i)=i+1
next

' unsort them by exchanging random ones
m=max*10
for i=1 to m
a=rnd*max
b=rnd*max

d=n(a)
n(a)=n(b)
n(b)=d
next

' get the first count to the dest array
m=count-1
redim z(m)
for i=0 to m
z(i)=n(i)
next

'sort the result
z.sort
End Sub
```

```
Sub Open()
// Test it

dim za(0) as Integer ' the array of the numbers

lotto 49,6,za ' 6 of 49 in Germany


' and display them
staticText1.text=str(za(0))+chr(13)+str(za(1))+chr(13)+str(za(2))+chr(13)+str(za(3))+chr(13)+str(za(4))+chr(13)+str(za
End Sub
```

9.0.102 How to do an asycron DNS lookup?

Plugin Version: all, Platform: Windows.

Answer: use CFHostMBS class (Mac OS X only).
Notes: Xojo internal functions and plugin DNS functions are sycronized.
You can use DNSLookupThreadMBS class for doing them asyncron.

9.0.103 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.

9.0.104 How to draw a nice antialiased line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you althrough it's not perfect.
You need to set lc to the current color you use.
Example:

```
Sub drawLine(xs as Integer, ys as Integer, xe as Integer, ye as Integer, face as RGBSurface, lineColor as color)
dim intX, intY, count, n, xDiff, yDiff as Integer
dim v, v1, floatX, floatY, xx, yy, xStep, yStep as Double
dim c as color

const st=1.0

xDiff=xe-xs
yDiff=ye-ys
count=max(abs(xDiff), abs(yDiff))
xStep=xDiff/count
yStep=yDiff/count
```

```
xx=xs
yy=ys
for n=1 to count
intX=xx
intY=yy
floatX=xx-intX
floatY=yy-intY

v=(1-floatX)*(1-floatY)*st
v1=1-v
c=face.pixel(intX, intY)
face.pixel(intX, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*(1-floatY)*st
v1=1-v
c=face.pixel(intX+1, intY)
face.pixel(intX+1, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=(1-floatX)*floatY*st
v1=1-v
c=face.pixel(intX, intY+1)
face.pixel(intX, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*floatY*st
v1=1-v
c=face.pixel(intX+1, intY+1)
face.pixel(intX+1, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)

xx=xx+xStep
yy=yy+yStep
next

End Sub
```

Notes:

PS: st should be 1 and face should be a RGBSurface or a Graphics object.

9.0.105 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

9.0.106 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.

9.0.107 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.

9.0.108 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.

9.0.109 How to extract text from HTML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use both RemoveHTMLTagsMBS and DecodingFromHTMLMBS like this:
Example:

```
dim html as string = "<p><B>Gr&uuml;&szlig;e</B></P>"
dim htmltext as string = RemoveHTMLTagsMBS(html)
dim text as string = DecodingFromHTMLMBS(htmltext)

MsgBox text // shows: Gr√º√üe
```

Notes: You can use it together with RemoveHTMLTagsMBS to remove html tags. What you get will be the text without tags.
DecodingFromHTMLMBS turns HTML escapes back to unicode characters. Like ä to √§.

9.0.110 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
```

9.0.111 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
```

9.0.112 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.

9.0.113 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".

9.0.114 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/

9.0.115 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.

9.0.116 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
```

9.0.117 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
```

9.0.118 How to get CFAbsoluteTime from date?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use code like this:
Example:

```
dim d as new date
dim t as CFTimeZoneMBS = SystemCFTimeZoneMBS
dim g as new CFGregorianDateMBS
g.Day = d.Day
g.Month = d.Month
g.Year = d.Year
g.Minute = d.Minute
g.Hour = d.Hour
g.Second = d.Second

dim at as CFAbsoluteTimeMBS = g.AbsoluteTime(t)
dim x as Double = at.Value

MsgBox str(x)
```

Notes: As you see we need a timezone and put the date values in a gregorian date record.
Now we can query absolute time for the given timezone.

9.0.119 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
```

9.0.120 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.

9.0.121 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.

9.0.122 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.

9.0.123 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

9.0.124 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.

9.0.125 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.

9.0.126 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" ...

9.0.127 How to get the current free stack space?

Plugin Version: all, Platform: macOS.

Answer: You can something like the code below:
Example:

```
Sub ShowStackSize()
dim threadid as Integer
dim size as Integer

declare function GetCurrentThread lib "Carbon" (byref threadid as Integer) as short
declare function ThreadCurrentStackSpace lib "Carbon" (threadid as Integer, byref size as Integer) as short

if GetCurrentThread(threadid)=0 then
if 0=ThreadCurrentStackSpace(threadid,size) then
MsgBox str(size)
end if
end if
```

```
End Sub
```

Notes: For Mac OS 9, use "ThreadLib" instead of "CarbonLib". You can use #if if you like for that.

9.0.128 How to get the current timezone?

Plugin Version: all, Platforms: macOS, Windows.

Answer:

You can use the TimeZoneMBS class or the CFTimeZoneMBS class.
Or code like below:
Example:

```
Function GMTOffsetInMinutes() as Integer
// Returns the offset of the current time to GMT in minutes.
// supports Mac OS and Windows, but not Linux yet (let me know if
// you have code for that, please)
//
// Note that the offset is not always an even multiple of 60, but
// there are also half hour offsets, even one 5:45h offset

// This version by Thomas Tempelmann (rb@tempel.org) on 25 Nov 2005
// with a fix that should also make it work with future Intel Mac targets.
//
// Using code from various authors found on the RB NUG mailing list

dim result, bias, dayLightbias as Integer
dim info as memoryBlock
dim offset as Integer

#if targetMacOS then

Declare Sub ReadLocation lib "Carbon" (location As ptr)

info = NewMemoryBlock(12)
ReadLocation info
if false then
// bad, because it does not work on Intel Macs:
'offset = info.short(9) * 256 + info.byte(11)
else
offset = BitwiseAnd (info.long(8), &hFFFFFF)
end

offset = info.short(9) * 256 + info.byte(11)
```

```
offset = offset \60
return offset

#endif

#if targetWin32 then

Declare Function GetTimeZoneInformation Lib "Kernel32" ( tzInfoPointer as Ptr ) as Integer
// returns one of
// TIME_ZONE_ID_UNKNOWN 0
// – Note: e.g. New Delhi (GMT+5:30) and Newfoundland (-3:30) return this value 0
// TIME_ZONE_ID_STANDARD 1
// TIME_ZONE_ID_DAYLIGHT 2

info = new MemoryBlock(172)
result = GetTimeZoneInformation(info)

bias = info.Long(0)
// note: the original code I found in the NUG archives used Long(84) and switched to Long(0)
// only for result=1 and result=2, but my tests found that Long(0) is also the right value for result=0

if result = 2 then
daylightBias = info.long(168)
end if
offset = - (bias + dayLightbias)
return offset

#endif

End Function
```

9.0.129 How to get the current window title?

Plugin Version: all, Platform: macOS.

Answer: The code below returns the current window title for the frontmost window on Mac OS X if Accessibilty services are
Example:

```
Function CurrentWindowTitle() As string
// your application needs permissions for accessibility to make this work!

dim SystemWideElement,FocusedApplicationElement,FocusedWindowElement as AXUIElementMBS
dim FocusedApplication,FocusedWindow,Title as AXValueMBS
dim s as String
dim cs as CFStringMBS
```

```
SystemWideElement=AccessibilityMBS.SystemWideAXUIElement
if SystemWideElement<>nil then
FocusedApplication=SystemWideElement.AttributeValue(AccessibilityMBS.kAXFocusedApplicationAttribute)
if FocusedApplication.Type=AccessibilityMBS.kAXUIElementMBSTypeID then
FocusedApplicationElement=new AXUIElementMBS
FocusedApplicationElement.Handle=FocusedApplication.Handle
FocusedApplicationElement.RetainObject

FocusedWindow=FocusedApplicationElement.AttributeValue(AccessibilityMBS.kAXFocusedWindowAttribute)

if FocusedWindow<>nil and AccessibilityMBS.kAXUIElementMBSTypeID=FocusedWindow.Type then

FocusedWindowElement=new AXUIElementMBS
FocusedWindowElement.Handle=FocusedWindow.Handle
FocusedWindowElement.RetainObject

Title=FocusedWindowElement.AttributeValue(AccessibilityMBS.kAXTitleAttribute)
if Title<>nil and Title.Type=kCFStringMBSTypeID then
cs=new CFStringMBS
cs.handle=Title.Handle
cs.RetainObject
Return cs.str
end if
end if
end if
end if
End Function
```

9.0.130 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.

9.0.131 How to get the list of the current selected files in the Finder?

Plugin Version: all, Platform: macOS.

Answer:

Use the AppleScript like this one:

```
tell application "finder"
return selection
end tell
```

Which translates into this AppleEvent:

```
Process("Finder").SendAE "core,getd,'—-':obj { form:prop, want:type(prop), seld:type(sele), from:'null'() }
"
```

and as Xojo code it looks like this:
Example:

```
dim ae as appleevent
dim o1 as appleeventObjectSpecifier
dim f as folderItem
dim aList as appleeventdescList
dim i as Integer
dim dateiname as string

// setup the AppleEvent
o1=getpropertyObjectDescriptor( nil, "sele")
ae= newappleEvent("core", "getd", "MACS")
ae.objectSpecifierParam("—-")=o1

// send it
if ae.send then
// got the list
alist=ae.replyDescList

// now show the list of filename into an editfield:

for i=1 to alist.count
f=alist.folderItemItem(i)

dateiname=f.name
// editfield1 with property "mulitline=true"!
editfield1.text=editfield1.text + dateiname + chr(13)
next
```

```
end if
```

9.0.132 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
```

9.0.133 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.

9.0.134 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.

9.0.135 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!

9.0.136 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
```

9.0.137 How to get Xojo apps running Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You need to install some requuire packages.
Notes: You need CUPS as well as GTK packages. On 64 bit systems also the ia32-libs package.

Please note that you need a x86 compatible Linux. So no PPC, Power, ARM or other CPUs.

9.0.138 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.

9.0.139 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.

9.0.140 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.

9.0.141 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.

9.0.142 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
```

9.0.143 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).

9.0.144 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.

9.0.145 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.

9.0.146 How to insert image to NSTextView or TextArea?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to insert file:
Example:

```
// insert a file to textview

Public Sub InsertFile(textview as NSTextViewMBS, f as FolderItem)
// read to file
```

```
dim b as BinaryStream = BinaryStream.Open(f)
dim s as string = b.Read(b.Length)

// build wrapper
dim fileWrapper as NSFileWrapperMBS = NSFileWrapperMBS.initRegularFileWithContents(s)
fileWrapper.preferredFilename = f.name

// make attachment
dim fileAttachment as new NSTextAttachmentMBS(fileWrapper)
dim attributedString as NSAttributedStringMBS = NSAttributedStringMBS.attributedStringWithAttach-
ment(fileAttachment)

// add to a NSTextViewMBS
textview.insertText attributedString

End Sub
```

Notes: For TextArea you can query the underlaying NSTextViewMBS object via TextArea.NSTextViewMBS method.

9.0.147 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
```

9.0.148 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
```

9.0.149 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.

9.0.150 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.

9.0.151 How to know how many CPUs are present?

Plugin Version: all, Platform: macOS.

Answer: Try this function:
Example:

```
Function GetCPUCount() as Integer
Declare Function MPProcessors Lib "Carbon" () as Integer

Return MPProcessors()
End Function
```

Notes: Your app will than need that library to launch on Classic. To avoid this the MBS plugin checks if this library is available and return 1 if it's not available.

9.0.152 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.

9.0.153 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
```

9.0.154 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.

9.0.155 How to make a lot of changes to a REAL SQL Database faster?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You may try to embed your changes to the database between two transaction calls.
Example:

```
dim db as Database // some database

db.SQLExecute "BEGIN TRANSACTION"
// Do some Stuff
db.SQLExecute "END TRANSACTION"
```

Notes: This can increase speed by some factors.

9.0.156 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.

9.0.157 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
```

9.0.158 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

9.0.159 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
```

9.0.160 How to make double clicks on a canvas?

Plugin Version: all, Platform: macOS.

Answer:

Update: Newer Xojo versions support DoubleClick event, so you don't need this code.

Here's my tip from the tips list on how to add a double-click event to the Canvas control. The technique could easily be used for a window or any Rectcontrol:

Because of its built-in drawing methods, the Canvas control is often used to create custom interface controls. But while the Canvas control has event handlers for most mouse events, it doesn't have an event handler for DoubleClick events. Fortunately, you can add a double-click event handler to a Canvas control easily. Basically, you're going to create a new class based on Canvas and add a double-click event to that. You can then use the new class anytime you need a Canvas with a double-click event.

To create a new Canvas class with a DoubleClick event handler, do this:

1. Add a new class to your project.
2. Set the Super property of the new class to "Canvas".
3. Change the name of this new class to "DoubleClickCanvas".

A double-click occurs when two clicks occur within the users double-click time (set in the Mouse control panel on both Macintosh and Windows) and within five pixels of each other. So, you'll need a few properties to store when and where the last click occurred.

4. Add a new property with the following declaration and mark it as private: lastClickTicks as Integer
5. Add a new property with the following declaration and mark it as private: lastClickX as Integer
6. Add a new property with the following declaration and mark it as private: lastClickY as Integer

Since the Canvas control doesn't have a DoubleClick event, you will need to add one.

7. Add a new event to your class by choosing New Event from the Edit menu and enter "DoubleClick" as the event name.

Double-clicks occur on MouseUp. In order for the mouseUp event to fire, you must return True in the MouseDown event.

8. In the MouseDown event, add the following code:
Return True

In the MouseUp event, you will need to determine what the users double-click time is. This value is represented on both the Mac and Windows in ticks. A tick is 1/60th of a second. Since there isn't a built-in function for this, you'll need to make a toolbox call. The mouseUp event code below makes the appropriate toolbox call for both Macintosh and Windows. It then compares the time of the users last click to the time of the current click and compares the location of the users last click to the location of the current click.

9. Add the following code to the MouseUp event:

```
dim doubleClickTime, currentClickTicks as Integer

#if targetMacOS then
Declare Function GetDblTime Lib "Carbon" () as Integer
doubleClickTime = GetDblTime()
#endif

#if targetWin32 then
Declare Function GetDoubleClickTime Lib "User32.DLL" () as Integer
```

```
doubleClickTime = GetDoubleClickTime()/60 // convert to ticks from milliseconds
#endif

currentClickTicks = ticks
//if the two clicks happened close enough together in time
if (currentClickTicks - lastClickTicks) <= doubleClickTime then
//if the two clicks occured close enough together in space
if abs(X - lastClickX) <= 5 and abs(Y - LastClickY) <= 5 then
DoubleClick //a double click has occured so call the event
end if
end if
lastClickTicks = currentClickTicks
lastClickX = X
lastClickY = Y
```

10. Now to test out your new DoubleClickCanvas, drag the class from the Project window to a window in your project to create an instance of it.

11. Double-click on the canvas you just added to your window to open the Code Editor. Notice that the canvas has a DoubleClick event handler. In this event handler, add the following code:

```
BEEP
```

9.0.161 How to make my Mac not sleeping?

Plugin Version: all, Platform: macOS.

Answer: Just inform the Mac OS about some system activity with code like this:
Example:

```
Sub UpdateSystemActivity()

#if TargetCarbon
declare function myUpdateSystemActivity lib "Carbon" alias "UpdateSystemActivity" (activity as Integer)
as short

const OverallAct = 0 // Delays idle sleep by small amount */
const UsrActivity = 1 // Delays idle sleep and dimming by timeout time */
const NetActivity = 2 // Delays idle sleep and power cycling by small amount */
const HDActivity = 3 // Delays hard drive spindown and idle sleep by small amount */
const IdleActivity = 4 // Delays idle sleep by timeout time */

dim e as Integer

e=myUpdateSystemActivity(UsrActivity)
```

```
// you may react on an error if e is not 0 after the call.

#endif
End Sub
```

Notes: You may use another constant if you prefer some different behavior.
Call it maybe every second.

9.0.162 How to make my own registration code scheme?

Plugin Version: all, Platform: Windows.

Answer: There are excellent articles about how to make a registratin code scheme, but you can also simply use our RegistrationEngineMBS class.
Notes: If you need a license text, why not use the one from Xojo as a starting point?

9.0.163 How to make small controls on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:
Example:

```
'/*
'* Use the control's default drawing variant. This does not apply to
'* Scroll Bars, for which Normal is Large.
'*/
const kControlSizeNormal = 0

'/*
'* Use the control's small drawing variant. Currently supported by
'* the Check Box, Combo Box, Radio Button, Scroll Bar, Slider and Tab
'* controls.
'*/
const kControlSizeSmall = 1

'/*
'* Use the control's small drawing variant. Currently supported by
'* the Indeterminate Progress Bar, Progress Bar and Round Button
'* controls.
'*/
const kControlSizeLarge = 2
```

```
'/*
'* Control drawing variant determined by the control's bounds. This
'* ControlSize is only available with Scroll Bars to support their
'* legacy behavior of drawing differently within different bounds.
'*/
const kControlSizeAuto = &hFFFF

const kControlSizeTag = "size"

declare function SetControlData lib "Carbon" (controlhandle as Integer, part as short, tagname as OSType, size as Integer, data as ptr) as short

dim m as MemoryBlock

m=NewMemoryBlock(2)
m.UShort(0)=kControlSizeSmall

Title=str(SetControlData(CheckBox1.Handle, 0, kControlSizeTag, 2, m))
```

9.0.164 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.

9.0.165 How to move a file or folder to trash?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:
Example:

```
Function MoveToTrash(f as FolderItem) As Boolean
#if TargetMacOS then
dim r as FolderItem
dim e as Integer = MacFileOperationMBS.MoveObjectToTrashSync(f, r, MacFileOperationMBS.kFSFileOperationDefaultOptions)
```

```
if e = 0 then
Return true // Ok
end if

#elseif TargetWin32 then
dim w as new WindowsFileCopyMBS

dim flags as Integer = w.FileOperationAllowUndo + w.FileOperationNoErrorUI + w.FileOperationSilent
+ w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if

flags = w.FileOperationNoErrorUI + w.FileOperationSilent + w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if
#else
// Target not supported
break
Return false
#endif
End Function
```

Notes: If you want to move a file to trash, you could use f.movefileto f.trashfolder, but that will overwrite existing files in the trash. You can use our MacFileOperationMBS class to move a file on Mac to the trash. And it uses the same code as the Finder, so files are renamed when the same name is already in use in the trash:

On Windows we use WindowsFileCopyMBS class.
Requires Mac OS X 10.5.

9.0.166 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)

9.0.167 How to move file with ftp and curl plugin?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can set post/pre quotes to have ftp commands executed before or after the download/upload.
Example:

```
dim d as CURLMBS // your curl object

// rename/move file
dim ws() As String
ws.Append "RNFR Temp.txt"
ws.append "RNTO MyFile.txt"

d.SetOptionPostQuote(ws)
```

Notes: Use SetOptionPostQuote, SetOptionPreQuote or SetOptionQuote.
The ftp commands you pass here are native ftp commands and not the commands you use with ftp applications. So rename is two commands. First RNFR to tell where to rename from and second RNTO with the new file name. To delete use DELE and the file path.

9.0.168 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.

9.0.169 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.

9.0.170 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
```

9.0.171 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.

9.0.172 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
```

9.0.173 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.

9.0.174 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.

9.0.175 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.

9.0.176 How to play audio in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the HTML5 audio tag and control it with javscript.
Notes: This is just another example app I made today. It plays a christmas song. The audio file is provided by the application to the server, so no external web server is needed and this application can run stand alone. To compile and run you need Xojo 2010r5.

In the open event we search the audio files and open them as binarystreams. We create the two webfile objects. Those webfiles are part of the app class, so we have them globally. There we set the data with the content of our streams. We also define file names and mime types. They are needed so browser know what we have here:

```
audioFileM4V = new WebFile
audioFileM4V.Data = bM.Read(BM.Length)
audioFileM4V.Filename = "music.m4a"
audioFileM4V.MIMEType = "audio/m4a"
```

```
audioFileOGG = new WebFile
audioFileOGG.Data = bO.Read(BO.Length)
audioFileOGG.Filename = "music.ogg"
audioFileOGG.MIMEType = "audio/ogg"
```

Next in the open event of the webpage we have a PageSource control. The location is set to be before content. In the open event we define the html code for this. First we pick the URLs for the audio files. Than we build the html to use the audio tag. As you see, we give it an ID for later use and have it preload automatically. If you add an autoplay tag, you can have the audio play right away. Inside the audio tag we have two sources so we provide audio for both Firefox (OGG) and Safari (MPEG4). Finally we have a text to display if HTML5 audio tag is not supported.

You can set the source in the EditSource event:

dim urlo as string = app.audioFileOGG.URL
dim urlm as string = app.audioFileM4V.URL
me.Source = ”<audio id=””mymusic”” preload=””auto””><source src=”””+urlo+””” type=””audio/ogg”” /><source src=”””+urlm+””” type=””audio/mpeg”” />Your browser does not support the audio element.</audio>”

Next in the Play button we execute code to play the audio. This is a short javascript code which searches in the html document for the element with the ID ”mymusic” which is the ID of our audio tag above. Once we got the object, we call it’s play method to start playback.

me.ExecuteJavaScript(”document.getElementById(’mymusic’).play();”)

same for pause:

me.ExecuteJavaScript(”document.getElementById(’mymusic’).pause();”)

and finally for changing volume:

me.ExecuteJavaScript(”document.getElementById(’mymusic’).volume=”+str(me.Value/100.0)+”;”)

9.0.177 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

9.0.178 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.

9.0.179 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.

9.0.180 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.

9.0.181 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.

9.0.182 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.

9.0.183 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.

9.0.184 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
```

9.0.185 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.

9.0.186 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.

9.0.187 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
```

9.0.188 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.

9.0.189 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.

9.0.190 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to save to RTFD:
Example:

```
// save text as RTFD including image attachments
dim f as FolderItem = GetSaveFolderItem(FileTypes1.ApplicationRtfd, "test.rtfd")

if f = nil then Return

dim a as NSAttributedStringMBS = textView.textStorage
dim w as NSFileWrapperMBS = a.RTFDFileWrapperFromRange(0, a.length, DocumentAttributes)

dim e as NSErrorMBS
if w.writeToFile(f, e) then
```

```
else
MsgBox e.LocalizedDescription
end if
```

Notes: For TextArea you can query the underlaying NSTextViewMBS object via TextArea.NSTextViewMBS method.

9.0.191 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.

9.0.192 How to scale a picture proportionally with mask?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.
Example:

```
Function ProportinalScaledWithMask(extends pic as Picture, Width as Integer, Height as Integer) As Picture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)

// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// check if we have a mask and clear it
dim m as picture = pic.mask(False)
pic.mask = nil

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

if m <>nil then
// restore mask and scale it
pic.mask = m
NewPic.mask.Graphics.DrawPicture m, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height
end if


// return result
Return NewPic
End Function
```

Notes: This version handles mask. As you see we actually have to remove mask in order to copy the picture part correctly.

9.0.193 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)

9.0.194 How to scale/resize a CIImageMBS?

Plugin Version: all, Platform: Windows.

Answer: Use the CIFilterLanczosScaleTransform filter to scale down a picture to a specific size.
Example:

```
Dim pic As Picture = LogoMBS(500)
Dim image As CIImageMBS = CIImageMBS.imageWithPicture(pic)

Dim filter As New CIFilterLanczosScaleTransformMBS

Const targetWidth = 600.0
Const targetHeight = 400.0

Dim scale As Double = targetHeight / image.Extent.Height
Dim aspect As Double = targetWidth / (image.Extent.Width * scale)

filter.inputImage = image
filter.inputScale = scale
filter.inputAspectRatio = aspect

Dim result As Picture = filter.outputImage.RenderPicture

Backdrop = result
```

Notes: This is same code as our scaleTo convenience method.

9.0.195 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.

9.0.196 How to search with regex and use unicode codepoints?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can specify unicode characters in search string with backslash x and digits.
Example:

```
dim r as RegExMbs
dim s as string
dim c as Integer
```

```
s="123 √§√√º ABC 456"

r=new RegExMBS
if r.Compile(".√.") then
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if

r=new RegExMBS
if r.Compile(".\xF6.") then // finds √ using Unicode codepoint
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if
```

9.0.197 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
```

9.0.198 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.

9.0.199 How to set the modified dot in the window?

Plugin Version: all, Platform: macOS.

Answer: Try this declares:
Example:

```
window1.ModifiedMBS=true
```

9.0.200 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.

9.0.201 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

9.0.202 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.

9.0.203 How to shutdown a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:
Example:

```
dim ae as appleevent
ae=newappleEvent(”FNDR”,”shut”,”MACS”)
if not ae.send then
msgBox ”The computer couldn’t be shutdown.”
end if
```

Notes: Or toolbox call (Attention: This method will stop the computer immediataly: No document asked to be saved, all applications quitting without knowing).

```
Declare Sub ShutDwnPower Lib "Carbon" ()
ShutDwnPower
```

9.0.204 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
```

9.0.205 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.

9.0.206 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.

9.0.207 How to use quotes in a string?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Just double them.
Example:

```
msgbox "This String contains ""quotes""."
```

9.0.208 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
```

9.0.209 How to use the Application Support folder?

Plugin Version: all, Platform: macOS.

Answer:

I was saving a registration code for an app to the Preferencefolder.
People on the list have suggested that it would be better in
the ApplicationSupportFolder. How do I save the file called CWWPrefs
into that folder using MBS?

I have checked for examples and the docs but can't see how to apply it

```
//f = SpecialFolder.Preferences.child("CWWPrefs")
f = ApplicationSupportFolderMBS(-32768)
```

Example:

```
dim folder,file as FolderItem

folder = createApplicationSupportFolderMBS(-32763)

if folder=nil then
// Some very old Mac OS Versions may not support it
// or the plugin may fail for any reason
folder=SpecialFolder.Preferences
end if

file=folder.Child("CWWPrefs")

MsgBox file.NativePath
```

Notes:

You may not be able to write there with a normal user account!

9.0.210 How to use the IOPMCopyScheduledPowerEvents function in Xojo?

Plugin Version: all, Platform: macOS.

Answer: You can use the following code which does this using the SoftDeclareMBS class.
Example:

```
Sub Open()
dim c as CFDateMBS
dim t as CFAbsoluteTimeMBS

// get current date
c=NewCFDateMBS

// in absolute time (seconds since x)
t=c.AbsoluteTime

// add 600 seconds (= 10 Minutes)
t.Value=t.Value+600

// Make a Date from it
c=t.Date

// Schedule the event
// 0 on success
// E00002C1 for missing root rights
```

```
Title=hex(schedulePowerEvent(c, "wake"))

// Just for information, display the scheduled stuff
CFShowMBS CopyScheduledPowerEvents
End Sub

Function CopyScheduledPowerEvents() As cfarrayMBS
dim s as SoftDeclareMBS
dim m as MemoryBlock

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMCopyScheduledPowerEvents") then
if s.CallFunction(0,nil) then
Return NewCFArrayMBSHandle(s.Result,true)
else
MsgBox "Failed to Call IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOKit."
end if

Return nil
End Function

Function SchedulePowerEvent(time_to_wake as CFDateMBS, Type as CFStringMBS) as Integer
dim s as SoftDeclareMBS
dim m as MemoryBlock

'/*
'* Types of power event
'* These are potential arguments to IOPMSchedulePowerEvent().
'* These are all potential values of the kIOPMPowerEventTypeKey in the CFDictionaries
'* returned by IOPMCopyScheduledPowerEvents().
'*/
'/*!
'@define kIOPMAutoWake
'@abstract Value for scheduled wake from sleep.
'*/
'#define kIOPMAutoWake "wake"
'
'/*!
'@define kIOPMAutoPowerOn
'@abstract Value for scheduled power on from off state.
```

```
'*/
'#define kIOPMAutoPowerOn "poweron"
'
'/*!
'@define kIOPMAutoWakeOrPowerOn
'@abstract Value for scheduled wake from sleep, or power on. The system will either wake OR
'power on, whichever is necessary.
'*/
'
'#define kIOPMAutoWakeOrPowerOn "wakepoweron"
'/*!
'@define kIOPMAutoSleep
'@abstract Value for scheduled sleep.
'*/
'
'#define kIOPMAutoSleep "sleep"
'/*!
'@define kIOPMAutoShutdown
'@abstract Value for scheduled shutdown.
'*/
'
'#define kIOPMAutoShutdown "shutdown"

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMSchedulePowerEvent") then

m=NewMemoryBlock(12)
m.Long(0)=time_to_wake.handle
m.Long(4)=0 // nil
m.Long(8)=type.Handle

if s.CallFunction(3,m) then
Return s.Result
end if
end if
end if

End Function
```

Notes: Requires Mac OS X and to execute root rights.

9.0.211 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".

9.0.212 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.

9.0.213 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.

9.0.214 I registered the MBS Plugins in my application, but later the registration dialog is shown.

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There are two main reasons.
Notes: 1. you may use the plugin before registering them. This is often the case if you register in a window open event and use the plugin in a control open event.
On the console on Mac OS X or Windows, you may see a message like this "MBS Plugins were used by the application before the RegisterMBSPlugin function was called. Please fix this in your code!".

2. you may have mixed different plugin versions which are not compatible.
In this case you can see a message "Internal plugin registration error." on the console on Mac OS X. Newer plugins may show a message dialog reporting this. Older version simply think they are not registered.

If the installer just merges old and new applications, users may have libraries of older and newer plugin versions in the libs folder. If your application loads the wrong version, the registration fails.

If you use remote debugging, make sure you clear the tempory files there, too. Otherwise you may have old DLLs on your hard disc which may disturb your application.

You can run into issues if you use your registration code on different places of your app. Please register only once in app.open (or app Constructor). If you have several codes, simply call them one after the other.

Also check that you only call RegisterMBSPlugin with valid serial number. If you later call RegisterMBSPlugin with Demo like in example code above, you remove the license.

Next check if you can clear the Xojo caches and that helps. This includes the Xojo Scratch folder and the Plugins & Project caches. Simply locate those folders and delete them. For Windows look in hidden AppData folder in your user folder. For Mac, please check
textasciitilde /Library/Caches and your temp folders.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

9.0.215 I want to accept Drag & Drop from iTunes

Plugin Version: all, Platform: macOS.

Answer: You need to accept AcceptMacDataDrop "itun" and Handle the DropObject.
Example:

```
Sub Open()
window1.AcceptMacDataDrop "itun"
End Sub

Sub DropObject(obj As DragItem)
dim s as string
dim f as folderItem
dim d as CFDictionaryMBS
dim o as CFObjectMBS
dim key as CFStringMBS
dim dl as CFDictionaryListMBS
dim i,c as Integer
dim u as CFURLMBS
dim file as FolderItem

if obj.MacDataAvailable("itun") then
s = obj.MacData("itun")
```

```
// Parse XML
o=NewCFObjectMBSFromXML(NewCFBinaryDataMBSStr(s))

// Make dictionary
if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

// get Tracks Dictionary
key=NewCFStringMBS("Tracks")
o=d.Value(key)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)
dl=d.List

// Walk over all entries in the Tracks dictionary
c=dl.Count-1
for i=0 to c
o=dl.Value(i)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

key=NewCFStringMBS("Location")
o=d.Value(key)
if o isa CFStringMBS then
u=NewCFURLMBSCFStringMBS(CFStringMBS(o),nil)

file=u.file
if file<>nil then
MsgBox file.NativePath
end if
end if
end if
next
end if
end if
end if
End Sub
```

Notes: The code above inside a window on Xojo 5.5 with MBS Plugin 5.3 will do it nice and show the paths.

9.0.216 I'm drawing into a listbox but don't see something.

Plugin Version: all.

Answer: If you draw this in a listbox cellbackground, you need to draw on the correct position
Example:

```
Function CellBackgroundPaint(g As Graphics, row as Integer, column as Integer) As Boolean
dim f as FolderItem
f=SpecialFolder.Desktop
f.DrawWideIconMBS(g,listbox1.left,listbox1.top+row*20,16)
Return true
End Function
```

Notes: Try this in a listbox. The Graphics object there has a cliping and an offset which the plugin doesn't know about.

9.0.217 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.

9.0.218 If I use one of your plug-ins under windows, would this then impose the use of dll after compilation or my would my compiled soft still be a stand-alone single file software?

Platforms: macOS, Linux, Windows.

Answer: Stand alone.
Notes: Xojo compiles all used plugins into the application binary.
Some plugin parts need external dlls but you will find that in the documentation. (e.g. pdflib for some classes)

9.0.219 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.

9.0.220 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

9.0.221 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.

9.0.222 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
```

9.0.223 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

9.0.224 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)

9.0.225 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?

9.0.226 SQLDatabase not initialized error?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Before you can use SQLDatabaseMBS, it must be initialized.
Example:

```
dim d as new SQLDatabaseMBS
```

Notes: This happens normally when you use ”new SQLDatabaseMBS”.
But if you just have a SQLConnectionMBS and get a recordset there, the initialization may not have happend, yet.
So please simply add a line ”dim d as new SQLDatabaseMBS” to your app.open code after registration, so the plugin part can initialize and late provide recordsets.

9.0.227 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.

9.0.228 The type translation between CoreFoundation/Foundation and Xojo data types.

Plugin Version: all, Platform: macOS.

Answer: The plugin does conversion between Cocoa/Carbon data types and native Xojo data types. The following list help you knowing what the current plugins support:
Notes: Cocoa NSObject to Variant:

nil ->nil
NSDictionary ->Dictionary
NSData ->MemoryBlock
NSString ->String
NSAttributedString ->NSAttributedStringMBS
NSDate ->Date
NSNumber ->double/integer/Int64/UInt64/UInt32/Boolean
NSURL ->String
NSValue with NSRect ->NSRectMBS
NSValue with NSPoint ->NSPointMBS
NSValue with NSSize ->NSSizeMBS
NSValue with NSRange ->NSRangeMBS
NSValue with QTTime ->QTTimeMBS
NSValue with QTTimeRange ->QTTimeRangeMBS
NSArray ->Array of Variant
QuartzFilter ->QuartzFilterMBS

- ->*MBS

Variant to Cocoa NSObject:

nil ->nil
Dictionary ->NSDictionary
Boolean ->NSNumber
Integer ->NSNumber
Color ->NSColor
Int64 ->NSNumber
Single ->NSNumber
Double ->NSNumber
Date ->NSDate
MemoryBlock ->NSData
String ->NSString
NSImageMBS ->NSImage
NSAttributedStringMBS ->NSAttributedString
NSColorMBS ->NSColor
NSRectMBS ->NSValue with NSRect
NSSizeMBS ->NSValue with NSSize

NSPointMBS ->NSValue with NSPoint
NSRangeMBS ->NSValue with NSRange
NSBurnMBS ->NSBurn
NSViewMBS ->NSView
NSFontMBS ->NSFont
NSParagraphStyleMBS ->NSParagraphStyle
NSAttributedStringMBS ->NSAttributedString
WebPolicyDelegateMBS ->WebPolicyDelegate
WebUIDelegateMBS ->WebUIDelegate
WebFrameLoadDelegateMBS ->WebFrameLoadDelegate
WebResourceLoadDelegateMBS ->WebResourceLoadDelegate
NSIndexSetMBS ->NSIndexSet
QTTimeMBS ->QTTime
QTTimeRangeMBS ->QTTimeRange
Array of Variant ->NSArray
Array of String ->NSArray
CFStringMBS ->NSString
CFNumberMBS ->NSNumber
CFDataMBS ->NSData
CFURLMBS ->NSURL
CFArrayMBS ->NSArray
CFDictionaryMBS ->NSDictionary
CFBinaryDataMBS ->NSDate

Carbon CFTypeRef to Variant:

CFDictionaryRef ->Dictionary
CFStringRef ->String
CFDataRef ->String
CFURL ->String
CFNumber ->Integer/Double/Int64
CFArray ->Array
CFDate ->date
nil ->nil
CGColorSpace ->CGColorSpaceMBS
CGColor ->CGColorMBS
CGImage ->CGImageMBS
CF* ->CF*MBS

Variant to Carbon CFTypeRef:

Dictionary ->CFDictionaryRef
Boolean ->CFBooleanRef
Color ->CFNumberRef
Integer ->CFNumberRef

Int64 ->CFNumberRef
Single ->CFNumberRef
Double ->CFNumberRef
String ->CFStringRef
Color ->CGColorRef
Date ->CFDateRef
nil ->nil
Memoryblock ->CFDataRef
FolderItem ->CFURLRef
Dictionary ->CFDictionaryRef
Array of Variant/String/Date/Double/Single/Int64/Integer ->CFArray
CGRectMBS ->CGRect as CFDataRef
CGSizeMBS ->CGSize as CFDataRef
CGPointMBS ->CGPoint as CFDataRef
CGColorMBS ->CGColor
CGColorSpaceMBS ->CGColorSpace
CGImageMBS ->CGImage
CGDataConsumerMBS ->CGDataConsumer
CGDataProviderMBS ->CGDataProvider
CF*MBS ->CF*

Strings without encodings should be put into dictionaries as memoryblocks.

9.0.229 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.

9.0.230 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.

9.0.231 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.

9.0.232 What does the NAN code mean?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

9.0.233 What font is used as a 'small font' in typical Mac OS X apps?

Plugin Version: all, Platform: macOS.

Answer:

Xojo 4.5 has a constant "SmallSystem" to use for a font name.
For older versions try this code:
Example:

```
Sub GetThemeFont(fontType as Integer, ByRef fontName as String, ByRef fontSize as Integer, ByRef
fontStyle as Integer)
dim err as Integer
dim theFont, theFontSize, theFontStyle as MemoryBlock

const smSystemScript = -1

Declare Function GetThemeFont Lib "Carbon" (inFontID as Integer, inScript as Integer, outFontName
as Ptr, outFontSize as Ptr, outStyle as Ptr) as Integer

theFont = NewMemoryBlock(256) //Str255
theFontSize = NewMemoryBlock(2) //SInt16
theFontStyle = NewMemoryBlock(1) //Style

err = GetThemeFont(fontType, smSystemScript, theFont, theFontSize, theFontStyle)

if err = 0 then
fontName = theFont.PString(0)
fontSize = theFontSize.UShort(0)
fontStyle = theFontStyle.Byte(0)
else
fontName = ""
fontSize = 0
fontStyle = 0
end if
End Sub
```

9.0.234 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.

9.0.235 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.

9.0.236 What is last version of the plugins for macOS 32-bit?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use version 23.0 or older.
Notes: We stopped including 32-bit code for macOS in version 23.1.
Please us older versions if you use an old Xojo.

Xojo 2017r3 and newer load our 64-bit plugins.

9.0.237 What is the difference between Timer and WebTimer?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Time is server side and WebTimer client side.
Notes: Timer is the normal timer class in Xojo. It runs on the server. On the side the WebTimer runs on the client. It triggers a request to the server to perform the action. So a WebTimer is good to keep the connection running and the website updated regularly. A timer on the server is good to make regular jobs like starting a database backup every 24 hours.

9.0.238 What is the list of Excel functions?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a list of function names known by LibXL.
Notes: LibXL parses the functions and writes tokens to the excel file. So even if Excel can do more functions, we can only accept the ones known by LibXL.

ABS, ABSREF, ACOS, ACOSH, ACTIVE.CELL, ADD.BAR, ADD.COMMAND, ADD.MENU, ADD.TOOLBAR, ADDRESS, AND, APP.TITLE, AREAS, ARGUMENT, ASC, ASIN, ASINH, ATAN, ATAN2, ATANH, AVEDEV, AVERAGE, AVERAGEA, BAHTTEXT, BETADIST, BETAINV, BINOMDIST, BREAK, CALL, CALLER, CANCEL.KEY, CEILING, CELL, CHAR, CHECK.COMMAND, CHIDIST, CHIINV, CHITEST, CHOOSE, CLEAN, CODE, COLUMN, COLUMNS, COMBIN, CONCATENATE, CONFIDENCE, CORREL, COS, COSH, COUNT, COUNTA, COUNTBLANK, COUNTIF, COVAR, CREATE.OBJECT, CRITBINOM, CUSTOM.REPEAT, CUSTOM.UNDO, DATE, DATEDIF, DATESTRING, DATEVALUE, DAVERAGE, DAY, DAYS360, DB, DBCS, DCOUNT, DCOUNTA, DDB, DEGREES, DELETE.BAR, DELETE.COMMAND, DELETE.MENU, DELETE.TOOLBAR, DEREF, DEVSQ, DGET, DIALOG.BOX, DIRECTORY, DMAX, DMIN, DOCUMENTS, DOLLAR, DPRODUCT, DSTDEV, DSTDEVP, DSUM, DVAR, DVARP, ECHO, ELSE, ELSE.IF, ENABLE.COMMAND, ENABLE.TOOL, END.IF, ERROR, ERROR.TYPE, EVALUATE, EVEN, EXACT, EXEC, EXECUTE, EXP, EXPONDIST, FACT, FALSE, FCLOSE, FDIST, FILES, FIND, FINDB, FINV, FISHER, FISHERINV, FIXED, FLOOR, FOPEN, FOR, FOR.CELL, FORECAST,

FORMULA.CONVERT, FPOS, FREAD, FREADLN, FREQUENCY, FSIZE, FTEST, FV, FWRITE, FWRITELN, GAMMADIST, GAMMAINV, GAMMALN, GEOMEAN, GET.BAR, GET.CELL, GET.CHART.ITEM, GET.DEF, GET.DOCUMENT, GET.FORMULA, GET.LINK.INFO, GET.MOVIE, GET.NAME, GET.NOTE, GET.OBJECT, GET.PIVOT.FIELD, GET.PIVOT.ITEM, GET.PIVOT.TABLE, GET.TOOL, GET.TOOLBAR, GET.WINDOW, GET.WORKBOOK, GET.WORKSPACE, GETPIVOTDATA, GOTO, GROUP, GROWTH, HALT, HARMEAN, HELP, HLOOKUP, HOUR, HYPERLINK, HYPGEOMDIST, IF, INDEX, INDIRECT, INFO, INITIATE, INPUT, INT, INTERCEPT, IPMT, IRR, ISBLANK, ISERR, ISERROR, ISLOGICAL, ISNA, ISNONTEXT, ISNUMBER, ISPMT, ISREF, ISTEXT, ISTHAIDIGIT, KURT, LARGE, LAST.ERROR, LEFT, LEFTB, LEN, LENB, LINEST, LINKS, LN, LOG, LOG10, LOGEST, LOGINV, LOGNORMDIST, LOOKUP, LOWER, MATCH, MAX, MAXA, MDETERM, MEDIAN, MID, MIDB, MIN, MINA, MINUTE, MINVERSE, MIRR, MMULT, MOD, MODE, MONTH, MOVIE.COMMAND, N, NA, NAMES, NEGBINOMDIST, NEXT, NORMDIST, NORMINV, NORMSDIST, NORMSINV, NOT, NOTE, NOW, NPER, NPV, NUMBERSTRING, ODD, OFFSET, OPEN.DIALOG, OPTIONS.LISTS.GET, OR, PAUSE, PEARSON, PERCENTILE, PERCENTRANK, PERMUT, PHONETIC, PI, PIVOT.ADD.DATA, PMT, POISSON, POKE, POWER, PPMT, PRESS.TOOL, PROB, PRODUCT, PROPER, PV, QUARTILE, RADIANS, RAND, RANK, RATE, REFTEXT, REGISTER, REGISTER.ID, RELREF, RENAME.COMMAND, REPLACE, REPLACEB, REPT, REQUEST, RESET.TOOLBAR, RESTART, RESULT, RESUME, RETURN, RIGHT, RIGHTB, ROMAN, ROUND, ROUNDBAHTDOWN, ROUNDBAHTUP, ROUNDDOWN, ROUNDUP, ROW, ROWS, RSQ, RTD, SAVE.DIALOG, SAVE.TOOLBAR, SCENARIO.GET, SEARCH, SEARCHB, SECOND, SELECTION, SERIES, SET.NAME, SET.VALUE, SHOW.BAR, SIGN, SIN, SINH, SKEW, SLN, SLOPE, SMALL, SPELLING.CHECK, SQRT, STANDARDIZE, STDEV, STDEVA, STDEVP, STDEVPA, STEP, STEYX, SUBSTITUTE, SUBTOTAL, SUM, SUMIF, SUMPRODUCT, SUMSQ, SUMX2MY2, SUMX2PY2, SUMXMY2, SYD, T, TAN, TANH, TDIST, TERMINATE, TEXT, TEXT.BOX, TEXTREF, THAIDAYOFWEEK, THAIDIGIT, THAIMONTHOFYEAR, THAINUMSOUND, THAINUMSTRING, THAISTRINGLENGTH, THAIYEAR, TIME, TIMEVALUE, TINV, TODAY, TRANSPOSE, TREND, TRIM, TRIMMEAN, TRUE, TRUNC, TTEST, TYPE, UNREGISTER, UPPER, USDOLLAR, USERDEFINED, VALUE, VAR, VARA, VARP, VARPA, VDB, VIEW.GET, VLOOKUP, VOLATILE, WEEKDAY, WEIBULL, WHILE, WINDOW.TITLE, WINDOWS, YEAR and ZTEST.

9.0.239 What is the replacement for PluginMBS?

Plugin Version: all, Platform: macOS.

Answer: Use the SoftDeclareMBS class to load libraries dynamically.

9.0.240 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.

9.0.241 What to do with a NSImageCacheException?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You need to add exception handlers for NSExceptionMBS in order to catch this exception.
Notes: You may also add code to write the stack of the exception into a log file for later locating the error source.

A NSImage has several image representations in memory. So basicly you pass in the base image and for whatever size an image is needed, the NSImage class will create a cache image representation of the requested size so on the next query it can use that cache for the same requested size.

9.0.242 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.

9.0.243 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.

9.0.244 Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetActiveDisplayList.

9.0.245 Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithPoint.

9.0.246 Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithRect.

9.0.247 Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetOnlineDisplayList.

9.0.248 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.

9.0.249 Where is NetworkAvailableMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We removed NetworkAvailableMBS some versions ago. It was not working right and basicly it's not useful. If you want to check whether you have a network, than do a DNS resolve:
Example:

```
// two independend domain names
const domain1 = "www.google.com"
const domain2 = "www.macsw.de"

// resolve IPs
dim ip1 as string = DNSNameToAddressMBS(Domain1)
dim ip2 as string = DNSNameToAddressMBS(Domain2)

// if we got IPs and not the same IPs (error/login pages)
if len(ip1)=0 or len(ip2)=0 or ip1=ip2 then
MsgBox "no connection"
else
MsgBox "have connection"
end if
```

Notes: This way you can detect whether you got something from DNS. And you can make sure that a DNS redirection to a login page won't catch you.

9.0.250 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.

9.0.251 Where is XLSDocumentMBS class?

Plugin Version: all, Platform: macOS.

Answer: This class has been removed in favor of XLBookMBS class.
Notes: This classes have been removed XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

9.0.252 Where to get information about file formats?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Please visit this web page:
http://www.wotsit.org

9.0.253 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

9.0.254 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.

9.0.255 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.

9.0.256 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.

9.0.257 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.

9.0.258 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.

9.0.259 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.

9.0.260 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.

9.0.261 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.

9.0.262 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.

9.0.263 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.

9.0.264 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

9.0.265 Xojo doesn't work with your plugins on Windows 98.

Plugin Version: all, Platform: Windows.

Answer: Please upgrade your Windows version.

9.0.266 Xojo or my RB application itself crashes on launch on Mac OS Classic. Why?

Plugin Version: all.

Answer:

You may check if the application has enough memory to be loaded.
RB should have on Mac OS Classic more than 20 MB of RAM.
I prefered to use 50 MB and for an application a 10 MB partition is a good way to start.

Parameter	Description
x	The x value of the data point. For an enumerated x-axis (see Axis.setLabels on what is an enumerated axis), the first data point is 0, and the nth data point is (n-1).
xLabel	The bottom x-axis label of the data point.
x2Label	The top x-axis label of the data point.
value	The value of the data point.
accValue	The sum of values of all data points that are in the same x position and same data group as the current data point, and with data set number less than or equal to the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
totalValue	The sum of values of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
percent	The percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
accPercent	The accumulated percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
gpercent	The percentage of the data point based on the total value of all data points in a layer.
dataSet	The data set number to which the data point belongs. The first data set is 0. The nth data set is (n-1).
dataSetName	The name of the data set to which the data point belongs.
dataItem	The data point number within the data set. The first data point is 0. The nth data point is (n-1).
dataGroup	The data group number to which the data point belongs. The first data group is 0. The nth data group is (n-1).
dataGroupName	The name of the data group to which the data point belongs.
layerId	The layer number to which the data point belongs. The first layer is 0. The nth layer is (n-1).
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using Layer.addExtraField, Layer.addExtraField2, BaseChart.addExtraField or BaseChart.addExtraField2.

diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by data set number. The Pth data set corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth data set corresponds to the Pth element of the (N + Q)th extra field.

Parameter	Description
zx	The symbol scale in the x dimension. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.
zy	The symbol scale in the y dimension. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.
z	The symbol scale without distinguishing the dimension to use. Applicable for layers with symbol scales set by LineLayer.setSymbolScale.

Parameter	Description
slope	The slope of the trend line.
intercept	The y-intercept of the trend line.
corr	The correlation coefficient in linear regression analysis.
stderr	The standard error in linear regression analysis.

Parameter	Description
top	The value of the top edge of the box-whisker symbol.
bottom	The value of the bottom edge of the box-whisker symbol.
max	The value of the maximum mark of the box-whisker symbol.
min	The value of the minimum mark of the box-whisker symbol.
med	The value of the median mark of the box-whisker symbol.

Parameter	Description
high	The high value.
low	The low value.
open	The open value.
close	The close value.

Parameter	Description
dir	The direction of the vector.
len	The length of the vector.

Parameter	Description
radius	The radial value of the data point.
value	Same as { radius } . See above.
angle	The angular value of the data point.
x	Same as { angle } . See above.
label	The angular label of the data point.
xLabel	Same as { label } . See above.
name	The name of the layer to which the data point belongs.
dataSetName	Same as { name } . See above.
i	The data point number. The first data point is 0. The nth data point is (n-1).
dataItem	Same as { i } . See above.
z	The symbol scale. Applicable for layers with symbol scales set by PolarLayer.setSymbolScale.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using Layer.addExtraField, Layer.addExtraField2, BaseChart.addExtraField or BaseChart.addExtraField2.

diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by layer index. The Pth layer corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth layer corresponds to the Pth element of the (N + Q)th extra field.

Parameter	Description
dir	The direction of the vector.
len	The length of the vector.

Parameter	Description
value	The axis value at the tick position.
label	The axis label at the tick position.

Parameter	Description
[param]	The name of the parameter
[a]	If this field a number, it specifies the number of decimal places (digits to the right of the decimal point).

[b] The thousand separator. Should be a non-alphanumeric character (not 0-9, A-Z, a-z). Use ' textasciitilde ' for no thousand separator. The default is ' textasciitilde ', which can be modified using BaseChart.setNumberFormat.

[c] The decimal point character. The default is '.', which can be modified using BaseChart.setNumberFormat.

[d] The negative sign character. Use ' textasciitilde ' for no negative sign character. The default is '-', which can be modified using BaseChart.setNumberFormat.

Parameter	Description
yyyy	The year in 4 digits (e.g. 2002)
yyy	The year showing only the least significant 3 digits (e.g. 002 for the year 2002)
yy	The year showing only the least significant 2 digits (e.g. 02 for the year 2002)
y	The year showing only the least significant 1 digits (e.g. 2 for the year 2002)
mmm	The month formatted as its name. The default is to use the first 3 characters of the english month name (Jan, Feb, Mar ...). The names can be configured using BaseChart.setMonthNames.
mm	The month formatted as 2 digits from 01 - 12, adding leading zero if necessary.
m	The month formatted using the minimum number of digits from 1 - 12.
MMM	The first 3 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
MM	The first 2 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
M	The first character of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
dd	The day of month formatted as 2 digits from 01 - 31, adding leading zero if necessary.
d	The day of month formatted using the minimum number of digits from 1 - 31.
w	The name of the day of week. The default is to use the first 3 characters of the english day of week name (Sun, Mon, Tue ...). The names can be configured using BaseChart.setWeekDayNames.
hh	The hour of day formatted as 2 digits, adding leading zero if necessary. The 2 digits will be 00 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
h	The hour of day formatted using the minimum number of digits. The digits will be 0 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
nn	The minute formatted as 2 digits from 00 - 59, adding leading zero if necessary.
n	The minute formatted using the minimum number of digits from 00 - 59.
ss	The second formatted as 2 digits from 00 - 59, adding leading zero if necessary.
s	The second formatted using the minimum number of digits from 00 - 59.
a	Display either 'am' or 'pm', depending on whether the time is in the morning or afternoon. The text 'am' and 'pm' can be modified using BaseChart.setAMPM.

Shape Id	Value	Description
SquareShape	1	Square shape. See (1, 1) above.
DiamondShape	2	Diamond shape. See (2, 1) above.
TriangleShape	3	Triangle shape pointing upwards. See (3, 1) above.
RightTriangleShape	4	Triangle shape pointing rightwards. See (4, 1) above.
LeftTriangleShape	5	Triangle shape pointing leftwards. See (5, 1) above.
InvertedTriangleShape	6	Triangle shape pointing downwards. See (1, 2) above.
CircleShape	7	Circle shape. See (2, 2) above.
StarShape	[Method]	Star shapes of various points. See (2, 3), (2, 4), (2, 5), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5) above for stars with 3 to 10 points.
PolygonShape	[Method]	Polygon shapes symmetrical about a vertical axis with a vertex at the top center position. See (4, 1), (4, 3), (4, 5), (5, 1) for polygons of 5 to 8 sides.
Polygon2Shape	[Method]	Polygon shapes symmetrical about a vertical axis but without any vertex at the top center position. See (4, 2), (4, 4) for polygons of 5 and 6 sides.
CrossShape	[Method]	'+' shapes. See (5, 2), (5, 3), (5, 4), (5, 5), (6, 1), (6, 2), (6. 3) for '+' shape with arm width of 0.1 - 0.7.
Cross2Shape	[Method]	'X' shapes. See (6, 4), (6, 5), (7, 1), (7, 2), (7, 3), (7, 4), (7, 5) for 'X' shapes with arm width of 0.1 - 0.7.

langEnglish	0	Roman script
langFrench	1	Roman script
langGerman	2	Roman script
langItalian	3	Roman script
langDutch	4	Roman script
langSwedish	5	Roman script
langSpanish	6	Roman script
langDanish	7	Roman script
langPortuguese	8	Roman script
langNorwegian	9	Roman script
langHebrew	10	Hebrew script
langJapanese	11	Japanese script
langArabic	12	Arabic script
langFinnish	13	Roman script
langGreek	14	Greek script using smRoman script code
langIcelandic	15	modified smRoman/Icelandic script
langMaltese	16	Roman script
langTurkish	17	modified smRoman/Turkish script
langCroatian	18	modified smRoman/Croatian script
langTradChinese	19	Chinese (Mandarin) in traditional characters
langUrdu	20	Arabic script
langHindi	21	Devanagari script
langThai	22	Thai script
langKorean	23	Korean script

Nan	Meaning
1	Invalid square root (negative number, usually)
2	Invalid addition (indeterminate such as infinity + (-infinity))
4	Invalid division (indeterminate such as 0/0)
8	Invalid multiplication (indeterminate such as 0*infinity)
9	Invalid modulo such as (a mod 0)
17	Try to convert invalid string to a number like val(”x7”)
33	Invalid argument in a trig function
34	Invalid argument in an inverse trig function
36	Invalid argument in a log function
37	Invalid argument in Pow function
38	Invalid argument in toolbox financial function
40	Invalid argument in hyperbolic function
42	Invalid argument in a gamma function

Symbol	Description and result
0	Digit placeholder. For example, if the value 8.9 is to be displayed as 8.90, use the format #.00
#	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall not display extra zeros when the number typed has fewer digits on either side of the decimal than there are # symbols in the format. For example, if the custom format is #.##, and 8.9 is in the cell, the number 8.9 is displayed.
?	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall put a space for insignificant zeros on either side of the decimal point so that decimal points are aligned in the column. For example, the custom format 0.0? aligns the decimal points for the numbers 8.9 and 88.99 in a column.
. (period)	Decimal point.
%	Percentage. If the cell contains a number between 0 and 1, and the custom format 0% is used, the application shall multiply the number by 100 and adds the percentage symbol in the cell.
, (comma)	Thousands separator. The application shall separate thousands by commas if the format contains a comma that is enclosed by number signs (#) or by zeros. A comma that follows a placeholder scales the number by one thousand. For example, if the format is #.0,, and the cell value is 12,200,000 then the number 12.2 is displayed.
E- E+ e- e+	Scientific format. The application shall display a number to the right of the "E" symbol that corresponds to the number of places that the decimal point was moved. For example, if the format is 0.00E+00, and the value 12,200,000 is in the cell, the number 1.22E+07 is displayed. If the number format is #0.0E+0, then the number 12.2E+6 is displayed.
$ -+/():space	Displays the symbol. If it is desired to display a character that differs from one of these symbols, precede the character with a backslash (\). Alternatively, enclose the character in quotation marks. For example, if the number format is (000), and the value 12 is in the cell, the number (012) is displayed.
\	Display the next character in the format. The application shall not display the backslash. For example, if the number format is 0\!, and the value 3 is in the cell, the value 3! is displayed.
*	Repeat the next character in the format enough times to fill the column to its current width. There shall not be more than one asterisk in one section of the format. If more than one asterisk appears in one section of the format, all but the last asterisk shall be ignored. For example, if the number format is 0*x, and the value 3 is in the cell, the value 3xxxxxx is displayed. The number of x characters that are displayed in the cell varies based on the width of the column.
_ (underline)	Skip the width of the next character. This is useful for lining up negative and positive values in different cells of the same column. For example, the number format _(0.0_);(0.0) aligns the numbers 2.3 and -4.5 in the column even though the negative number is enclosed by parentheses.
"text"	Display whatever text is inside the quotation marks. For example, the format 0.00 "dollars" displays 1.23 dollars when the value 1.23 is in the cell.
@	Text placeholder. If text is typed in the cell, the text from the cell is placed in the format where the at symbol (@) appears. For example, if the number format is "Bob "@" Smith" (including quotation marks), and the value "John" is in the cell, the value Bob John Smith is displayed.

[Black] [Green] [White] [Blue] [Magenta] [Yellow] [Cyan] [Red]

To display	As	Use this code
Months	1-12	m
Months	01-12	mm
Months	Jan-Dec	mmm
Months	January-December	mmmm
Months	J-D	mmmmm
Days	1-31	d
Days	01-31	dd
Days	Sun-Sat	ddd
Days	Sunday-Saturday	dddd
Years	00-99	yy
Years	1900-9999	yyyy
Hours	0-23	h
Hours	00-23	hh
Minutes	0-59	m
Minutes	00-59	mm
Seconds	0-59	s
Seconds	00-59	ss
Time	4 AM	h AM/PM
Time	4:36 PM	h:mm AM/PM
Time	4:36:03 P	h:mm:ss A/P
Time	4:36:03.75	h:mm:ss.00
Elapsed time	1:02	[h] :mm
Elapsed time	62:16	[mm] :ss
Elapsed time	3735.80	[ss] .00

To display	As	Use this code
1234.59	1234.6	####.#
8.9	8.900	#.000
.631	0.6	0.#
12	12.0	#.0#
1234.568	1234.57	#.0#
44.398	44.398	???.???
102.65	102.65	???.???
2.8	2.8	???.???
5.25	5 1/4	# ??/??
5.3	5 3/10	# ??/??
12000	12,000	#,###
12000	12	#,
12400000	12.4	0.0„