

MBS SQL 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 SQL Plugin

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Chapter 5

SQL

5.1 class Database

5.1.1 class Database

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The Xojo Database class is the base class for the database subclasses that communicate with a variety of databases.

Notes: Use one of the subclasses to connect to your database.

5.1.2 Methods

5.1.3 AddRow(**TableName as String, row as DatabaseRow**)

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Inserts Data (a populated DatabaseRow) as a new row in TableName.

5.1.4 BeginTransaction

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new transaction.

Notes: Changes to the database made after this call can be saved with CommitTransaction or undone with RollbackTransaction.

5.1.5 Close

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Closes or disconnects the database.

Notes: Calling Close does not issue a Commit, but some databases will automatically Commit changes in a transaction when you Close the connection and some database will automatically Rollback changes in a transaction when the connection is closed. Refer to the documentation for your database to check what its behavior is.

For desktop applications, you will often Connect to the database when the app starts and Close it when the app quits.

For web applications, you usually Connect to the database when the Session starts and Close it when the Session quits.

5.1.6 Commit

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Commits an open transaction. This permanently saves changes to the database.

Notes: You have to have an open transaction to be able to use Commit. On SQLite (and other databases), you can start a transaction with this command:

```
BEGIN TRANSACTION
```

It can be sent using SQLExecute:

```
DB.SQLExecute("BEGIN TRANSACTION")
```

5.1.7 CommitTransaction

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Commits an open transaction. This permanently saves changes to the database.

5.1.8 Connect

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

5.1. CLASS DATABASE 29

Function: Connects to the database so that you can begin using it.

See also:

- 5.1.9 Connect as boolean 29

5.1.9 Connect as boolean

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Connects to the database so that you can begin using it.

Notes: Before proceeding with database operations, test to be sure that Connect returns True. If Connect returns False, you should also check the ErrorCode and ErrorMessage.

See Option() for various options you can set before connecting.

e.g. `c.Option("SQLiteVFSFlags") = "1"` for SQLite for read only access.

See also:

- 5.1.8 Connect 28

5.1.10 ExecuteSQL(sql As String, ParamArray values As Variant)

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Used to execute an SQL command.

Notes: Use this for commands that do not return any data, such as CREATE TABLE or INSERT.

See also:

- 5.1.11 ExecuteSQL(sql As String, values() As Variant) 29

5.1.11 ExecuteSQL(sql As String, values() As Variant)

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Used to execute an SQL command.

Notes: Use this for commands that do not return any data, such as CREATE TABLE or INSERT.

See also:

- 5.1.10 ExecuteSQL(sql As String, ParamArray values As Variant) 29

5.1.12 InsertRecord(TableName as String, Data as DatabaseRecord)

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Inserts Data (a populated DatabaseRecord) as a new row in TableName.

Notes: Always check the Error property to verify that the data was added.

5.1.13 Prepare(statement as String) as PreparedStatement

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a PreparedStatement using the SQL statement for use with the various database prepared statement classes.

Notes: A prepared statement is an SQL statement with parameters that has been pre-processed by the database so that it can be executed more quickly if it is re-used with different parameters. Prepared statements also mitigate the risk of SQL injection in web apps.

5.1.14 Rollback

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Cancels an open transaction restoring the database to the state it was in before the transaction began.

Notes: You will generally want to rollback database changes if a database error occurs within the transaction.

You have to have an open transaction to be able to use Rollback. On SQLite (and other databases), you can start a transaction with this command:

```
BEGIN TRANSACTION
```

It can be sent using SQLExecute:

```
DB.SQLExecute("BEGIN TRANSACTION")
```

5.1.15 RollbackTransaction

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Cancels an open transaction restoring the database to the state it was in before the transaction began.

5.1.16 SelectSQL(sql As String, ParamArray values As Variant) as RowSet

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL SELECT statement and returns the results in a RowSet.

See also:

- 5.1.17 SelectSQL(sql As String, values() As Variant) as RowSet 31

5.1.17 SelectSQL(sql As String, values() As Variant) as RowSet

Plugin Version: 20.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL SELECT statement and returns the results in a RowSet.

See also:

- 5.1.16 SelectSQL(sql As String, ParamArray values As Variant) as RowSet 31

5.1.18 SQLExecute(ExecuteString as string)

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Used to execute an SQL command. Use this for commands that do not return any data, such as CREATE TABLE or INSERT. ExecuteString contains the SQL statement.

Notes: To avoid SQL Injection, be sure to use Prepared SQL Statements.

5.1.19 SQLSelect(SelectString as string) as RecordSet

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: This is an SQL statement that returns a RecordSet.

Notes: SelectString contains the SQL statement.

Typically only SQL SELECT statements return a RecordSet, but some databases return a RecordSet for SQL commands such as INSERT, UPDATE or stored procedures.

If the SQL does not return data then Nil is returned. Nil is also usually returned if there is an error in the SQL statement, but you should instead check Database.Error to check if an error occurred.

To avoid SQL Injection, be sure to use Prepared SQL Statements.

5.1.20 Properties

5.1.21 DatabaseName as String

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The name of the database to open.

Example:

```
dim db as new SQLiteDatabaseMBS
db.DatabaseName="PostgreSQL:127.0.0.1,5432@dbname=postgres connect_timeout=10 sslmode=require"
```

Notes: The DatabaseName is typically used with server databases (such as MySQL or PostgreSQL) to identify the specific database to use on the server.

Please set the DatabaseName, UserName and Password properties when using SQLiteDatabaseMBS class. The Host property is ignored.

The database name must contain the complete information and a prefix for the kind of database. (Read and Write property)

5.1.22 Error as Boolean

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: True if an error is returned from the database engine.

Notes: See the values of the ErrorCode and ErrorMessage properties to learn the specifics of the error.

You should check the Error property after each database operation to see if there was an error. If there is an error, you can display or log the ErrorCode and ErrorMessage. (Read and Write property)

5.1.23 ErrorCode as Integer

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The error code returned from the database.

Notes: Error codes and error messages are different for each database. (Read and Write property)

5.1.24 ErrorMessage as String

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Text of the error message returned from the database.

Notes: Error codes and error messages are different for each database.

You should check the Error property after each database operation to see if there was an error. If there is an error, you can display or log the ErrorCode and ErrorMessage.

(Read and Write property)

5.1.25 Host as String

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The database host name or IP address of the database server.

Notes: (Read and Write property)

5.1.26 Password as String

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The password that is required for access to the database.

Notes: Typically used in conjunction with UserName.

(Read and Write property)

5.1.27 UserName as String

Plugin Version: 1.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The username that is required for access to the database.

Notes: (Read and Write property)

5.2 class DB2MBS

5.2.1 class DB2MBS

Plugin Version: 13.2, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for some DB2 related API commands.

Example:

```
dim cmd as new SQLCommandMBS // your command
dim con as new SQLConnectionMBS // your connection
dim api as DB2MBS = con.NativeAPI
```

```
// now use an API function
MsgBox str(api.SQLRowCount(cmd))
```

Notes: More commands are added as requested.

Deprecated in favor of direct methods on SQLCommandMBS. Please let us know if you need more DB2 specific functions.

Subclass of the SQLAPIMBS class.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)
- [MBS Xojo / Real Studio Plugins, version 17.1pr1](#)
- [MonkeyBread Software Releases the MBS Real Studio plug-ins in version 13.2](#)
- [MBS Xojo / Real Studio Plugins, version 13.2pr11](#)

5.2.2 Methods

5.2.3 SQLExecDirect(cmd as SQLCommandMBS, text as string)

Plugin Version: 13.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes an SQL command directly without any preprocessing in the plugin.

Example:

```
dim cmd as new SQLCommandMBS // your command
dim con as new SQLConnectionMBS // your connection
dim api as DB2MBS = con.NativeAPI
```

```
// now use an API function
```

```
const sql = "some sql command"  
api.SQLExecDirect cmd, sql
```

Notes: Lasterror is set.

5.2.4 SQLRowCount(cmd as SQLCommandMBS) as Int64

Plugin Version: 13.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the affected number of rows for the last operation.

Notes: Lasterror is set.

5.2.5 Properties

5.2.6 Lasterror as Integer

Plugin Version: 13.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: The last error code.

Notes: (Read and Write property)

5.3 class InformixMBS

5.3.1 class InformixMBS

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for Informix specific functions.

Notes: Deprecated in favor of direct methods on `SQLConnectionMBS`. Please let us know if you need more Informix specific functions.

Subclass of the `SQLAPIMBS` class.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)
- [MBS Xojo / Real Studio Plugins, version 17.1pr1](#)
- [MonkeyBread Software Releases the MBS Real Studio plug-ins in version 13.1](#)
- [MonkeyBread Software Releases the MBS Real Studio plug-ins in version 13.0](#)
- [MBS Real Studio Plugins, version 13.0fc1](#)

5.3.2 Methods

5.3.3 `Error(cmd as SQLCommandMBS, byref SQLState as string, byref NativeError as Integer, byref ErrorMessage as string) as Integer`

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the error status.

5.3.4 `GetCursorName(cmd as SQLCommandMBS) as string`

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries cursor name for given recordset.

5.3.5 HDBC as Integer

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns Database Connection handle.

5.3.6 HENV as Integer

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: The environment handle.

5.3.7 HSTMT(cmd as SQLCommandMBS) as Integer

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the statement handle for the command object.

Notes: Returns 0 on any error.

5.3.8 SetCursorName(cmd as SQLCommandMBS, name as string) as boolean

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets cursor name for given recordset.

Notes: Returns true on success.

5.4 module InternalCubeSQLLibraryMBS

5.4.1 module InternalCubeSQLLibraryMBS

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The module for our internal CubeSQL client connector.

Example:

```
if InternalCubeSQLLibraryMBS.Use then
  MsgBox "Using internal CubeSQL library."
else
  MsgBox "Failed, so please use library file."
end if

Dim db As SQLiteDatabaseMBS // or SqlConnectionMBS

db.Option("ConnectionTimeout") = "30" // 30 seconds timeout
db.Option("ConnectionEncryption") = "SSL_AES256"
db.Option("SSLCertificatePath") = SSLCertificatePath

// connect...
```

Notes: This is a CubeSQL client library built into a plugin, so you can decide with use of MBS SQL Plugin to use this plugin instead of providing your own external copy of CubeSQL shared library.

Version 19.4 or newer have CubeSQL with SSL included.

You can use Option("ConnectionEncryption") with SSL, SSL+AES128, SSL+AES192 and SSL+AES256 as values.

If ConnectionEncryption is SSL, we can pass path from Option("SSLCertificatePath") with the certificate file.

Blog Entries

- [CubeSQL Library for Mac](#)
- [MBS Xojo Plugins, version 18.3pr1](#)
- [CubeSQL support for MBS Xojo SQL Plugin](#)

Videos

- [Presentation from Xojo Developer Conference 2019 in Miami.](#)

5.4.2 Methods

5.4.3 SSLVersion as String

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries SSL version of library.

5.4.4 Use as boolean

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Registers the built in CubeSQL client library for use.

Example:

```
if InternalCubeSQLLibraryMBS.Use then
MsgBox "Using internal CubeSQL library."
else
MsgBox "Failed, so please use library file."
end if
```

Notes: So instead of having SQL Plugin load CubeSQL shared library from file, we use the one built into this plugin.

5.4.5 Version as String

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries version of library.

5.5 module InternalPostgreSQLLibraryMBS

5.5.1 module InternalPostgreSQLLibraryMBS

Plugin Version: 16.2, Platforms: macOS, Linux, Targets: All.

Deprecated: This item is deprecated and should no longer be used. You can use postgres driver libraries instead. **Function:** The module for our internal PostgreSQL engine.

Example:

```
if InternalPostgreSQLLibraryMBS.Use then
  MsgBox "Using internal PostgreSQL."
else
  MsgBox "Failed, so please use library file."
end if
```

Notes: This is a PostgreSQL library built into a plugin, so you can decide with use of MBS SQL Plugin to use this plugin instead of providing your own external copy of PostgreSQL shared library.

Deprecated since the library version is outdated. Please use PostgreSQL libraries, e.g. from our libraries page:

<https://www.monkeybreadsoftware.de/xojo/download/plugin/Libs/>

Blog Entries

- [MBS Xojo Plugins, version 22.5pr7](#)
- [MBS Xojo Plugins, version 20.5pr8](#)
- [MBS Xojo Plugins, version 20.4pr1](#)
- [CubeSQL support for MBS Xojo SQL Plugin](#)
- [MBS Xojo / Real Studio Plugins, version 17.1pr1](#)
- [MBS Xojo / Real Studio Plugins, version 16.2pr2](#)

5.5.2 Methods

5.5.3 OpenSSLVersion as String

Plugin Version: 16.2, Platforms: macOS, Linux, Targets: All.

Function: Returns the version of the OpenSSL library.

Example:

```
MsgBox InternalPostgreSQLLibraryMBS.OpenSSLVersion
```

5.5.4 Use as boolean

Plugin Version: 16.2, Platforms: macOS, Linux, Targets: All.

Function: Registers the built in PostgreSQL client library for use.

Example:

```
if InternalPostgreSQLLibraryMBS.Use then
  MsgBox "Using internal PostgreSQL."
else
  MsgBox "Failed, so please use library file."
end if
```

Notes: So instead of having SQL Plugin load libpg shared library from file, we use the one built into this plugin.

5.5.5 Version as Integer

Plugin Version: 16.2, Platforms: macOS, Linux, Targets: All.

Function: Returns version of PostgreSQL version.

Example:

```
MsgBox str(InternalPostgreSQLLibraryMBS.Version)
// e.g. 90501 for 9.5.1
```

5.6 module InternalSQLiteLibraryMBS

5.6.1 module InternalSQLiteLibraryMBS

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: The module for our internal SQLite3 engine.

Example:

```
// enable our built-in SQLite library, which supports encryption
Call InternalSQLiteLibraryMBS.Use

// where to store?
Dim f As FolderItem = SpecialFolder.Desktop.Child("test.db")
Dim storage_database As New SQLiteDatabaseMBS ' SQLiteDatabase
storage_database.SQLiteEncryptionKey = "aes256:password" ' <- password with AES256 as prefix to pick
algorithm
storage_database.DatabaseName = "sqlite:" + f.NativePath

If storage_database.Connect Then

// create table if this is not yet here
storage_database.SQLExecute "Create table if not exists pics(pic_id integer PRIMARY KEY AUTOIN-
CREMENT, name varchar(20), pic blob)"

// done
MsgBox "Ready"
Else
MsgBox storage_database.ErrorMessage
End If
```

Notes: This is a SQLite3 library built into a plugin, so you can decide with use of MBS SQL Plugin to use this plugin instead of providing your own external copy of SQLite shared library.

Blog Entries

- [MBS Xojo Plugins, version 24.1pr4](#)
- [Did you know that you can load extensions in SQLite?](#)
- [News from the MBS Xojo Plugins Version 21.2](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 21.2](#)
- [Converting Xojo project to use MBS SQL Plugin](#)
- [CubeSQL support for MBS Xojo SQL Plugin](#)
- [Use JSON functions with SQLite](#)

- [MBS Releases the MBS Xojo / Real Studio plug-ins in version 16.4](#)
- [SQLite3 command line tool in Xojo](#)
- [SQL Plugin option to include SQLite Library](#)

Xojo Developer Magazine

- [14.1, page 27: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz](#)
- [13.5, page 8: News](#)

5.6.2 Methods

5.6.3 CompileOption(index as Integer) as String

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries name of a compile option.

Example:

```
dim list() as string

for i as Integer = 0 to 100
dim s as string = InternalSQLiteLibraryMBS.CompileOption(i)
if s = "" then exit
dim b as Boolean = InternalSQLiteLibraryMBS.CompileOptionUsed(s)
dim t as string
if b then
t = ": yes"
else
t = ": no"
end if
list.Append s + t
next
```

```
MsgBox Join(list, EndOfLine)
```

Notes: Index index starting with zero until you get back an empty name.

5.6.4 CompileOptionUsed(optionName as String) as Boolean

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries if a given compile option was set on or off.

Example:

```
dim list() as string

for i as Integer = 0 to 100
dim s as string = InternalSQLiteLibraryMBS.CompileOption(i)
if s = "" then exit
dim b as Boolean = InternalSQLiteLibraryMBS.CompileOptionUsed(s)
dim t as string
if b then
t = ": yes"
else
t = ": no"
end if
list.Append s + t
next

MsgBox Join(list, EndOfLine)
```

Notes: If you need a specific option set, please contact MBS support.

5.6.5 DumpToFile(SqliteDBConnectionHandle as Ptr, File as FolderItem, TableName as string = "", PreserveRowid as Boolean = false, Newlines as Boolean = false, DumpDataOnly as Boolean = false, DumpNoSys as Boolean = false)

Plugin Version: 22.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Dumps SQLite database to text file just like dump command in SQLite command line tool.

Example:

Call InternalSQLiteLibraryMBS.Use

Dim con As New SQLiteConnectionMBS

// connect....

```
Dim handle As ptr = con.SQLiteConnectionHandle
Dim file As FolderItem = SpecialFolder.Desktop.Child("dump.txt")
InternalSQLiteLibraryMBS.DumpToFile(handle, file)
```

Notes: Must use the internal SQLite database, otherwise it will crash.
Raises exception if handle or file is nil.

SQL errors are output by SQLite to the output file.

5.6.6 DumpToString(SqliteDBConectionHandle as Ptr, byref Data as String, MaximumSize as Integer = 1000000, TableName as string = "", PreserveRowid as Boolean = false, Newlines as Boolean = false, DumpDataOnly as Boolean = false, DumpNoSys as Boolean = false)

Plugin Version: 22.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Dumps SQLite database to text file just like dump command in SQLite command line tool.

Example:

```
Call InternalSQLiteLibraryMBS.Use
```

```
Dim con As New SqlConnectionMBS
```

```
// connect....
```

```
Dim handle As ptr = con.SQLiteConnectionHandle
```

```
dim data as string
```

```
InternalSQLiteLibraryMBS.DumpToFile(handle, data, 1000000)
```

Notes: Must use the internal SQLite database, otherwise it will crash.

Raises exception if handle is nil or we run out of memory.

SQL errors are output by SQLite to the output file.

Please pass size of memory we should allocate. Then we can run the dump.

if the final COMMIT is missing or the size is close to the limit you gave, you may run again with higher limit.

5.6.7 isKeyword(name as string) as boolean

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Checks if an identifier is a keyword.

Example:

```
if InternalSQLiteLibraryMBS.isKeyword("TABLE") then
```

```
MsgBox "Table is a keyword"
```

```
else
```

```
MsgBox "Table is not a keyword!"
```

```
end if
```

5.6.8 Keywords as String()

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries list of keywords.

Example:

```
MsgBox Join(InternalSQLiteLibraryMBS.Keywords,EndOfLine)
```

5.6.9 LoadICU as Boolean

Plugin Version: 21.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Loads ICU libraries now.

Example:

```
If InternalSQLiteLibraryMBS.ICULoaded Then  
  MsgBox "already loaded"  
ElseIf InternalSQLiteLibraryMBS.LoadICU Then  
  MsgBox "loaded successfully"  
Else  
  MsgBox "failed to load the unicode libraries."  
End If
```

Notes: Returns true on success.

Normally we load them when SQLite initializes and we then add the ICU extension if we find the library. Call this function to explicitly load them now.

If MBS Plugin can find International Components for Unicode library files, we can load them and use them for proper unicode handling in SQLite.

5.6.10 SourceID as String

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: The source code ID.

Example:

```
MsgBox InternalSQLiteLibraryMBS.SourceID
```

5.6.11 Use as boolean

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Registers the built in SQLite library for use.

Example:

```
if InternalSQLiteLibraryMBS.Use then
  MsgBox "Using internal SQLite"
else
  MsgBox "Failed, so please use library file."
end if
```

Notes: So instead of having SQL Plugin load sqlite3 shared library from file, we use the one built into this plugin.

5.6.12 Version as String

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the version number.

Example:

```
MsgBox InternalSQLiteLibraryMBS.Version
```

5.6.13 VersionNumber as Integer

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the sqlite version number.

Example:

```
MsgBox str(InternalSQLiteLibraryMBS.VersionNumber)
```

5.6.14 Properties

5.6.15 ICUEnabled as Boolean

Plugin Version: 21.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether ICU libraries are enabled.

Notes: If MBS Plugin can find International Components for Unicode library files, we can load them and use them for proper unicode handling in SQLite.

Default is true to enable them, if possible.

(Read and Write property)

5.6.16 ICULoaded as Boolean

Plugin Version: 21.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether ICU libraries are loaded.

Notes: If MBS Plugin can find International Components for Unicode library files, we can load them and use them for proper unicode handling in SQLite.

(Read only property)

5.6.17 ICUUsed as Boolean

Plugin Version: 21.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether ICU libraries have been used.

Notes: Once SQLite is initialized, we set this to 1 if we passed the functionality to SQLite.

Starts with false and should later turn true if ICU libraries are loaded and enabled for usage.

(Read only property)

5.6.18 MemoryHighwater as Int64

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries high water memory usage mark.

Example:

```
MsgBox "SQLite uses "+_
str(InternalSQLiteLibraryMBS.MemoryUsed)+"_
" bytes and has a high mark of "+_
str(InternalSQLiteLibraryMBS.MemoryHighwater)+" bytes."
```

Notes: (Read only property)

5.6.19 MemoryUsed as Int64

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries current memory usage.

Example:

```
MsgBox "SQLite uses "+_
str(InternalSQLiteLibraryMBS.MemoryUsed)+_
" bytes and has a high mark of "+_
str(InternalSQLiteLibraryMBS.MemoryHighwater)+" bytes."
```

Notes: (Read only property)

5.6.20 Path as String

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries file path to the plugin library.

Notes: Allows you to query path for plugin library, so you can pass it to SQLite to load as extension.
(Read only property)

5.7 class MySQLMBS

5.7.1 class MySQLMBS

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for MySQL specific functionality.

Notes: Deprecated in favor of direct methods on SQLConnectionMBS. Please let us know if you need more MySQL or MariaDB specific functions.

Subclass of the SQLAPIMBS class.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)
- [MBS Xojo / Real Studio Plugins, version 17.1pr1](#)
- [MonkeyBread Software Releases the MBS Real Studio plug-ins in version 12.5](#)
- [MBS Real Studio Plugins, version 12.5pr7](#)
- [MBS Real Studio Plugins, version 12.5pr4](#)

5.7.2 Methods

5.7.3 AffectedRows as UInt64

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the number of affected rows in the last statement.

Notes: see also

<http://dev.mysql.com/doc/refman/5.1/en/mysql-affected-rows.html>

5.7.4 Error as string

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the last error text.

Notes: see also

<http://dev.mysql.com/doc/refman/5.1/en/mysql-error.html>

5.7.5 ErrorNumber as UInt32

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the last error code.

Notes: see also

<http://dev.mysql.com/doc/refman/5.1/en/mysql-errno.html>

5.7.6 FieldCount as UInt32

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of columns for the most recent query on the connection.

Notes: see also

<http://dev.mysql.com/doc/refman/5.1/en/mysql-field-count.html>

5.7.7 Info as string

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Retrieves an info string providing information about the most recently executed statement.

Notes: see also

<http://dev.mysql.com/doc/refman/5.1/en/mysql-info.html>

5.7.8 InsertID as Int64

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the last auto increment value from last insert command.

Notes: Please query value right after doing Insert. This value is reset when you call commit.
For MySQL and MariaDB connections.

see also

<http://dev.mysql.com/doc/refman/5.1/en/mysql-insert-id.html>

5.7.9 NumberOfRows(cmd as SQLCommandMBS) as UInt64

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries number of records in a command.

5.7.10 SetSSL(keyPath as string, CertificatePath as string, AuthorityPath as string, authorityFolderPath as string, Cipher as string)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets SSL connection parameters.

Notes: Calls `mysql_ssl_set` internally.

Used for establishing secure connections using SSL. It must be called before `Connect()`. It does nothing unless SSL support is enabled in the client library.

`keyPath` is the path name to the key file.

`CertificatePath` is the path name to the certificate file.

`AuthorityPath` is the path name to the certificate authority file.

`authorityFolderPath` is the path name to a directory that contains trusted SSL CA certificates in PEM format.

`Cipher` is a list of permissible ciphers to use for SSL encryption.

Any unused SSL parameters may be given as empty string.

For paths, please use `folderitem.NativePath` and not `folderitem.ShellPath`.

Please switch to using the following options on the connection:

```
MYSQL_SSL_KEY
MYSQL_SSL_CERT
MYSQL_SSL_CA
MYSQL_SSL_CAPATH
MYSQL_SSL_CIPHER
```

They should be specified before the connection is made.

e.g.

```
db.Option("MYSQL_SSL_CIPHER") = "DHE-RSA-AES256-SHA"
```

Allows to specify MySQL SSL parameters that will be used with `mysql_ssl_set`. MySQL API method called only when at least one parameter specified. See MySQL documentation for more information about these options.

5.8 class PostgreSQLAPIMBS

5.8.1 class PostgreSQLAPIMBS

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for Postgre SQL specific functions.

Notes: The Listen method and Notification event are in the SQLDatabaseMBS/SQLConnectionMBS classes directly.

Deprecated in favor of direct methods on SQLCommandMBS. Please let us know if you need more postgreSQL specific functions.

Subclass of the SQLAPIMBS class.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr1](#)
- [MBS Xojo / Real Studio Plugins, version 17.1pr1](#)
- [Postgre SQL Database Extension](#)

5.8.2 Methods

5.8.3 DB as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The database name used to create the connection.

5.8.4 ErrorMessage as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The last error message.

5.8.5 Field(cmd as SQLCommandMBS, RecordIndex as Integer, FieldIndex as Integer) as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries a field by index for the row with the RecordIndex.

See also:

- 5.8.6 Field(cmd as SQLCommandMBS, RecordIndex as Integer, FieldName as string) as string 54

5.8.6 Field(cmd as SQLCommandMBS, RecordIndex as Integer, FieldName as string) as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries a field by name for the row with the RecordIndex.

See also:

- 5.8.5 Field(cmd as SQLCommandMBS, RecordIndex as Integer, FieldIndex as Integer) as string 53

5.8.7 FieldCount(cmd as SQLCommandMBS) as Integer

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number of fields in the result.

5.8.8 Host as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The host used to create the connection.

5.8.9 Options as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The options used to create the connection.

5.8.10 Password as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The password used to create the connection.

5.8.11 Port as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The port used to create the connection.

5.8.12 RecordCount(cmd as SQLCommandMBS) as Integer

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number of records in the result.

5.8.13 TTY as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The tty used to create the connection.

5.8.14 User as string

Plugin Version: 9.8, Platforms: macOS, Linux, Windows, Targets: All.

Function: The user name used to create the connection.

5.9 Globals

5.9.1 BuildRecordSetMBS(fieldNames() as string, values() as string) as RecordSet

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Builds a recordset from strings.

Example:

```
dim names() as string = array("Firstname", "Lastname")
dim values() as string
```

```
values.append "Stefan"
values.append "Miller"
values.append "Patrick"
values.append "Maier"
```

```
dim r as RecordSet = BuildRecordSetMBS(names, values)
```

Notes: First array has field names. Second array has all values.

As plugin can't access multi dimensional arrays, we have to flatten it into one dimension and concat all rows. Returns nil on low memory.

Array sizes should be like: $Ubound(values)+1 = (ubound(fieldNames)+1) * RecordCount$

See also BuildRowSetMBS for newer Xojo versions.

Blog Entries

- [Cleanup Xojo Plugins](#)
- [RowSet in MBS Xojo SQL Plugin](#)
- [MBS Xojo Plugins, version 20.5pr6](#)
- [RecordSet to JSON and back](#)
- [MonkeyBread Software Releases the MBS Real Studio plug-ins in version 13.0](#)
- [MBS Real Studio Plugins, version 13.0pr6](#)
- [RecordSet news](#)

5.9.2 BuildRowSetMBS(fieldNames() as string, values() as string) as RowSet

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

Function: Builds a recordset from strings.

Example:

```
dim names() as string = array("Firstname", "Lastname")
dim values() as string
```

```
values.append "Stefan"
values.append "Miller"
values.append "Patrick"
values.append "Maier"
```

```
dim r as RowSet = BuildRowSetMBS(names, values)
```

Notes: First array has field names. Second array has all values.

As plugin can't access multi dimensional arrays, we have to flatten it into one dimension and concat all rows.

Returns nil on low memory.

Array sizes should be like: $Ubound(values)+1 = (ubound(fieldNames)+1) * RecordCount$

RowSet requires Xojo 2019r2 or newer.

Blog Entries

- [Cleanup Xojo Plugins](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 21.1](#)
- [MBS Xojo Plugins, version 21.1pr4](#)
- [RowSet in MBS Xojo SQL Plugin](#)

5.9.3 CloneRecordSetMBS(rec as RecordSet) as RecordSet

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates an in memory copy of the RecordSet.

Notes: This copied record set can be used instead of the original one and even after the original database connection is closed.

Blog Entries

- [Cleanup Xojo Plugins](#)
- [RecordSet news](#)
- [MBS Real Studio Plugins, version 12.5pr13](#)

5.10 class RecordSet

5.10.1 class RecordSet

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: Desktop only.

Function: The built in recordset class in Xojo.

5.10.2 Methods

5.10.3 CloneMBS as RecordSet

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates an in memory copy of the RecordSet.

Notes: This copied record set can be used instead of the original one and even after the original database connection is closed.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 16.3pr5](#)
- [MonkeyBread Software Releases the MBS Real Studio plug-ins in version 12.5](#)
- [MBS Real Studio Plugins, version 12.5pr13](#)
- [Cloning RecordSets](#)

Xojo Developer Magazine

- [11.1, page 9: News](#)

5.11 class SQLAPIMBS

5.11.1 class SQLAPIMBS

Plugin Version: 9.5, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** This is a class for the native APIs.

Notes: The plugin does not implem

Blog Entries

- [Cleanup Xojo Plugins](#)
- [MBS Xojo Plugins, version 19.5pr1](#)
- [MBS REALbasic plug-ins version 9.5](#)

5.11.2 Properties

5.11.3 ClassName as String

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

Function: The class name of the underlying C++ class.

Notes: Sometimes useful to see a which API currently is used.
(Read only property)

5.11.4 Connection as Variant

Plugin Version: 9.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The database connection this API is used with.

Notes: (Read only property)

5.12 class SQLBLobMBS

5.12.1 class SQLBLobMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: A class for a blob.

Notes: Basically this is a `SQLStringMBS` which is always marked to contain binary data. You only need this class to use the constructor with `dataProvider` to stream data to the database.

Subclass of the `SQLLongOrLobMBS` class.

Blog Entries

- [MBS Real Studio Plugins, version 12.4pr1](#)

5.12.2 Methods

5.12.3 Constructor

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

See also:

- 5.12.4 `Constructor(Data as MemoryBlock)` 60
- 5.12.5 `Constructor(data as SQLStringMBS)` 61
- 5.12.6 `Constructor(Data as string, isText as Boolean = True)` 61
- 5.12.7 `Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32)` 61

5.12.4 `Constructor(Data as MemoryBlock)`

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data, e.g. for blob.

See also:

- 5.12.3 `Constructor` 60
- 5.12.5 `Constructor(data as SQLStringMBS)` 61
- 5.12.6 `Constructor(Data as string, isText as Boolean = True)` 61
- 5.12.7 `Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32)` 61

5.12. CLASS SQLBLOBMBS 61

5.12.5 Constructor(data as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new blob object from a string object.

See also:

- 5.12.3 Constructor 60
- 5.12.4 Constructor(Data as MemoryBlock) 60
- 5.12.6 Constructor(Data as string, isText as Boolean = True) 61
- 5.12.7 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 61

5.12.6 Constructor(Data as string, isText as Boolean = True)

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data or text copied from the data string.

Notes: If isText is true, the data is interpreted as text and string encoding conversion may modify it. If isText is false the bytes are copied raw.

See also:

- 5.12.3 Constructor 60
- 5.12.4 Constructor(Data as MemoryBlock) 60
- 5.12.5 Constructor(data as SQLStringMBS) 61
- 5.12.7 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 61

5.12.7 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new blob object from a data provider.

Notes: The blocksize specifies in which sizes data is requested from the provider.

You must make sure that the data provider and this new blob object life long enough. Because the actual data is requested later when you do the update on the database.

If BlockSize is 0, the default block size is used.

See also:

- 5.12.3 Constructor 60
- 5.12.4 Constructor(Data as MemoryBlock) 60
- 5.12.5 Constructor(data as SQLStringMBS) 61
- 5.12.6 Constructor(Data as string, isText as Boolean = True) 61

5.13 class SQLBytesMBS

5.13.1 class SQLBytesMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for a string of bytes.

Notes: Subclass of the SQLStringMBS class.

Blog Entries

- [MBS Real Studio Plugins, version 12.4pr1](#)

5.13.2 Methods

5.13.3 Constructor

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

See also:

- 5.13.4 Constructor(Data as MemoryBlock) 62
- 5.13.5 Constructor(data as SQLStringMBS) 62
- 5.13.6 Constructor(Data as string, isText as Boolean = True) 63

5.13.4 Constructor(Data as MemoryBlock)

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data, e.g. for blob.

See also:

- 5.13.3 Constructor 62
- 5.13.5 Constructor(data as SQLStringMBS) 62
- 5.13.6 Constructor(Data as string, isText as Boolean = True) 63

5.13.5 Constructor(data as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new bytes object based on the given string object.

See also:

5.13. CLASS SQLBYTESMBS	63
• 5.13.3 Constructor	62
• 5.13.4 Constructor(Data as MemoryBlock)	62
• 5.13.6 Constructor(Data as string, isText as Boolean = True)	63

5.13.6 Constructor(Data as string, isText as Boolean = True)

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data or text copied from the data string.

Notes: If isText is true, the data is interpreted as text and string encoding conversion may modify it. If isText is false the bytes are copied raw.

See also:

• 5.13.3 Constructor	62
• 5.13.4 Constructor(Data as MemoryBlock)	62
• 5.13.5 Constructor(data as SQLStringMBS)	62

5.14 class SQLCLobMBS

5.14.1 class SQLCLobMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: A class for a clob (character large object).

Notes: Basically this is a SQLStringMBS which is always marked to contain text. You only need this class to use the constructor with dataprovider to stream data to the database.

Subclass of the SQLLongOrLobMBS class.

Blog Entries

- [MBS Real Studio Plugins, version 12.4pr1](#)

5.14.2 Methods

5.14.3 Constructor

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

See also:

- 5.14.4 Constructor(data as SQLStringMBS) 64
- 5.14.5 Constructor(Data as string, isText as boolean=true) 64
- 5.14.6 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 65

5.14.4 Constructor(data as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new clob object from a string object.

See also:

- 5.14.3 Constructor 64
- 5.14.5 Constructor(Data as string, isText as boolean=true) 64
- 5.14.6 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 65

5.14.5 Constructor(Data as string, isText as boolean=true)

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data or text copied from the data string.

Notes: If isText is true, the data is interpreted as text and string encoding conversion may modify it. If isText is false the bytes are copied raw.

See also:

- 5.14.3 Constructor 64
- 5.14.4 Constructor(data as SQLStringMBS) 64
- 5.14.6 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 65

5.14.6 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new clob object from a data provider.

Notes: The blocksize specifies in which sizes data is requested from the provider.

You must make sure that the data provider and this new clob object life long enough. Because the actual data is requested later when you do the update on the database.

If BlockSize is 0, the default block size is used.

See also:

- 5.14.3 Constructor 64
- 5.14.4 Constructor(data as SQLStringMBS) 64
- 5.14.5 Constructor(Data as string, isText as boolean=true) 64

5.15 class SQLCommandMBS

5.15.1 class SQLCommandMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: This is the central class for the using the SQL database access.

Example:

```

dim con as SQLConnectionMBS
dim cmd as SQLCommandMBS

try

con = new SQLConnectionMBS // connection object
cmd = new SQLCommandMBS // create command object

// where is the library?
con.SetFileOption con.kOptionLibraryMySQL, SpecialFolder.UserHome.Child("libmysqlclient.dylib")

// connect to database (mySQL in our example)
// server: 192.168.1.80
// port: 3306
// database: test
// name: root
// no password
con.Connect("192.168.1.80,3306@test","root","","SQLConnectionMBS.kMySQLClient)
// associate a command with connection
// connection can also be specified in SACommand constructor
cmd.Connection=con

// create table
cmd.setCommandText("Create table test_tbl(fid integer, fvarchar20 varchar(20), fblob blob)")
cmd.Execute

// insert value
cmd.setCommandText("Insert into test_tbl(fid, fvarchar20) values (1, 'Some string (1)')")
cmd.Execute

// commit changes on success
con.Commit

MsgBox("Table created, row inserted!")

catch r as SQLExceptionMBS
// SAConnection::Rollback()
// can also throw an exception
// (if a network error for example),

```

```
// we will be ready
try

// on error rollback changes
if con<>nil then
con.rollback
end if
catch x as SQLExceptionMBS
// ignore
end try

// show error message
MsgBox r.message
end try
```

Notes: The plugin can cache the recordset locally. To enable you can call `SQLCommandMBS.Cache` or use the `Option("AutoCache") = "true"` on either command or connection or database objects. The plugin will then fetch all records and store them in memory. After this you can walk over the recordset and use `FetchPos`, `FetchFirst`, `FetchLast`, `FetchPrev` and `FetchNext` to locate the rows you need. When you call `Field()` you always get last row, but to read from cached result set, please use `Value()` function. When using `RecordSet`, the values are read via `Value()` functions automatically.

see also

https://www.sqlapi.com/ApiDoc/class_s_a_command.html

Blog Entries

- [MBS Xojo Plugins, version 24.0pr7](#)
- [News from the MBS Xojo Plugins Version 21.1](#)
- [RowSet in MBS Xojo SQL Plugin](#)
- [10th birthday of MBS SQL Plugin](#)
- [Call stored procedures with output parameters](#)
- [Problems with killing Xojo threads with plugin calls.](#)
- [Upcoming Changes for our SQL Plugin](#)
- [MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 14.0](#)
- [Multithreaded plugin functions can increase speed of Real Studio application](#)
- [MBS REALbasic Plugins Version 10.4 release notes](#)

Xojo Developer Magazine

- 14.1, pages 28 to 30: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz
- 14.1, pages 24 to 26: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz
- 12.2, page 10: News

5.15.2 Methods

5.15.3 AsRecordSet as RecordSet

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a recordset using the command to query fields.

Notes: You can use normal RecordSet functions to walk through fields and they simply control the command object.

This is for convenience like passing RecordSet to report functions in Xojo.

For this method to work, you need to have somewhere a property with SQLiteDatabaseMBS so Xojo includes our SQLiteDatabase plugin which provides the RecordSet functionality.

The record set may not have a valid RecordCount or have working movefirst/movelastr/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

5.15.4 AsRowSet as RowSet

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a RowSet using the command to query fields.

Notes: You can use normal RowSet functions to walk through fields and they simply control the command object.

This is for convenience like passing RowSet to other functions in Xojo.

For this method to work, you need to have somewhere a property with SQLiteDatabaseMBS so Xojo includes our SQLiteDatabase plugin which provides the RowSet functionality.

The RowSet may not have a valid RecordCount or have working movefirst/movelastr/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

Requires Xojo 2019r2 or newer.

5.15.5 Cache

Plugin Version: 16.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Caches values.

Notes: The plugin will load the whole recordset and store it in memory. Now you can move forward/backward as needed to read data.

If you set `Option("AutoCache") = "true"`, the plugin will call Cache automatically for all result sets. We can only cache first result set.

5.15.6 Cancel

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Attempts to cancel the pending result set, or current statement execution.

Notes: Only if `isExecuting` is true, doing cancel makes sense.

Cancel can cancel the following types of processing on a statement:

A function running asynchronously on the statement.

A function running on the statement on another thread.

After an application calls a function asynchronously, it checks repeatedly to determine whether it has finished processing. While the function is processing, an application can call Cancel to cancel the function.

In a multithread application, the application can cancel a function that is running synchronously on a statement.

see also

https://www.sqlapi.com/ApiDoc/class_s_a_command.html

5.15.7 Close

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Closes the specified command object.

Notes: Use the Close method to close the command explicitly.

A command will be implicitly closed in destructor, so you don't have to call Close method explicitly.

5.15.8 Constructor

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new command object with no connection and no command text.

See also:

- 5.15.9 Constructor(connection as SqlConnectionMBS, SQLCommand as String, CommandType as Integer = 0) 70

5.15.9 Constructor(connection as SqlConnectionMBS, SQLCommand as String, CommandType as Integer = 0)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: This constructor initializes a new SqlCommandMBS object.

Example:

```
// your connection
dim con as SqlConnectionMBS
dim SQL as string = "Insert into test_tbl(fid, fvarchar20) values(:id, :name)"

// create command object
dim cmd as new SqlCommandMBS(con, sql)

// assign values by name of parameter:
cmd.Param("id").setAsLong(2)
cmd.Param("name").setAsString(new SQLStringMBS("Some string (2)"))

// Insert first row
cmd.Execute
```

Notes: Connection: the connection to associated with the command.

SQLCommand: A string which represents command text string (an SQL statement or a stored procedure name). If it is an empty string, no command text is associated with the command, and you have to call setCommandText method later.

CommandType: The type of command like kCommandTypeUnknown, kCommandTypeSQLStatement, kCommandTypeSQLStatementRaw or kCommandTypeStoredProcedure.

All text strings sent to the plugin must have a defined encoding. Else the internal text encoding conversions will fail.

See also:

- 5.15.8 Constructor

5.15.10 CreateParam(name as string, ParamType as Integer, DirType as Integer=0) as SQLParamMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates parameter associated with the specified command.

Notes: Parameters

name:	A string representing the name of parameter.
ParamType:	Type of the parameter's value. Use the kDataType constants.
ParamSize:	An integer value represents parameter's value size.
ParamPrecision:	An integer value represents parameter's value precision.
ParamScale:	An integer value represents parameter's value scale.
DirType:	Type of the parameter. Use the kParamDirType* constants.

Returns a new SQLParamMBS object on success or nil on any error.

Normally you should not create parameters by yourself. The Library automatically detects whether the command has parameters in terms of the command text and implicitly creates a set of SParam objects.

Nevertheless, if you call CreateParam explicitly you have to delete all SParam objects created automatically by the Library before. Use DestroyParams method before the first call of CreateParam method.

See also:

- 5.15.11 CreateParam(name as string, ParamType as Integer, NativeType as Integer, ParamSize as Integer, ParamPrecision as Integer, ParamScale as Integer, DirType as Integer=0) as SQLParamMBS

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5.15.11 CreateParam(name as string, ParamType as Integer, NativeType as Integer, ParamSize as Integer, ParamPrecision as Integer, ParamScale as Integer, DirType as Integer=0) as SQLParamMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates parameter associated with the specified command.

Notes: Parameters

Returns a new SQLParamMBS object on success or nil on any error.

Normally you should not create parameters by yourself. The Library automatically detects whether the command has parameters in terms of the command text and implicitly creates a set of SParam objects.

name:	A string representing the name of parameter.
ParamType:	Type of the parameter's value. Use the kDataType constants.
ParamSize:	An integer value represents parameter's value size.
ParamPrecision:	An integer value represents parameter's value precision.
ParamScale:	An integer value represents parameter's value scale.
DirType:	Type of the parameter. Use the kParamDirType* constants.

Nevertheless, if you call `CreateParam` explicitly you have to delete all `SAParam` objects created automatically by the Library before. Use `DestroyParams` method before the first call of `CreateParam` method.

See also:

- 5.15.10 `CreateParam(name as string, ParamType as Integer, DirType as Integer=0)` as `SQLParamMBS`
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5.15.12 `DB2SQLExecDirect(sql as string)`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes an SQL command directly without any preprocessing in the plugin.

Example:

```
dim cmd as new SQLCommandMBS // your command
dim con as new SQLConnectionMBS // your connection

// now use an API function
const sql = "some sql command"
cmd.DB2SQLExecDirect sql
```

Notes: `Lasterror` is set.

5.15.13 `DB2SQLRowCount as Int64`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the affected number of rows for the last operation.

Notes: `Lasterror` is set.

5.15.14 `DestroyParams`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Destroys all parameters associated with the specified command.

Notes: DestroyParams method destroys all parameters either created automatically by the Library or by user.

Normally you should not create and delete parameters by yourself. The Library automatically detects whether the command has parameters, implicitly creates a set of SAParam objects and then deletes them in SACommanddestructor. But if you have some reason to create parameters explicitly use CreateParam method and then call DestroyParams method to delete all parameters after your work with parameters is over.

5.15.15 Execute

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes the current command.

Example:

```
// your connection
dim con as SQLConnectionMBS
dim SQL as string = "Insert into test_tbl(fid, fvarchar20) values(:id, :name)"

// create command object
dim cmd as new SQLCommandMBS(con, sql)

// assign values by name of parameter:
cmd.Param("id").setAsLong(2)
cmd.Param("name").setAsString(new SQLStringMBS("Some string (2)"))

// Insert first row
cmd.Execute
```

Notes: Use the Execute method to execute the query or stored procedure specified in the command text. Execute method calls Prepare method implicitly if needed. If the command has input parameters, they should be bound before calling Execute method. Input parameters represented by SAParam object. To bind input variables assign a value to SAParam object returning by Param or ParamByIndex methods.

A command (an SQL statement or procedure) can have a result set after executing. To check whether a result set exists use isResultSet method. If result set exists, a set of SAField objects is created after command execution. Rows from the result set can be fetched one by one using FetchNext method. To get field description or value use Field method.

Output parameters represented by SAParam objects. They are available after command execution. To get parameter description or value use Param or ParamByIndex methods.

5.15.16 ExecuteCommand(SQLCommand as string, CommandType as Integer=0)

Plugin Version: 10.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes the given command.

Notes: This is a convenience function.

Internally it calls setCommandText with the given command and calls Execute.

All text strings sent to the plugin must have a defined encoding. Else the internal text encoding conversions will fail.

5.15.17 ExecuteCommandMT(SQLCommand as string, CommandType as Integer=0)

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes the given command.

Notes: This is a convenience function.

Internally it calls setCommandText with the given command and calls Execute.

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.

All text strings sent to the plugin must have a defined encoding. Else the internal text encoding conversions will fail.

5.15.18 ExecuteMT

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes the current command.

Notes: Use the Execute method to execute the query or stored procedure specified in the command text. Execute method calls Prepare method implicitly if needed. If the command has input parameters, they should be bound before calling Execute method. Input parameters represented by SAParam object. To bind input variables assign a value to SAParam object returning by Param or ParamByIndex methods.

A command (an SQL statement or procedure) can have a result set after executing. To check whether a result set exists use isResultSet method. If result set exists, a set of SAField objects is created after command execution. Rows from the result set can be fetched one by one using FetchNext method. To get field description or value use Field method.

Output parameters represented by SAParam objects. They are available after command execution. To get parameter description or value use Param or ParamByIndex methods.

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.

5.15.19 FetchFirst as boolean

Plugin Version: 11.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Fetches first row from a result set.

Notes: Same as FetchNext, but jumps to the first row.

Returns true if the row was fetched; otherwise false.

Not supported for Interbase and SQLite.

When you cache the result set, you can always move within the result set.

5.15.20 FetchLast as boolean

Plugin Version: 11.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Fetches last row from a result set.

Notes: Same as FetchNext, but jumps to the last row.

Returns true if the row was fetched; otherwise false.

Not supported for Interbase and SQLite.

When you cache the result set, you can always move within the result set.

5.15.21 FetchNext as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Fetches next row from a result set.

Notes: Returns true if the next row was fetched; otherwise false .

Use `FetchNext` method to fetch row by row from the result set.

Each column of fetched row is represented by `SAField` object. If a result set exists after the last command execution, a set of `SAField` objects is created implicitly. To check whether a result set exists use `isResultSet` method. `FetchNext` method updates value parts of `SAField` objects.

To get field description or value use `Field` method.

When you cache the result set, you can always move within the result set.

5.15.22 `FetchPos(offset as Integer, relative as boolean = false)` as `boolean`

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Fetches a row by index.

Notes: Returns true if the row was fetched; otherwise false.

You may need to request recordset to be scrollable to have this work.

For that, please set `Option("Scrollable") = "true"` before doing the query.

When you cache the result set, you can always move within the result set.

5.15.23 `FetchPrior` as `boolean`

Plugin Version: 11.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Fetches previous row from a result set.

Notes: Returns true if the row was fetched; otherwise false.

Same as `FetchNext`, just going back inside the result set.

Not supported for Interbase and SQLite.

When you cache the result set, you can always move within the result set.

5.15.24 `Field(index as Integer)` as `SQLFieldMBS`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the column specified by its position in the result set.

Example:

```
dim c as SQLCommandMBS // your command object

// get field by name
dim f1 as SQLFieldMBS = c.Field("FirstName")

// get field by Index
dim f2 as SQLFieldMBS = c.Field(1)
```

Notes: index: A one-based field number in a result set.

Use Field method to access a field by its name or position in the result set.
For Cached result sets, please use Value() function to get values.

Using an index smaller than 1 and greater than the value returned by FieldCount method will result in a failed assertion.

A set of SAField objects creates implicitly after the command execution if the result set exists. SAField object contains full information about a column: name, type, size, value.

Raises OutOfBoundsException exception if index parameter is out of range.
See also:

- 5.15.25 Field(name as string) as SQLFieldMBS

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5.15.25 Field(name as string) as SQLFieldMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the column specified by its name in the result set.

Example:

```
dim c as SQLCommandMBS // your command object

// get field by name
dim f1 as SQLFieldMBS = c.Field("FirstName")

// get field by Index
dim f2 as SQLFieldMBS = c.Field(1)
```

Notes: name: A string that represents a name of the requested field.

Returns a reference to a SAField object.

Use Field method to access a field by its name or position in the result set.
For Cached result sets, please use Value() function to get values.

Using a non-existent field name will throw an exception.

A set of SAField objects creates implicitly after the command execution if the result set exists. SAField object contains full information about a column: name, type, size, value.
See also:

- 5.15.24 Field(index as Integer) as SQLFieldMBS

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5.15.26 FieldExists(name as string) as Boolean

Plugin Version: 21.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Checks whether a field exists.

Notes: Returns true if field is found or false if not.

5.15.27 FieldNames as String()

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns an array with all the field names for quick inspection.

Example:

```
dim cmd as SQLCommandMBS // your command
```

```
dim FieldNames() as String = cmd.FieldNames
```

5.15.28 Open

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Opens the specified command object.

Notes: Use the Open method to open the command explicitly.

A command will be implicitly opened by any method that needs an open command, therefore you don't have to call it explicitly.

To test whether a command is opened use `isOpened` method.

5.15.29 Param(ID as Integer) as SQLParamMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the command parameter specified by its position.

Notes: ID: A position of parameter specified in the command text. Normally position is a number stated in the command text after a colon (for example, 1 for `:1`, 5 for `:5`).

Returns a reference to a `SAParam` object which is only valid as long as the param object is not deleted by the library.

Use `Param` method to access a parameter by its name or position (in SQL statement). If, for example, you want to walk through all the parameters use `ParamByIndex` method.

If parameters were not created before calling `Param` method the Library creates them implicitly (can query native API if needed and therefore can throw exception on error) and then returns the specified parameter.

Passing a value of name or position which does not specified in the command text will throw an exception.

`SAParam` object contains full information about a parameter: name, type, size, etc. Values for the input parameters can be assigned to `SAParam` object.

See also:

- 5.15.30 `Param(name as string) as SQLParamMBS`

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5.15.30 Param(name as string) as SQLParamMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the command parameter specified by its name.

Example:

```
// your connection
dim con as SQLConnectionMBS
dim SQL as string = "Insert into test_tbl(fid, fvarchar20) values(:id, :name)"

// create command object
dim cmd as new SQLCommandMBS(con, sql)

// assign values by name of parameter:
cmd.Param("id").setAsLong(2)
```

```
cmd.Param("name").setAsString(new SQLStringMBS("Some string (2)"))
// Insert first row
cmd.Execute
```

Notes: Name: A string that represents a name of the requested parameter. Normally name is a string stated in the command text after a colon (for example, 'city' for :city, 'my city' for : "my city") or a parameter name in a stored procedure or function.

Returns a reference to a SAParam object which is only valid as long as the param object is not deleted by the library.

Use Param method to access a parameter by its name or position (in SQL statement). If, for example, you want to walk through all the parameters use ParamByIndex method.

If parameters were not created before calling Param method the Library creates them implicitly (can query native API if needed and therefore can throw exception on error) and then returns the specified parameter.

Passing a value of name or position which does not specified in the command text will throw an exception.

SAParam object contains full information about a parameter: name, type, size, etc. Values for the input parameters can be assigned to SAParam object.
See also:

- 5.15.29 Param(ID as Integer) as SQLParamMBS

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5.15.31 ParamByIndex(index as Integer) as SQLParamMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the command parameter specified by index.

Notes: Index: A zero-based index of the requested parameter in the array of SAParam objects. It must be greater than or equal to 0 and 1 less than the value returned by ParamCount method.

Returns a reference to a SAParam object.

Normally you should use Param method to access a parameter by its name or position (in SQL statement). ParamByIndex method can be used if, for example, you want to walk through all the parameters.

If parameters were not created before calling ParamByIndex method the Library creates them implicitly (can query native API if needed and therefore can throw exception on error) and then returns the specified

parameter.

Passing a negative value of index or a value greater or equal than the value returned by ParamCount method will result in a failed assertion.

SAParam object contains full information about a parameter: name, type, size, etc. Values for the input parameters can be assigned to SAParam object.

Raises OutOfBoundsException exception if index parameter is out of range.

5.15.32 PostgreSQLField(RecordIndex as integer, FieldIndex as integer) as string

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries a field by index for the row with the RecordIndex.

See also:

- 5.15.33 PostgreSQLField(RecordIndex as integer, FieldName as string) as string 81

5.15.33 PostgreSQLField(RecordIndex as integer, FieldName as string) as string

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries a field by name for the row with the RecordIndex.

See also:

- 5.15.32 PostgreSQLField(RecordIndex as integer, FieldIndex as integer) as string 81

5.15.34 PostgreSQLFieldCount as Integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number of fields in the result.

5.15.35 PostgreSQLRowCount as Integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number of records in the result.

5.15.36 Prepare

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Prepares command before execution.

Notes: Prepare method compiles the command, but does not execute it. The method detects syntax errors in command text and verifies the existence of database objects.

Execute method calls Prepare method implicitly if needed, therefore you don't have to call it explicitly.

5.15.37 setCommandText(SQLCommand as string, CommandType as Integer = 0)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets the command text.

Example:

```
dim s as new SQLCommandMBS
```

```
s.setCommandText "select * from test"
```

```
MsgBox s.CommandText
```

Notes: SQLCommand: A string which represents command text string (an SQL statement or a stored procedure name).

CommandType: The type of command like kCommandTypeUnknown, kCommandTypeSQLStatement, kCommandTypeSQLStatementRaw or kCommandTypeStoredProcedure.

It's not necessary to set a command type explicitly, because it is defined automatically in terms of command text string. But if you still have any reason to do it, use one of the kCommandType* constants. To get command type use CommandType method.

5.15.38 SetParameters(Params as dictionary)

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

Function: Sets the parameters based on the keys and values in the dictionary.

Example:

```
dim con as SQLConnectionMBS // your connection
```

```
dim pic as picture // some picture
```

```

// get picture data
dim jpegData as MemoryBlock = pic.GetData(Picture.FormatJPEG, 80)

// parse a SQL command
dim sql as string = "Insert into BlobTest(name, image) values (:name, :image)"
dim cmd as new SQLCommandMBS(con, sql)

dim d as new Dictionary
// set by param index
d.Value(0) = "test.jpg"
// set by param name
d.Value("image") = jpegData

// set all parameters together
cmd.SetParameters d
cmd.Execute

```

Notes: Keys can be String, Text or numeric types. Text and String are used to pick parameters by name. Numeric values are used to pick parameter by index (zero based). MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Raises exceptions if you pass anything which is not recognized. Other types are translated as good as possible.

Raises OutOfBoundsException exception if index parameter is out of range.

5.15.39 Value(index as Integer) as SQLValueReadMBS

Plugin Version: 16.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value specified by its position in the result set.

Example:

```

dim c as SQLCommandMBS // your command object

// get field by name
dim f1 as SQLValueReadMBS = c.Value("FirstName")

// get field by Index
dim f2 as SQLValueReadMBS = c.Value(1)

```

Notes: You can use Value() to get values for normal or cached result sets.

index: A one-based field number in a result set.

Use Value method to access a field by its name or position in the result set.
For Cached result sets, please use Value() function to get values.

Using an index smaller than 1 and greater then the value returned by FieldCount method will result in a failed assertion.

A set of SAField objects creates implicitly after the command execution if the result set exists. SAField object contains full information about a column: name, type, size, value.

Raises OutOfBoundsException exception if index parameter is out of range.
See also:

- 5.15.40 Value(name as string) as SQLValueReadMBS

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5.15.40 Value(name as string) as SQLValueReadMBS

Plugin Version: 16.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value specified by its name in the result set.

Example:

```
dim c as SQLCommandMBS // your command object
```

```
// get value by name
```

```
dim f1 as SQLValueReadMBS = c.Value("FirstName")
```

```
// get value by Index
```

```
dim f2 as SQLValueReadMBS = c.Value(1)
```

Notes: You can use Value() to get values for normal or cached result sets.

name: A string that represents a name of the requested field.

Returns a reference to a SAValueRead object.

Use Value method to access a field by its name or position in the result set.
Using a non-existent field name will throw an exception.

A set of SAField objects creates implicitly after the command execution if the result set exists.SAField object

contains full information about a column: name, type, size, value.
See also:

- 5.15.39 Value(index as Integer) as SQLValueReadMBS

5.15.41 Properties

5.15.42 CommandCount as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries number of current command objects.

Notes: This method should help you find leaked objects by keeping track of current count from the plugin perspective.

This includes SQLCommandMBS and RecordSet objects.

(Read only property)

5.15.43 CommandText as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets the command text associated with the SACCommand object.

Example:

```
dim s as new SQLCommandMBS(nil, "select * from test")
```

```
MsgBox s.CommandText
```

Notes: Use the CommandText method to return the command text declared in SACCommand constructor or setCommandText method.

All text strings sent to the plugin must have a defined encoding. Else the internal text encoding conversions will fail.

(Read and Write property)

5.15.44 CommandType as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets the command type currently associated with the SACCommand object.

Notes: One of the following values from SACCommandType_t enum:

- `kCommandTypeUnknown` Command type is not defined. Library will detect command type automatically when needed.
- `kCommandTypeSQLStmt` Command is an SQL statement.
- `kCommandTypeSQLStmtRaw` Command is an SQL statement that mustn't be interpreted by SQLAPI++.
- `kCommandTypeStoredProc` Command is a stored procedure or a function.

Remarks

The command type can be explicitly set in `SACCommand` constructor and `setCommandText` method, but it's not necessary to do it.

The `CommandType` method returns the command type value that was specified in `SACCommand` constructor or `setCommandText` method. If you declared the command type value as `kCommandTypeUnknown` (the default value) then command type is detected by the Library and the `CommandType` method returns this detected value.

(Read only property)

5.15.45 Connection as `SQLConnectionMBS`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The connection for the command.

Notes: When you set the connection on a command object that already has associated connection, the previous association will be correctly discarded (with closing opened command if needed) and new connection will be set.

If you attempt to call any method on a `SACCommand` object that requires database access with no valid connection, an error occurs.

(Read and Write property)

5.15.46 `FieldCount` as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of fields (columns) in a result set.

Notes: `FieldCount` method returns the number of fields created implicitly after the command execution if a result set exists.

A field is represented by `SAField` object. You can get field value and description using `Field` method.

(Read only property)

5.15.47 Fields as Dictionary

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Provides dictionary with all fields.

Notes: This dictionary should help for debugging to inspect all fields and their text value.
(Read only property)

5.15.48 hasCache as Boolean

Plugin Version: 16.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether cache is active.

Notes: (Read only property)

5.15.49 isBOF as Boolean

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether we are at the beginning of the result set.

Notes: Set to true when running the query and when FetchFirst succeeds.
Otherwise false.
(Read only property)

5.15.50 isEOF as Boolean

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether we are at the end of the result set.

Notes: True if we are at the end of the recordset, e.g. FetchNext failed.
Set to false by Execute.

We set it to true, when something goes wrong, so Xojo's RecordSet and RowSet end looping.

We can only know, that we are not at the last one, if FetchNext internally failed to get the next record.
(Read only property)

5.15.51 isExecuted as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether this command was already executed.

Notes: (Read only property)

5.15.52 isExecuting as Boolean

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether this command is executing.

Notes: You only see this true if you use threaded queries and look on the property from another thread.

(Read only property)

5.15.53 isOpened as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns true if the SACommand object is opened; otherwise false.

Notes: (Read only property)

5.15.54 isResultSet as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Tests whether a result set exists after the command execution.

Notes: Returns true if the result set exists; otherwise false.

(Read only property)

5.15.55 Options as Dictionary

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a dictionary with all options.

Notes: For debugging, it may be useful to inspect options in debugger.

(Read only property)

5.15.56 ParamCount as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of parameters associated with the SACommand object.

Notes: ParamCount method returns the number of parameters created explicitly by using CreateParam

method or (if parameters were not created before) creates them implicitly (can query native API if needed and therefore can throw exception on error) and returns the number of created parameters.

Command parameter is represented by SAParam object. You can look SAParam objects through and assign their values with Param and ParamByIndex methods.

(Read only property)

5.15.57 Parameters as Dictionary

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Provides dictionary with all parameters.

Notes: This dictionary should help for debugging to inspect all parameters and their text value.

(Read only property)

5.15.58 RowsAffected as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of rows affected by the last insert/update/delete command execution.

Example:

```
dim con as SQLConnectionMBS // your connection

dim sql as string = "UPDATE Test SET MyField=1"
dim c as new SQLCommandMBS(con, sql)
```

```
c.Execute
```

```
MsgBox str(c.RowsAffected)
```

Notes: (Read only property)

5.15.59 Tag as Variant

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The tag property.

Example:

```
dim c as SQLCommandMBS // your command object
```

```
// store reference to window/control, so we have it available in events  
c.Tag = self
```

Notes: You can store here whatever you like.
(Read and Write property)

5.15.60 Option(name as string) as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: A string value of a specific command option.

Example:

```
dim cmd as SQLCommandMBS // your command  
  
// turn on auto cache  
cmd.Option("AutoCache") = "true"
```

Notes: see also:

https://www.sqlapi.com/ApiDoc/class_s_a_command.html
(Read and Write computed property)

5.15.61 Events

5.15.62 Trace(traceInfo as Integer, SQL as string)

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

Function: The event to trace SQL commands.

5.15.63 Working

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: .

Function: The event called while the ExecuteMT and ExecuteCommandMT methods are running.

5.15.64 Constants

Constants

Constant	Value	Description
kOptionPreFetchRows	"PreFetchRows"	One of the option constants.
kParamDirTypeInput	0	One of the parameter direction type constants. Input parameter.
kParamDirTypeInputOutput	1	One of the parameter direction type constants. Input/output parameter.
kParamDirTypeOutput	2	One of the parameter direction type constants. Output parameter.
kParamDirTypeReturn	3	One of the parameter direction type constants. Returning parameter.

Command Types

Constant	Value	Description
kCommandTypeSQLStatement	1	Command is an SQL statement.
kCommandTypeSQLStatementRaw	2	Command is an SQL statement that mustn't be interpreted by SQLAPI.
kCommandTypeStoredProcedure	3	Command is a stored procedure or a function.
kCommandTypeUnknown	0	Used by default. Library detects command type automatically.

5.16 class SQLConnectionMBS

5.16.1 class SQLConnectionMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for a SQL Plugin Database connection.

Example:

```

dim con as new SQLConnectionMBS

try

// where is the library?
con.SetFileOption con.kOptionLibraryMySQL, SpecialFolder.UserHome.Child("libmysqlclient.dylib")

// connect to database
// in this example it is Oracle,
// but can also be Sybase, Informix, DB2
// SQLServer, InterBase, SQLBase and ODBC

dim server as string = "192.168.1.80,3306@test"

con.Connect(server, "root", "", SQLConnectionMBS.kMySQLClient)

MsgBox "We are connected!"

// Disconnect is optional
// autodisconnect will occur in destructor if needed
con.Disconnect

msgbox "We are disconnected!"

catch r as RuntimeException
MsgBox r.message

// SAConnection::Rollback()
// can also throw an exception
// (if a network error for example),
// we will be ready
try

// on error rollback changes
con.Rollback

catch rr as runtimeexception
MsgBox rr.message
end try

```

end try

Notes: Supported databases: CubeSQL, Centura SQLBase, DB2, DuckDB, Firebird, Informix, InterBase, MariaDB, Microsoft Access, Microsoft SQL Server, MySQL, ODBC, Oracle Database Server, PostgreSQL, SQL Anywhere, SQLite, SQLCIPHER and Sybase.

Connect to Microsoft Access, FileMaker Server (or Pro), Microsoft Visual FoxPro and others via ODBC.

With Xojo 2013r1, you only need a database server license from Xojo, Inc. if you use the SQLDatabaseMBS class. The SQLConnectionMBS class does not require this license. But some features like getting a recordset do need the license as they refer to the SQLDatabaseMBS class.

Please free all RecordSets and SQLCommand objects before you close the SQLConnection or the SQLDatabase. The plugin keeps references from RecordSets and SQLCommand to prevent automatic destruction of the database connection. If you close a database connection while you have RecordSets and SQLCommand in use, things may go wrong.

The plugin can cache the recordset locally. To enable you can call SQLCommandMBS.Cache or use the Option("AutoCache") = "true" on either command or connection or database objects. The plugin will then fetch all records and store them in memory. After this you can walk over the recordset and use FetchPos, FetchFirst, FetchLast, FetchPrev and FetchNext to locate the rows you need. When you call Field() you always get last row, but to read from cached result set, please use Value() function. When using RecordSet, the values are read via Value() functions automatically.

You can use InternalPostgreSQLLibraryMBS or InternalSQLiteLibraryMBS if you like to use our built in SQLite or PostgreSQL database libraries.

see also

https://www.sqlapi.com/ApiDoc/class_s_a_connection.html

The class pings the database every minute by checking whether it's alive and to avoid server dropping connection. This can be disabled by setting Option("Ping") = "false". Ping is not used for SQLite.

MBS Database connections are implemented via SQLConnectionMBS and SQLCommandMBS classes. We provide a thin layer on top with SQLDatabaseMBS class to make it compatible to the Xojo database class. And when you use SQLDatabaseMBS, you can always get the matching SQLConnectionMBS object via Connection property. Instead of SQLCommandMBS class, you may just use SelectSQL/ExecuteSQL or older SQLSelect/SQLExecute functions.

We have a collection of library files here:

<https://www.monkeybreadsoftware.de/xojo/download/plugin/Libs/>

Blog Entries

- [MBS Xojo Plugins, version 24.1pr1](#)
- [12th birthday of MBS SQL Plugin](#)
- [News from the MBS Xojo Plugins Version 20.5](#)
- [Connect to Microsoft SQL Server with MBS Xojo SQL Plugin](#)
- [LiteSync and Xojo](#)
- [New SQL Insert and Update functions for our Xojo Plugin](#)
- [CubeSQL support for MBS Xojo SQL Plugin](#)
- [SQLite in memory databases](#)
- [Wishes for little plug-in additions?](#)
- [MBS REALbasic Plugins Version 10.4 release notes](#)

Videos

- [MBS SQL Plugin Presentation](#)
- [Presentation from Munich conference about MBS Plugins.](#)

Xojo Developer Magazine

- [22.1, page 9: News](#)
- [16.1, page 10: News](#)
- [14.1, pages 24 to 30: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz](#)
- [12.4, page 9: News](#)

5.16.2 Methods

5.16.3 BeginTransaction

Plugin Version: 22.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Begins a transaction.

Notes: This method does nothing. Why?

Well, if auto commit is on, you don't need to call this.

If auto commit is off, we call BeginTransaction for you, so if you call this method you would call it a second time and get an error.

We have this method for compatibility to other SQL database classes from Xojo.

5.16.4 CancelAllCommands

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Cancel all commands for the connection.

Notes: This loops over the list of commands associated with this connection and calls Cancel on them.

5.16.5 Commands as SQLCommandMBS()

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries list of all command objects related to the connection.

5.16.6 Commit

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Saves any changes and ends the current transaction.

Notes: Use Commit method to write transaction changes permanently to a database. It commits the work of all commands that associated with that connection.

All changes to the database since the last commit are made permanent and cannot be undone. Before a commit, all changes made since the start of the transaction can be rolled back using Rollback method.

5.16.7 Connect(DBString as string, UserID as string, Password as string, client as Integer = 0)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Opens the connection to a data source.

Example:

```
dim con as SQLConnectionMBS// your connection
```

```
// some calls for MS SQL Server:
```

```
con.Connect("srv2@pubs", "", "", SQLConnectionMBS.kSQLServerClient)
```

```
con.Connect("@pubs", "", "", SQLConnectionMBS.kSQLServerClient)
```

```
con.Connect("BEDLAM\SQL2005EX_EN@pubs", "", "", SQLConnectionMBS.kSQLServerClient)
```

```
con.Connect("BEDLAM\SQLEXPRESS@master", "", "", SQLConnectionMBS.kSQLServerClient)
```

```
// for MySQL:
```

```
con.Connect("192.168.1.80,3306@test","root","password", SQLConnectionMBS.kMySQLClient)
```

// for Postgre SQL:

```
con.Connect("somedb", "name", "password",SQLConnectionMBS.kPostgreSQLClient)
// with options
con.Connect("127.0.0.1,5432@dbname=postgres connect_timeout=10 sslmode=require", "name", "password",SQL-
ConnectionMBS.kPostgreSQLClient)
```

// for SQLite:

```
con.Connect("/test.db", "", "",SQLConnectionMBS.kSQLiteClient)
```

Notes:

- DBString: Name of database this connection will connect to (see Server specific notes).
- UserID: A string containing a user name to use when establishing the connection (see Server specific notes).
- Password: A string containing a password to use when establishing the connection.
- client: Optional. One of the following values from k*Client constants.

Using the Connect method on a SACConnection object establishes the physical connection to a data source. After this method successfully completes, the connection is live and you can issue commands against it and process the results.

If you use the default value of Client parameter, you should set Client before using Connect.

To check whether a connection established use isConnected method. To check whether a connection is broken or not use isAlive method.

see also for server specific notes:

https://www.sqlapi.com/ApiDoc/class_s_a_connection.html

For IPv6 we changed plugin to use , instead of : for the port separator. So please use , to separate port from IP or host.

For Firebird, if you connect to a database and you have 32/64bit mismatch, you get error number 3.

See Option() for various options you can set before connecting.

e.g. c.Option("SQLiteVFSFlags") = "1" for SQLite for read only access.

Raises OutOfBoundsException exception if client parameter is out of range.

5.16.8 ConnectMT(DBString as string, UserID as string, Password as string, client as Integer = 0)

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

Function: Opens the connection to a data source.

Notes:

- DBString: Name of database this connection will connect to (see Server specific notes).
- UserID: A string containing a user name to use when establishing the connection (see Server specific notes).
- Password: A string containing a password to use when establishing the connection.
- client: Optional. One of the following values from k*Client constants.

Using the Connect method on a SAConnection object establishes the physical connection to a data source. After this method successfully completes, the connection is live and you can issue commands against it and process the results.

If you use the default value of Client parameter, you should set Client before using Connect.

To check whether a connection established use isConnected method. To check whether a connection is broken or not use isAlive method.

see also for server specific notes:

https://www.sqlapi.com/ApiDoc/class_s_a_connection.html

For IPv6 we changed plugin to use , instead of : for the port separator. So please use , to separate port from IP or host.

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.

The MT method will not trigger WillConnect and DidConnect events.

Raises OutOfBoundsException exception if client parameter is out of range.

5.16.9 CubeSQLLastInsertID as Int64

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the last auto increment value from last insert command.

Notes: Only for CubeSQL connections. May raise error if not available.

5.16.10 CubeSQLReceiveData(byref data as String, byref IsEndChunk as Boolean) as Boolean

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Receives a data chunk for file download.

Notes: Returns true on success.

Data is set with data and IsEndChunk is set to true for last chunk.

5.16.11 CubeSQLSendData(data as MemoryBlock)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sends data chunk for file upload.

Notes: This is the sendchunk function in CubeSQL.

See also:

- 5.16.12 CubeSQLSendData(data as String) 98

5.16.12 CubeSQLSendData(data as String)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sends data chunk for file upload.

Notes: This is the sendchunk function in CubeSQL.

See also:

- 5.16.11 CubeSQLSendData(data as MemoryBlock) 98

5.16.13 CubeSQLSendEndData

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sends end data packet.

Notes: This is the send_enddata function in CubeSQL.

5.16.14 Disconnect

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Disconnects the connection from the database.

Notes: Closes all commands objects and RecordSets.

5.16.15 InsertRecord(TableName as String, Record as Dictionary)

Plugin Version: 17.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to insert a record.

Example:

```
dim con as SQLConnectionMBS // your database connection
```

```
dim d as new Dictionary
```

```
d.Value("ID")=2
```

```
d.Value("text")="test insert"
```

```
d.Value("other")="Just a test"
```

```
con.InsertRecord("test_tbl", d)
```

Notes: The plugin builds for you SQL statement with prepared statement and runs the insert command with values.

Lasterror is set or exception raised as with SQLExecute.

Internally this uses a prepared statement. You can check the generated statement via LastStatement property.

5.16.16 kOptionLibrarySeparator as String

Plugin Version: 10.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: One of the option constant to specify the platform specific path separator.

Notes: Use with Option() to specify multiple file paths for a library.

Has a different value on the different platforms.

Value is ";" on Windows and ":" on macOS/Linux.

5.16.17 Listen

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Start listening for notifications.

Notes: Works only for PostgreSQL Client.

Please set client or connect before calling this method.

5.16.18 MySQLInsertID as Int64

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the last auto increment value from last insert command.

Notes: Please query value right after doing Insert. This value is reset when you call commit.

For mySQL and MariaDB connections.

see also

<http://dev.mysql.com/doc/refman/5.1/en/mysql-insert-id.html>

5.16.19 Rollback

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Cancels any changes made during the current transaction and ends the transaction.

Notes: Rollback method rolls back the database to the state it was in at the completion of the last commit operation. All uncommitted work is undone.

Rollback method rolls back the work of all commands that associated with that connection.

To commit all changes made since the start of the transaction use Commit method.

5.16.20 SetFileOption(name as string, file as folderitem)

Plugin Version: 10.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets an option with passing a file path.

Example:

```
dim db as new SQLConnectionMBS
```

```
// where is the library?
```

```
db.SetFileOption SQLConnectionMBS.kOptionLibraryMySQL, SpecialFolder.UserHome.Child("libmysqlclient.dylib")
```

Notes: Allows you to specify a file path with a folderitem.

Makes sure the path is correct and you have a 32 or 64-bit library matching the architecture of your application.

5.16.21 `SQLExecute(command as string, CommandType as Integer = 0)`

Plugin Version: 10.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL command and ignores result.

Notes: This is a convenience function.

Internally it creates a `SQLCommandMBS` with the given command and calls `Execute`.

All text strings sent to the plugin must have a defined encoding. Else the internal text encoding conversions will fail.

5.16.22 `SQLExecuteMT(command as string, CommandType as Integer = 0)`

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL command and ignores result.

Notes: This is a convenience function.

Internally it creates a `SQLCommandMBS` with the given command and calls `Execute`.

All text strings sent to the plugin must have a defined encoding. Else the internal text encoding conversions will fail.

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.

5.16.23 `SQLiteBackupFinish(Backup as SQLite3BackupMBS) as integer`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Finishes a backup run.

Notes: When `BackupStep` has returned `kErrorDone`, or when the application wishes to abandon the backup

operation, the application should destroy the `SQLite3BackupMBS` by passing it to `BackupFinish`. The `BackupFinish` interfaces releases all resources associated with the `SQLite3BackupMBS` object. If `BackupStep` has not yet returned `kErrorDone`, then any active write-transaction on the destination database is rolled back. The `SQLite3BackupMBS` object is invalid and may not be used following a call to `BackupFinish`.

The value returned by `BackupFinish` is `kErrorOK` if no `BackupStep` errors occurred, regardless of whether or not `BackupStep` completed. If an out-of-memory condition or IO error occurred during any prior `BackupStep` call on the same `SQLite3BackupMBS` object, then `BackupFinish` returns the corresponding error code.

A return of `kErrorBusy` or `kErrorLocked` from `BackupStep` is not a permanent error and does not affect the return value of `BackupFinish`.

5.16.24 `SQLiteBackupInit(Dest as Variant, DestName as String, Source as Variant, SourceName as String) as SQLite3BackupMBS`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initializes a backup.

Notes: The backup API copies the content of one database into another. It is useful either for creating backups of databases or for copying in-memory databases to or from persistent files.

see also

http://www.sqlite.org/c3ref/backup_finish.html

Exclusive access is required to the destination database for the duration of the operation. However the source database is only read-locked while it is actually being read; it is not locked continuously for the entire backup operation. Thus, the backup may be performed on a live source database without preventing other users from reading or writing to the source database while the backup is underway.

To perform a backup operation:

- `BackupInit` is called once to initialize the backup,
- `BackupStep` is called one or more times to transfer the data between the two databases, and finally
- `BackupFinish` is called to release all resources associated with the backup operation.

There should be exactly one call to `BackupFinish` for each successful call to `BackupInit`.

The `D` and `N` arguments to `BackupInit(D,N,S,M)` are the database connection associated with the destination database and the database name, respectively. The database name is "main" for the main database, "temp" for the temporary database, or the name specified after the `AS` keyword in an `ATTACH` statement for an attached database. The `S` and `M` arguments passed to `BackupInit(D,N,S,M)` identify the database connection and database name of the source database, respectively. The source and destination database connections (parameters `S` and `D`) must be different or else `BackupInit(D,N,S,M)` will file with an error.

If an error occurs within `BackupInit(D,N,S,M)`, then `nil` is returned and an error code and error message are stored in the destination database connection `D`. The error code and message for the failed call to `BackupInit` can be retrieved using the `ErrCode` and `ErrMsg` functions. A successful call to `BackupInit` returns a `SQLite3BackupMBS` object. The `SQLite3BackupMBS` object may be used with the `BackupStep` and `BackupFinish` functions to perform the specified backup operation.

Concurrent Usage of Database Handles

The source database connection may be used by the application for other purposes while a backup operation is underway or being initialized. If `SQLite` is compiled and configured to support threadsafe database connections, then the source database connection may be used concurrently from within other threads.

However, the application must guarantee that the destination database connection is not passed to any other API (by any thread) after `BackupInit` is called and before the corresponding call to `BackupFinish`. `SQLite` does not currently check to see if the application incorrectly accesses the destination database connection and so no error code is reported, but the operations may malfunction nevertheless. Use of the destination database connection while a backup is in progress might also cause a mutex deadlock.

If running in shared cache mode, the application must guarantee that the shared cache used by the destination database is not accessed while the backup is running. In practice this means that the application must guarantee that the disk file being backed up to is not accessed by any connection within the process, not just the specific connection that was passed to `BackupInit`.

The `SQLite3BackupMBS` object itself is partially threadsafe. Multiple threads may safely make multiple concurrent calls to `BackupStep`. However, the `BackupRemaining` and `BackupPageCount` APIs are not strictly speaking threadsafe. If they are invoked at the same time as another thread is invoking `BackupStep` it is possible that they return invalid values.

`Source` and `Dest` can be `SQLConnectionMBS` or `SQLiteDatabaseMBS`. You need to pass `source` and `dest`, even if one is self as we give you the option to decide where to pass the current database connection.

5.16.25 `SQLiteBackupPageCount(Backup as SQLite3BackupMBS)` as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of pages in total.

Notes: Each call to `BackupStep` sets two values inside the `SQLite3BackupMBS` object: the number of pages still to be backed up and the total number of pages in the source database file. The `BackupRemaining` and `BackupPageCount` interfaces retrieve these two values, respectively.

The values returned by these functions are only updated by `BackupStep`. If the source database is modified during a backup operation, then the values are not updated to account for any extra pages that need to be updated or the size of the source database file changing.

5.16.26 `SQLiteBackupRemaining(Backup as SQLite3BackupMBS)` as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of pages remaining.

Notes: Each call to BackupStep sets two values inside the SQLite3BackupMBS object: the number of pages still to be backed up and the total number of pages in the source database file. The BackupRemaining and BackupPageCount interfaces retrieve these two values, respectively.

The values returned by these functions are only updated by BackupStep. If the source database is modified during a backup operation, then the values are not updated to account for any extra pages that need to be updated or the size of the source database file changing.

5.16.27 SQLiteBackupStep(Backup as SQLite3BackupMBS, Pages as Integer) as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Copies up to Pages pages between the source and destination databases specified by SQLite3BackupMBS object.

Notes: If N is negative, all remaining source pages are copied. If BackupStep(B,N) successfully copies N pages and there are still more pages to be copied, then the function returns kErrorOK. If BackupStep(B,N) successfully finishes copying all pages from source to destination, then it returns kErrorDone. If an error occurs while running BackupStep(B,N), then an error code is returned. As well as kErrorOK and kErrorDone, a call to BackupStep may return kErrorReadOnly, kErrorNoMem, kErrorBusy, kErrorLocked, or an kErrorIOACCESS | kErrorIOXXX extended error code.

The BackupStep might return kErrorReadOnly if the destination database was opened read-only or if the destination is an in-memory database with a different page size from the source database.

If BackupStep cannot obtain a required file-system lock, then the sqlite3_busy_handler | busy-handler function is invoked (if one is specified). If the busy-handler returns non-zero before the lock is available, then kErrorBusy is returned to the caller. In this case the call to BackupStep can be retried later. If the source database connection is being used to write to the source database when BackupStep is called, then kErrorLocked is returned immediately. Again, in this case the call to BackupStep can be retried later on. (If kErrorIOACCESS | kErrorIOXXX, kErrorNoMem, or kErrorReadOnly is returned, then there is no point in retrying the call to BackupStep. These errors are considered fatal.) The application must accept that the backup operation has failed and pass the backup operation handle to the BackupFinish to release associated resources.

The first call to BackupStep obtains an exclusive lock on the destination file. The exclusive lock is not released until either BackupFinish is called or the backup operation is complete and BackupStep returns kErrorDone. Every call to BackupStep obtains a shared lock on the source database that lasts for the duration of the BackupStep call. Because the source database is not locked between calls to BackupStep, the source database may be modified mid-way through the backup process. If the source database is modified by an external process or via a database connection other than the one being used by the backup operation, then the backup will be automatically restarted by the next call to BackupStep. If the source database is modified by the using the same database connection as is used by the backup operation, then the backup database is automatically updated at the same time.

5.16.28 SQLiteConnectionHandle as Ptr

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the current connection reference for the database.

Notes: sqlite3 pointer for using in declares.

5.16.29 SQLiteEnableLoadExtension(OnOff as boolean)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Enables/disables extension loading for the given connection.

5.16.30 SQLiteLastInsertRowID as Int64

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns Last Insert Rowid.

Notes: Each entry in an SQLite table has a unique 64-bit signed integer key called the ROWID. The rowid is always available as an undeclared column named ROWID, OID, or `_ROWID_` as long as those names are not also used by explicitly declared columns. If the table has a column of type INTEGER PRIMARY KEY then that column is another alias for the rowid.

This routine returns the rowid of the most recent successful INSERT into the database from the database connection in the first argument. If no successful INSERTs have ever occurred on that database connection, zero is returned.

(If an INSERT occurs within a trigger, then the rowid of the inserted row is returned by this routine as long as the trigger is running. But once the trigger terminates, the value returned by this routine reverts to the last value inserted before the trigger fired.)

An INSERT that fails due to a constraint violation is not a successful INSERT and does not change the value returned by this routine. ^Thus INSERT OR FAIL, INSERT OR IGNORE, INSERT OR ROLLBACK, and INSERT OR ABORT make no changes to the return value of this routine when their insertion fails. ^^(When INSERT OR REPLACE encounters a constraint violation, it does not fail. The INSERT continues to completion after deleting rows that caused the constraint problem so INSERT OR REPLACE will always change the return value of this interface.)^

For the purposes of this routine, an INSERT is considered to be successful even if it is subsequently rolled back.

This function is accessible to SQL statements via the `last_insert_rowid()` SQL function.

If a separate thread performs a new INSERT on the same database connection while the LastInsertRowID function is running and thus changes the last insert rowid, then the value returned by LastInsertRowID is unpredictable and might not equal either the old or the new last insert rowid.

5.16.31 SQLiteLibVersion as String

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the version string of the SQLite library.

5.16.32 SQLiteLoadExtension(file as FolderItem, ByRef ErrorMessage as String) as Integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Loads an SQLite extension library from the named file.

Notes: The LoadExtension interface attempts to load an SQLite extension library contained in the file.

Returns kErrorOk on success and kErrorError if something goes wrong.

Extension loading must be enabled using EnableLoadExtension prior to calling this API, otherwise an error will be returned.

See also:

- 5.16.33 SQLiteLoadExtension(path as String, ByRef ErrorMessage as String) as Integer 106

5.16.33 SQLiteLoadExtension(path as String, ByRef ErrorMessage as String) as Integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Loads an SQLite extension library from the named file.

Notes: The LoadExtension interface attempts to load an SQLite extension library contained in the file.

Returns kErrorOk on success and kErrorError if something goes wrong.

Extension loading must be enabled using EnableLoadExtension prior to calling this API, otherwise an error will be returned.

See also:

- 5.16.32 SQLiteLoadExtension(file as FolderItem, ByRef ErrorMessage as String) as Integer 106

5.16.34 SQLiteMemoryHighwater(reset as boolean = false) as Int64

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries maximum memory usage so far.

Notes: Can be reset with reset parameter being true.

5.16.35 SQLiteMemoryUsed as Int64

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries memory in use by SQLite.

Notes: This is memory allocated, but not yet freed.

Value is zero until SQLite3 initialized.

5.16.36 SQLiteReKey(Key as String) as Integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: You can change the key on a database using the Rekey Function.

Notes: An empty key decrypts the database.

Rekeying requires that every page of the database file be read, decrypted, reencrypted with the new key, then written out again. Consequently, rekeying can take a long time on a larger database.

Most SEE variants allow you to encrypt an existing database that was created using the public domain version of SQLite. This is not possible when using the authenticating version of the encryption extension in see-aes128-ccm. If you do encrypt a database that was created with the public domain version of SQLite, no nonce will be used and the file will be vulnerable to a chosen-plaintext attack. If you call SetKey() immediately after Open when you are first creating the database, space will be reserved in the database for a nonce and the encryption will be much stronger. If you do not want to encrypt right away, call SetKey() anyway, with an empty key, and the space for the nonce will be reserved in the database even though no encryption is done initially.

A public domain version of the SQLite library can read and write an encrypted database with an empty key. You only need the encryption extension if the key is non-empty.

Returns a SQLite error code.

5.16.37 SQLiteSetBusyHandler(MaxAttempts as Integer = 5)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Installs busy handler for this connection.

Notes: This routine sets a callback function that might be invoked whenever an attempt is made to open a database table that another thread or process has locked.

The plugin has an busy handler which will wait up to MaxAttempts and yield to other Xojo threads while waiting.

Passing 5 should wait up to 100ms.

There can only be a single busy handler defined for each [database connection] . Setting a new busy handler clears any previously set handler.) Note that calling SetBusyTimeout will also set or clear the busy handler.

The busy callback should not take any actions which modify the database connection that invoked the busy handler. Any such actions result in undefined behavior.

5.16.38 SQLiteSetBusyTimeout(TimeOutMS as Integer = 20)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: This routine sets a busy handler that sleeps for a specified amount of time when a table is locked.

Notes: The handler will sleep multiple times until at least "ms" milliseconds of sleeping have accumulated. ^After at least "ms" milliseconds of sleeping, the handler returns 0 which causes SQLite query to return SQLite Busy or IO Blocked error.

Calling this routine with an argument less than or equal to zero turns off all busy handlers.

(There can only be a single busy handler for a particular database connection any any given moment. If another busy handler was defined (using SetBusyHandler prior to calling this routine, that other busy handler is cleared.)

5.16.39 SQLiteSetKey(Key as String) as Integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Applies encryption to a database connection.

Notes: Returns a SQLite error code.

The amount of key material actually used by the encryption extension depends on which variant of SEE you

are using. With RC4, the first 256 byte of key are used. With the AES128, the first 16 bytes of the key are used. With AES256, the first 32 bytes of key are used.

If you specify a key that is shorter than the maximum key length, then the key material is repeated as many times as necessary to complete the key. If you specify a key that is larger than the maximum key length, then the excess key material is silently ignored.

The key must begin with an ASCII prefix to specify which algorithm to use. The prefix must be one of "rc4:", "aes128:", or "aes256:". The prefix is not used as part of the key sent into the encryption algorithm. So the real key should begin on the first byte after the prefix.

The string provided to the plugin is used with it's current encoding. So be sure you use right text encoding for what you want. e.g. using "Müller" as key in text encoding Windows ANSI will not open a database which used that key in UTF-8 encoding.

The Xojo database encryption in SQLiteDatabase class uses AES-128 OFB.

5.16.40 SQLiteDatabase.ColumnMetaData(DBName as string, TableName as string, ColumnName as string, byref DataType as string, byref CollationSequence as string, byref NotNull as boolean, byref PrimaryKey as boolean, byref AutoIncrement as Boolean) as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extract Metadata About A Column Of A Table

Notes: Not available in all sqlite libraries!

This routine returns metadata about a specific column of a specific database table accessible using the database connection handle passed as the first function argument.

The column is identified by the second, third and fourth parameters to this function. The second parameter is either the name of the database (i.e. "main", "temp", or an attached database) containing the specified table or NULL. If it is NULL, then all attached databases are searched for the table using the same algorithm used by the database engine to resolve unqualified table references.

The third and fourth parameters to this function are the table and column name of the desired column, respectively. Neither of these parameters may be NULL.

Metadata is returned by writing to the memory locations passed as the 5th and subsequent parameters to this function. Any of these arguments may be NULL, in which case the corresponding element of metadata is omitted.

CollationSequence is assigned the Name of default collation sequence. NotNull is set to true if column has a NOT NULL constraint. PrimaryKey is set to true if column is part of the PRIMARY KEY and AutoIncrement is set to true if column is AUTOINCREMENT.

If the specified table is actually a view, an error code is returned.

If the specified column is "rowid", "oid" or "_rowid_" and an INTEGER PRIMARY KEY column has been explicitly declared, then the output parameters are set for the explicitly declared column. (If there is no explicitly declared INTEGER PRIMARY KEY column, then the output parameters are set as follows:

```
data type: "INTEGER"
collation sequence: "BINARY"
not null: false
primary key: true
auto increment: false
```

(This function may load one or more schemas from database files. If an error occurs during this process, or if the requested table or column cannot be found, an error code is returned and an error message left in the database connection (to be retrieved using ErrorMessage).)

This API is only available if the library was compiled with the SQLITE_ENABLE_COLUMN_METADATA C-preprocessor symbol defined.

5.16.41 SQLiteThreadsafe as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Test To See If The Library Is Threadsafe.

Notes: The threadsafe() function returns zero if and only if SQLite was compiled mutexing code omitted due to the SQLITE_THREADSAFE compile-time option being set to 0.

SQLite can be compiled with or without mutexes. When the SQLITE_THREADSAFE C preprocessor macro is 1 or 2, mutexes are enabled and SQLite is threadsafe. When the SQLITE_THREADSAFE macro is 0, the mutexes are omitted. Without the mutexes, it is not safe to use SQLite concurrently from more than one thread.

Enabling mutexes incurs a measurable performance penalty. So if speed is of utmost importance, it makes sense to disable the mutexes. But for maximum safety, mutexes should be enabled. The default behavior is for mutexes to be enabled.

This interface can be used by an application to make sure that the version of SQLite that it is linking against was compiled with the desired setting of the SQLITE_THREADSAFE macro.

This interface only reports on the compile-time mutex setting of the SQLITE_THREADSAFE flag. If SQLite

is compiled with `SQLITE_THREADSAFE=1` or `=2` then mutexes are enabled by default but can be fully or partially disabled using a call to `sqlite3_config()` with the verbs `SQLITE_CONFIG_SINGLETHREAD`, `SQLITE_CONFIG_MULTITHREAD`, or `SQLITE_CONFIG_MUTEX`. (The return value of the `sqlite3_threadsafe()` function shows only the compile-time setting of thread safety, not any run-time changes to that setting made by `sqlite3_config()`. In other words, the return value from `sqlite3_threadsafe()` is unchanged by calls to `sqlite3_config()`.)

See the threading mode documentation for additional information.

5.16.42 SQLSelect(command as string, CommandType as Integer = 0) as string

Plugin Version: 10.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL command and returns the first field's string value.

Notes: This is a convenience function.

Internally it creates a `SQLCommandMBS` with the given command and calls `Execute`.

If the result is a record set, the first field from the first row is returned.

This is basically useful for commands like "select sqlite_version()".

All text strings sent to the plugin must have a defined encoding. Else the internal text encoding conversions will fail.

5.16.43 SQLSelectAsRecordSet(command as string, CommandType as Integer = 0) as RecordSet

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL command and returns the result as `RecordSet` object.

Notes: This is a convenience function.

Internally it creates a `SQLCommandMBS` with the given command and calls `Execute`.

For this method to work, you need to have somewhere a property with `SQLDatabaseMBS` so Xojo includes our `SQLDatabase` plugin which provides the `RecordSet` functionality.

If `Scrollable` property is true, the recordset will be requested to be scrollable.

The record set may not have a valid `RecordCount` or have working `movefirst/movelast/moveprev` methods unless the underlying database supports those and `Scrollable` result sets is enabled/supported.

5.16.44 `SQLSelectAsRecordSetMT(command as string, CommandType as Integer = 0) as RecordSet`

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL command and returns the result as RecordSet object.

Notes: This is a convenience function.

Internally it creates a SQLCommandMBS with the given command and calls Execute.

For this method to work, you need to have somewhere a property with SQLDatabaseMBS so Xojo includes our SQLDatabase plugin which provides the RecordSet functionality.

If Scrollable property is true, the recordset will be requested to be scrollable.

The record set may not have a valid RecordCount or have working movefirst/movelast/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

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.

5.16.45 `SQLSelectAsRowSet(command as string, CommandType as integer = 0) as RowSet`

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL command and returns the result as RowSet object.

Notes: This is a convenience function.

Internally it creates a SQLCommandMBS with the given command and calls Execute.

For this method to work, you need to have somewhere a property with SQLDatabaseMBS so Xojo includes our SQLDatabase plugin which provides the RowSet functionality.

If Scrollable property is true, the RowSet will be requested to be scrollable.

The RowSet may not have a valid RecordCount or have working movefirst/movelast/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

For Xojo 2019r2 and newer. See SQLSelectAsRecordSet for older versions.

5.16.46 SQLSelectAsRowSetMT(command as string, CommandType as integer = 0) as RowSet

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL command and returns the result as RowSet object.

Notes: This is a convenience function.

Internally it creates a SQLCommandMBS with the given command and calls Execute.

For this method to work, you need to have somewhere a property with SQLDatabaseMBS so Xojo includes our SQLDatabase plugin which provides the RowSet functionality.

If Scrollable property is true, the RowSet will be requested to be scrollable.

The RowSet may not have a valid RecordCount or have working movefirst/movelast/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

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.

For Xojo 2019r2 and newer. See SQLSelectAsRecordSetMT for older versions.

5.16.47 SQLSelectMT(command as string, CommandType as Integer = 0) as string

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Executes a SQL command and returns the first field's string value.

Notes: This is a convenience function.

Internally it creates a SQLCommandMBS with the given command and calls Execute.

If the result is a record set, the first field from the first row is returned.

This is basically useful for commands like "select sqlite_version()".

All text strings sent to the plugin must have a defined encoding. Else the internal text encoding conversions will fail.

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.

5.16.48 UpdateRecord(TableName as String, Record as Dictionary, Keys as Dictionary)

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to update a record.

Example:

```
dim con as SQLConnectionMBS // your database connection
```

```
dim d as new Dictionary
```

```
d.Value("text")="new text"
```

```
d.Value("other")="second value"
```

```
con.UpdateRecord("test_tbl", d, new dictionary("ID":2))
```

Notes: The plugin builds for you SQL statement with prepared statement and runs the update command with given values for records with given key values.

You can put multiple field names in the keys dictionary.

Lasterror is set or exception raised as with SQLExecute.

Internally this uses a prepared statement. You can check the generated statement via LastStatement property.

5.16.49 Properties

5.16.50 AutoCommit as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether autocommit is enabled or disabled for the current connection.

Example:

```
Dim con as SQLConnectionMBS // your database connection
```

```
con.AutoCommit = SQLConnectionMBS.kAutoCommitOn
```

Notes: If autocommit is on, the database is committed automatically after each SQL command. Otherwise, transaction is committed only after Commit calling.
(Read and Write property)

5.16.51 Client as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The current DBMS client assigned for the connection.

Example:

```
dim con as new SQLConnectionMBS
con.client = SQLConnectionMBS.kSQLiteClient
```

Notes: Raises `OutOfBoundsException` exception if value parameter is out of range on setting.
(Read and Write property)

5.16.52 ClientVersion as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets the DBMS client API version number.

Notes: The higher word contains the major client version (the XX value in the XX.YY version number); the lower word contains the minor client version (the YY value in the XX.YY version number).

If an DBMS client was not set calling `ClientVersion` method will throw an exception.
(Read only property)

5.16.53 ConnectionCount as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries number of current connection objects.

Notes: This method should help you find leaked objects by keeping track of current count from the plugin perspective.

This includes `SQLConnectionMBS` and `SQLDatabaseMBS` objects.

(Read only property)

5.16.54 Error as Boolean

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether an error occurred.

Notes: This is set always when an error occurs and cleared if no error happened.

Be aware that the next call to a plugin function may reset error status.

If you look on this property in debugger, it's probably already cleared by the debugger querying a property.

(Read only property)

5.16.55 ErrorCode as Integer

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The last error code.

Notes: This is set always when an error occurs and cleared if no error happened.

(Read only property)

5.16.56 ErrorMessage as string

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The last error message.

Notes: This is set always when an error occurs and cleared if no error happened.

(Read only property)

5.16.57 isAlive as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the database server connection status for a particular connection object.

Notes: Returns true if the database server is active and accessible; otherwise false.

This method uses the safe query execution for most supported DBMS-es. The query uses the well known database table or procedure (`mysql_ping` is used for MySQL or MariaDB). If the query fails the method returns false.

(Read only property)

5.16.58 isConnected as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the connection state for a particular connection object.

Notes: Returns true if connected; otherwise false.

(Read only property)

5.16.59 IsolationLevel as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The transaction isolation level.

Example:

```
dim con as SqlConnectionMBS // your connection
con.IsolationLevel = SqlConnectionMBS.kReadUncommitted
```

Notes: Use the kReadCommitted, kReadUncommitted, kRepeatableRead, kSerializable and kLevelUnknown constants.

(Read and Write property)

5.16.60 LastStatement as String

Plugin Version: 15.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The last executed SQL Statement.

Notes: (Read only property)

5.16.61 NativeAPI as Variant

Plugin Version: 9.5, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** Returns a set of functions of native DBMS client API.

Notes: Returns a SQLAPIMBS object.

Deprecated in version 19.5 in favor of direct methods in SQLDatabaseMBS and SqlConnectionMBS classes.
(Read only property)

5.16.62 Options as Dictionary

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a dictionary with all options.

Notes: For debugging, it may be useful to inspect options in debugger.
(Read only property)

5.16.63 RaiseExceptions as Boolean

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether to raise exceptions.

Notes: Default is true which means we set error, ErrorCode and ErrorMessage properties and than raise SQLExceptionMBS exception.

If you set to false, we don't raise the exception and you have similar behavior as with database class.

We recommend to use exceptions as they are not so easily ignored like an error property being true.

(Read and Write property)

5.16.64 RowsAffected as Integer

Plugin Version: 23.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns number of rows affected by last DML operation.

Notes: Returns the number of rows affected by the last insert/update/delete command execution.

Can also return the result set rows count, usually when the result set is cached at the client side.

(Read only property)

5.16.65 Scrollable as Boolean

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

Function: Whether to make internally created SQLCommand objects scrollable.

Notes: Since plugin version 15.0, Scrollable is false by default.

(Read and Write property)

5.16.66 ServerVersion as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets the currently connected DBMS server version number.

Notes: The higher word contains the major server version (the XX value in the XX.YY version number); the lower word contains the minor server version (the YY value in the XX.YY version number).

(Read only property)

5.16.67 ServerVersionString as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets the currently connected DBMS server version string.

Notes: A server version string may contain some useful information about server brand, configuration and so on. It is a good idea to display this information in all your applications.

(Read only property)

5.16.68 SQLiteEncryptionKey as String

Plugin Version: 15.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The encryption key to use.

Example:

```
dim db as new SQLiteConnectionMBS
db.SQLiteEncryptionKey = "Hello"
```

Notes: This key is applied to the database after connecting. In case of an error, the plugin raises an exception. An empty key can be used for having no encryption.

Alternatively you can use SQLite3MBS.SetKey yourself.

The amount of key material actually used by the encryption extension depends on which variant of SEE you are using. With RC4, the first 256 byte of key are used. With the AES128, the first 16 bytes of the key are used. With AES256, the first 32 bytes of key are used.

If you specify a key that is shorter than the maximum key length, then the key material is repeated as many times as necessary to complete the key. If you specify a key that is larger than the maximum key length, then the excess key material is silently ignored.

The key must begin with an ASCII prefix to specify which algorithm to use. The prefix must be one of "rc4:", "aes128:", or "aes256:". The prefix is not used as part of the key sent into the encryption algorithm. So the real key should begin on the first byte after the prefix. If no prefix is given, we default to AES 128. To be compatible to Xojo, you can use AES128.

The string provided to the plugin is used with its current encoding. So be sure you use right text encoding for what you want. e.g. using "Müller" as key in text encoding Windows ANSI will not open a database which used that key in UTF-8 encoding.

The Xojo database encryption in SQLiteDatabase class uses AES-128 OFB.

(Read and Write property)

5.16.69 Tag as Variant

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The tag property.

Notes: You can store here whatever you like.

(Read and Write property)

5.16.70 VariantsKeepSQLObjects as Boolean

Plugin Version: 16.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether variants should use SQL types.

Notes: If set to true, we return datetime and numeric as SQLDateTimeMBS and SQLNumericMBS objects.

If false, we return them as date and double.

(Read and Write property)

5.16.71 Option(name as string) as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: A string value of a specific connection or command option.

Example:

```
dim c as SQLConnectionMBS // your connection

// for Microsoft SQL use OLEDB, so you don't need native SQL drivers installed...
c.Option("UseAPI") = "OLEDB"
c.Option("SQLNCLL.LIBS") = "sqlsrv32.dll" // Library included in Windows Vista and newer

// for SQLite, set flag to open database file read only:
c.Option("SQLiteVFSFlags") = "1"

// set 10 seconds timeout for MySQL
c.Option("MYSQL_OPT_CONNECT_TIMEOUT") = "10"

// turn on auto cache
c.Option("AutoCache") = "true"

// set connection timeout for ODBC:
c.Option("SQL_ATTR_CONNECTION_TIMEOUT") = "10"
```

Notes: see also:

https://www.sqlapi.com/ApiDoc/class_s_a_connection.html

We have a collection of library files here:

<https://www.monkeybreadsoftware.de/xojo/download/plugin/Libs/>
(Read and Write computed property)

5.16.72 Events

5.16.73 DidConnect

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: .

Function: Event called after connection was made.

Notes: After we got connected, you can apply various options on the new connection here.

5.16.74 PostgresNotification(NotificationName as string, PID as Integer, Extras as String)

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: .

Function: A postgresSQL notification was received.

Notes: Provides notification name, process ID of app and optional extra information.

5.16.75 Trace(traceInfo as Integer, SQL as string, Command as SQLCommandMBS)

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

Function: The event to trace SQL commands.

5.16.76 WillConnect

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: .

Function: Event called before connection is established.

Notes: Last chance to set connection options.

5.16.77 Working

Plugin Version: 10.4, Platforms: macOS, Linux, Windows, Targets: .

Function: The event called while the `SQLExecuteMT` and `SQLSelectMT` methods are running.

5.16.78 Constants

Constants

Constant	Value	Description
<code>kOptionAPPNAME</code>	<code>"APPNAME"</code>	A constant for the options.
<code>kOptionLibraryCubeSQL</code>	<code>"CUBESQL.LIBS"</code>	One of the option constant to specify the library with the <code>SetFileOption</code> method. Tells the plugin where to find the library for CubeSQL. Only needed if you don't use <code>InternalCubeSQLLibraryMBS</code> module! The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux. The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll". You get this library with the CubeSQL download on their homepage. If no value is given, we default to Windows: <code>cubeSQL_64bit.dll;cubesql.dll</code> macOS: <code>libcubesql_r.dylib</code> Linux: <code>libcubesql_r.so</code> The default is set to work in most cases and try various possible library names.
<code>kOptionLibraryDuckDB</code>	<code>"DUCKDB.LIBS"</code>	ConstantsGroup: Options to specify the library with <code>SetFileOption</code> <code>dim con as SQLConnectionMBS // your connection</code> <code>dim f as FolderItem = GetFolderItem("duckdb.dll")</code> <code>con.SetFileOption con.kOptionLibraryDuckDB, f</code>
<code>kOptionWSID</code>	<code>"WSID"</code>	A constant for the options.
<code>SQLiteInMemory</code>	<code>":memory:"</code>	Connection string for SQLite for a new in-memory database.

Isolation Levels

Constant	Value	Description
<code>kANSILevel0</code>	0	ANSI Level 0
<code>kANSILevel1</code>	1	ANSI Level 1
<code>kANSILevel2</code>	2	ANSI Level 2
<code>kANSILevel3</code>	3	ANSI Level 3
<code>kLevelUnknown</code>	-1	Unknown
<code>kReadCommitted</code>	1	Read committed.
<code>kReadUncommitted</code>	0	Read uncommitted.
<code>kRepeatableRead</code>	2	Repeatable read.
<code>kSerializable</code>	3	Serializable.
<code>kSnapshot</code>	4	Changes made in other transactions can not be seen. For Microsoft SQL Server.

Values for autocommit property

Constant	Value	Description
kAutoCommitOff	0	Autocommit is off.
kAutoCommitOn	1	Autocommit is on.
kAutoCommitUnknown	-1	Autocommit unknown

The database client constants

Constant	Value	Description
kClientNotSpecified	0	Client is not specified.
kCubeSQLClient	13	CubeSQL client. (coming soon)
kDB2Client	6	DB2 client.
kDuckDBClient	14	DuckDB client
kFirebirdClient	4	InterBase/Firebird client.
kInformixClient	7	Informix client.
kInterBaseClient	4	InterBase/Firebird client.
kMariaDBClient	15	MariaDB client.
kMySQLClient	9	MySQL or MariaDB client.
kODBCClient	1	ODBC client.
kOracleClient	2	Oracle client. For Windows the file is "oci.dll", for Linux libclntsh.so and for Mac OS X libclntsh.dylib.
kPostgreSQLClient	10	PostgreSQL client.
kSQLAnywhereClient	12	SQL Anywhere client.
kSQLBaseClient	5	SQLbase client.
kSQLiteClient	11	SQLite client. Or spatialite.
kSQLServerClient	3	Mircosoft SQL Server client. You may need to download the client packages for accessing SQL Server. Files like the SQLNCLI dll may be missing. You can download for example the Feature Pack for Microsoft SQL Server 2005 from the microsoft download page.
kSybaseClient	8	Sybase client.

Error Codes

Constant	Value	Description
kErrorBindVarNotFound	7	Bind variable not found.
kErrorClientInitFails	6	Initialization failed for client.
kErrorClientNotSet	1	Client not set.
kErrorClientNotSupported	2	Unsupported client type for this platform.
kErrorClientVersionOld	5	Library file is too old.
kErrorFieldNotFound	8	Field not found.
kErrorGetLibraryVersionFails	4	Failed to query library version.
kErrorLoadLibraryFails	3	Failed to load a library. For example path could be wrong or 32/64bit mismatch.
kErrorNoMemory	0	Out of memory.
kErrorUnknownColumnType	11	Unknown column type.
kErrorUnknownDataType	9	Unknown data type.
kErrorUnknownParameterType	10	Unknown parameter type.
kErrorWrongConversion	12	Failed to convert a value, e.g. string to number.
kErrorWrongDatetime	13	Can't convert text to date.

Options to specify the library with SetFileOption

Constant	Value	Description
kOptionLibraryDB2	"DB2CLI.LIBS"	<p>Tells the plugin where to find the library for DB2. The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux. The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll". You get this library with the DB2 download on their homepage. If no value is given, we default to Windows: db2clio.dll macOS: libdb2.dylib Linux: libdb2.so</p>
kOptionLibraryFirebird	"IBASE.LIBS"	<p>Tells the plugin where to find the library for FireBird (or Interbase). The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux. The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll". You get this library with the FireBird download on their homepage. If no value is given, we default to Windows: ibclient64.dll;fbclient.dll;gds32.dll macOS: libgds.dylib;libfbclient.dylib Linux: libgds.so;libfbclient.so</p>
kOptionLibraryInformix	"INFCLI.LIBS"	<p>The default is set to work in most cases and try various possible libraries. Tells the plugin where to find the library for Informix. The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux. The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll". You get this library with the Informix download on their homepage. If no value is given, we default to Windows: ICLIT09B.DLL;ICLIT09A.DLL macOS: iclit09b.dylib;iclit09a.dylib;libifcli.dylib Linux: iclit09b.so;iclit09a.so;libifcli.so</p>
kOptionLibraryInterbase	"IBASE.LIBS"	<p>The default is set to work in most cases and try various possible libraries. Tells the plugin where to find the library for FireBird (or Interbase). The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux. The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll". You get this library with the FireBird download on their homepage. If no value is given, we default to Windows: ibclient64.dll;fbclient.dll;gds32.dll macOS: libgds.dylib;libfbclient.dylib Linux: libgds.so;libfbclient.so</p>
kOptionLibraryMySQL	"MYSQL.LIBS"	<p>The default is set to work in most cases and try various possible libraries. Tells the plugin where to find the library for MySQL (or MariaDB). The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux. The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll". You get this library with the MySQL download on their homepage. Libs folder on our website. If no value is given, we default to Windows: libmysql.dll;libmariadb.dll macOS: libmysqlclient.dylib.21:libmysqlclient_r.dylib.21:libmysqlclient_r.18.dylib;libmysqlclient_r.16.dylib;libmysqlclient_r.15.dylib;libmysqlclient.dylib;libmariadb.dylib.3:libmariadb.dylib.2:libmariadb.dylib.3:libmariadb.dylib.2:libmariadb.dylib.3 Linux: libmysqlclient.so.21:libmysqlclient_r.so.21:libmysqlclient_r.so.16:libmysqlclient_r.so.15:libmysqlclient.so;libmariadb.so.3:libmariadb.so.2:libmariadb.so.3</p>
kOptionLibraryODBC	"ODBC.LIBS"	<p>The default is set to work in most cases and try various possible libraries. Tells the plugin where to find the library for ODBC. The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux. The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll".</p>

5.17 class SQLiteDatabaseMBS

5.17.1 class SQLiteDatabaseMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The database class for the SQL plugin

Example:

```
dim db as new SQLiteDatabaseMBS

// where is the library?
db.SetFileOption SQLConnectionMBS.kOptionLibrarySQLite, folderitem("/usr/lib/libsqlite3.0.dylib", folderitem.PathTypeShell)

// connect to database
// in this example it is SQLite,
// but can also be Sybase, Oracle, Informix, DB2, SQLServer, InterBase, MySQL, SQLBase and ODBC

dim path as string

if TargetMacOS then
path = "/tmp/test.db" // put the database in the temporary folder
else
path = "test.db" // for Windows and Linux in the current folder the application is inside.
end if

db.DatabaseName = "sqlite:"+path

if db.Connect then

MsgBox "We are connected!"

// Disconnect is optional
// autodisconnect will occur in destructor if needed
db.close

msgbox "We are disconnected!"
end if
```

Notes: You can use the SQL plugin without using Xojo built in database classes if you use the SQLConnectionMBS and SQLCommandMBS classes.

Or you use the SQLiteDatabaseMBS class which is a subclass of the database class and can be used with Xojo's RecordSet class. The current implementation is not complete. You can connect with passing the database URL in the DatabaseName property of the SQLiteDatabaseMBS class. You prefix this URL with the database

type you are using.

You can use `Execute` and `Select` to run SQL statements. Errors can be queried with the `lasterror` properties. For the `RecordSet`, you can get the column count, the column names and values and move to the next row. All the other methods like deleting a record or updating a value are not implemented and you need to use SQL commands to do this.

Supported databases: CubeSQL, Centura SQLBase, DB2, DuckDB, Firebird, Informix, InterBase, MariaDB, Microsoft Access, Microsoft SQL Server, MySQL, ODBC, Oracle Database Server, PostgreSQL, SQL Anywhere, SQLite, SQLCipher and Sybase.

Connect to Microsoft Access, FileMaker Server (or Pro), Microsoft Visual FoxPro and others via ODBC.

As field and table schema functions are not implemented, you can't use this database with the database browser features in the Xojo IDE.

The plugin does not provide `RecordCount` on `RecordSet` class. For that you need to make an extra `SELECT count(*)` query.

With Xojo 2013r1, you only need a database server license from Xojo, Inc. if you use the `SQLDatabaseMBS` class. The `SQLConnectionMBS` class does not require this license. But some features like getting a recordset do need the license as they refer to the `SQLDatabaseMBS` class.

Please free all `RecordSets` and `SQLCommand` objects before you close the `SQLConnection` or the `SQLDatabase`. The plugin keeps references from `RecordSets` and `SQLCommand` to prevent automatic destruction of the database connection. If you close a database connection while you have `RecordSets` and `SQLCommand` in use, things may go wrong.

The plugin can cache the recordset locally. To enable you can call `SQLCommandMBS.Cache` or use the `Option("AutoCache") = "true"` on either command or connection or database objects. The plugin will then fetch all records and store them in memory. After this you can walk over the recordset and use `FetchPos`, `FetchFirst`, `FetchLast`, `FetchPrev` and `FetchNext` to locate the rows you need. When you call `Field()` you always get last row, but to read from cached result set, please use `Value()` function. When using `RecordSet`, the values are read via `Value()` functions automatically.

You can use `InternalPostgreSQLLibraryMBS` or `InternalSQLiteLibraryMBS` if you like to use our built in SQLite or PostgreSQL database libraries.

The class pings the database every minute by checking whether it's alive and to avoid server dropping connection. This can be disabled by setting `Option("Ping") = "false"`. Ping is not used for SQLite.

MBS Plugin 21.1 adds support for `Edit/Update` methods in `RecordSet` and `RowSet` classes.

MBS Database connections are implemented via `SQLConnectionMBS` and `SQLCommandMBS` classes. We

provide a thin layer on top with `SQLDatabaseMBS` class to make it compatible to the Xoyo database class. And when you use `SQLDatabaseMBS`, you can always get the matching `SQLConnectionMBS` object via `Connection` property. Instead of `SQLCommandMBS` class, you may just use `SelectSQL/ExecuteSQL` or older `SQLSelect/SQLExecute` functions.

We have a collection of library files here:

<https://www.monkeybreadsoftware.de/xoyo/download/plugin/Libs/>
Subclass of the Database class.

Blog Entries

- [MBS SQL Plugin Tips and Tricks](#)
- [RowSet in MBS Xoyo SQL Plugin](#)
- [Connect to Oracle via MBS Xoyo SQL Plugin](#)
- [MBS Xoyo Plugins 18.3](#)
- [Crossplatform connection to Microsoft SQL Server in Xoyo](#)
- [Problems with killing Xoyo threads with plugin calls.](#)
- [MBS Releases the MBS Xoyo / Real Studio plug-ins in version 16.1](#)
- [\[ANN \] MonkeyBread Software Releases the MBS Xoyo / Real Studio plug-ins in version 14.3](#)
- [MBS Releases the MBS Real Studio Web Starter Kit in version 1.0](#)
- [MBS REALbasic Plugins Version 10.4 release notes](#)

Videos

- [MBS SQL Plugin Presentation](#)
- [Presentation from Munich conference about MBS Plugins.](#)

Xoyo Developer Magazine

- [21.1, page 9: News](#)
- [21.1, page 26: News from MBS Xoyo Plugins, What's up with MonkeyBread Software by Stefanie Juchmes](#)
- [18.5, page 10: News](#)
- [14.1, pages 24 to 30: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz](#)
- [13.4, page 11: News](#)
- [12.3, page 10: News](#)

- [11.6, page 40: ChartPart 3.0, Create charts and graphs within your Xojo applications](#) by Kevin Cully
- [11.3, page 11: News](#)
- [11.2, page 33: Windows Installing, Using Inno Setup to Create a Windows Installer App](#) by Marc Zeedar
- [11.1, page 9: News](#)

5.17.2 Methods

5.17.3 BeginTransaction

Plugin Version: 22.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Begins a transaction.

Notes: This method does nothing. Why?

Well, if auto commit is on, you don't need to call this.

If auto commit is off, we call BeginTransaction for you, so if you call this method you would call it a second time and get an error.

We have this method for compatibility to other SQL database classes from Xojo.

5.17.4 CancelAllCommands

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Cancel all commands for the connection.

Notes: This loops over the list of commands associated with this connection and calls Cancel on them.

5.17.5 Commands as SQLCommandMBS()

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries list of all command objects related to the connection.

5.17.6 Connect as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Connects to the database.

Example:

```
dim db as new SQLiteDatabaseMBS
```

```

// where is the library?
db.SetFileOption SqlConnectionMBS.kOptionLibraryMySQL, SpecialFolder.UserHome.Child("libmysqlclient.dylib")

// connect to database
// in this example it is MySQL,
// but can also be Sybase, Informix, Oracle, DB2
// SQLServer, InterBase, SQLBase and ODBC

db.DatabaseName="mysql:192.168.1.80,3306@test"

db.UserName="root"
db.Password=""

// or postgresSQL with timeout and ssl mode
db.DatabaseName="PostgreSQL:127.0.0.1,5432@dbname=postgres connect_timeout=10 sslmode=require"

if db.Connect then

MsgBox "We are connected!"

MsgBox "Server Version: "+db.Connection.ServerVersionString

// Disconnect is optional
// autodisconnect will occur in destructor if needed

else
MsgBox db.ErrorMessage
end if

```

Notes: Returns true on success and false on failure.

Please set the DatabaseName, UserName and Password properties. The Host property is ignored. The database name must contain the complete information and a prefix for the kind of database.

Use this prefixes: "CubeSQL:", "SQLAnywhere:", "ODBC:", "Oracle:", "SQLServer:", "Firebird:", "DuckDB:", "InterBase:", "SQLBase:", "DB2:", "Informix:", "Sybase:", "MySQL:", "MariaDB:", "PostgreSQL:" or "SQLite:". Connect to Microsoft Access, FileMaker Server (or Pro), Microsoft Visual FoxPro and others via ODBC.

For IPv6 we changed plugin to use , instead of : for the port separator. So please use , to separate port from IP or host.

For Firebird, if you connect to a database and you have 32/64bit mismatch, you get error number 3.

5.17.7 ConnectMT as Boolean

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

Function: Connects to the database.

Notes: Returns true on success and false on failure.

Please set the DatabaseName, UserName and Password properties. The Host property is ignored. The database name must contain the complete information and a prefix for the kind of database.

Use this prefixes: "CubeSQL:", "SQLAnywhere:", "ODBC:", "Oracle:", "SQLServer:", "Firebird:", "DuckDB:", "InterBase:", "SQLBase:", "DB2:", "Informix:", "Sybase:", "MySQL:", "MariaDB:", "PostgreSQL:" or "SQLite:". Connect to Microsoft Access, FileMaker Server (or Pro), Microsoft Visual FoxPro and others via ODBC.

For IPv6 we changed plugin to use , instead of : for the port separator. So please use , to separate port from IP or host.

Same as Connect, but if you run this on a thread, the plugin gives time to other threads so the rest of your application runs just fine.

The MT method will not trigger WillConnect and DidConnect events.

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.

5.17.8 Constructor(globals as SQLGlobalsMBS = nil)

Plugin Version: 13.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: The constructor.

Notes: Please don't call this directly as it's called automatically with using new command.

5.17.9 CubeSQLLastInsertID as Int64

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the last auto increment value from last insert command.

Notes: Only for CubeSQL connections. May raise error if not available.

5.17.10 CubeSQLReceiveData(byref data as String, byref IsEndChunk as Boolean) as Boolean

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Receives a data chunk for file download.

Notes: Returns true on success.

Data is set with data and IsEndChunk is set to true for last chunk.

5.17.11 CubeSQLSendData(data as MemoryBlock)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sends data chunk for file upload.

Notes: This is the sendchunk function in CubeSQL.

See also:

- 5.17.12 CubeSQLSendData(data as String) 132

5.17.12 CubeSQLSendData(data as String)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sends data chunk for file upload.

Notes: This is the sendchunk function in CubeSQL.

See also:

- 5.17.11 CubeSQLSendData(data as MemoryBlock) 132

5.17.13 CubeSQLSendEndData

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sends end data packet.

Notes: This is the send_enddata function in CubeSQL.

5.17.14 InsertRecord(TableName as String, Record as Dictionary)

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to insert a record.

Example:

```
dim db as SQLDatabaseMBS // your database connection

dim d as new Dictionary

d.Value("ID")=2
d.Value("text")="test insert"
d.Value("other")="Just a test"

db.InsertRecord("test_tbl", d)

if db.Error then
MsgBox db.ErrorMessage
end if
```

Notes: The plugin builds for you SQL statement with prepared statement and runs the insert command with values.

Lasterror is set or exception raised as with SQLExecute.

Internally this uses a prepared statement. You can check the generated statement via LastStatement property.

5.17.15 Listen

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Start listening for notifications.

Notes: Works only for PostgreSQL Client.

Please set client or connect before calling this method.

5.17.16 MySQLInsertID as Int64

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the last auto increment value from last insert command.

Notes: Please query value right after doing Insert. This value is reset when you call commit.

For MySQL and MariaDB connections.

see also

<http://dev.mysql.com/doc/refman/5.1/en/mysql-insert-id.html>

5.17.17 Prepare(statement as string) as SQLPreparedStatementMBS

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

Function: Prepares a statement.

Notes: Returns prepared statement or nil in case of error.

Please check ErrorMessage property for errors.

5.17.18 SetFileOption(name as string, file as folderitem)

Plugin Version: 10.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets an option with passing a file path.

Example:

```
dim db as new SQLiteDatabaseMBS
```

```
// where is the library?
```

```
db.SetFileOption SQLConnectionMBS.kOptionLibraryMySQL, SpecialFolder.UserHome.Child("libmysqlclient.dylib")
```

Notes: Allows you to specify a file path with a folderitem.

Makes sure the path is correct and you have a 32 or 64-bit library matching the architecture of your application.

5.17.19 SQLExecute(ExecuteString as string, CommandType as Integer)

Plugin Version: 13.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the SQLExecute threaded.

Notes: Same as SQLExecute, but with additional CommandType parameter.

5.17.20 SQLExecuteMT(ExecuteString as string, CommandType as Integer = 0)

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the SQLExecute threaded.

Notes: Same as SQLExecute, but if you run this on a thread, the plugin gives time to other threads so the rest of your application runs just fine.

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.

5.17.21 SQLiteBackupFinish(Backup as SQLite3BackupMBS) as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Finishes a backup run.

Notes: When BackupStep has returned kErrorDone, or when the application wishes to abandon the backup operation, the application should destroy the SQLite3BackupMBS by passing it to BackupFinish. The BackupFinish interfaces releases all resources associated with the SQLite3BackupMBS object. If BackupStep has not yet returned kErrorDone, then any active write-transaction on the destination database is rolled back. The SQLite3BackupMBS object is invalid and may not be used following a call to BackupFinish.

The value returned by BackupFinish is kErrorOK if no BackupStep errors occurred, regardless of whether or not BackupStep completed. If an out-of-memory condition or IO error occurred during any prior BackupStep call on the same SQLite3BackupMBS object, then BackupFinish returns the corresponding error code.

A return of kErrorBusy or kErrorLocked from BackupStep is not a permanent error and does not affect the return value of BackupFinish.

5.17.22 SQLiteBackupInit(Dest as Variant, DestName as String, Source as Variant, SourceName as String) as SQLite3BackupMBS

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initializes a backup.

Notes: The backup API copies the content of one database into another. It is useful either for creating backups of databases or for copying in-memory databases to or from persistent files.

see also

http://www.sqlite.org/c3ref/backup_finish.html

Exclusive access is required to the destination database for the duration of the operation. However the source database is only read-locked while it is actually being read; it is not locked continuously for the entire backup operation. Thus, the backup may be performed on a live source database without preventing other users from reading or writing to the source database while the backup is underway.

To perform a backup operation:

- BackupInit is called once to initialize the backup,
- BackupStep is called one or more times to transfer the data between the two databases, and finally

- BackupFinish is called to release all resources associated with the backup operation.

There should be exactly one call to BackupFinish for each successful call to BackupInit.

The D and N arguments to BackupInit(D,N,S,M) are the database connection associated with the destination database and the database name, respectively. The database name is "main" for the main database, "temp" for the temporary database, or the name specified after the AS keyword in an ATTACH statement for an attached database. The S and M arguments passed to BackupInit(D,N,S,M) identify the database connection and database name of the source database, respectively. The source and destination database connections (parameters S and D) must be different or else BackupInit(D,N,S,M) will file with an error.

If an error occurs within BackupInit(D,N,S,M), then nil is returned and an error code and error message are stored in the destination database connection D. The error code and message for the failed call to BackupInit can be retrieved using the ErrCode and ErrorMessage functions. A successful call to BackupInit returns a SQLite3BackupMBS object. The SQLite3BackupMBS object may be used with the BackupStep and BackupFinish functions to perform the specified backup operation.

Concurrent Usage of Database Handles

The source database connection may be used by the application for other purposes while a backup operation is underway or being initialized. If SQLite is compiled and configured to support threadsafe database connections, then the source database connection may be used concurrently from within other threads.

However, the application must guarantee that the destination database connection is not passed to any other API (by any thread) after BackupInit is called and before the corresponding call to BackupFinish. SQLite does not currently check to see if the application incorrectly accesses the destination database connection and so no error code is reported, but the operations may malfunction nevertheless. Use of the destination database connection while a backup is in progress might also cause a mutex deadlock.

If running in shared cache mode, the application must guarantee that the shared cache used by the destination database is not accessed while the backup is running. In practice this means that the application must guarantee that the disk file being backed up to is not accessed by any connection within the process, not just the specific connection that was passed to BackupInit.

The SQLite3BackupMBS object itself is partially threadsafe. Multiple threads may safely make multiple concurrent calls to BackupStep. However, the BackupRemaining and BackupPageCount APIs are not strictly speaking threadsafe. If they are invoked at the same time as another thread is invoking BackupStep it is possible that they return invalid values.

Source and Dest can be SQLiteConnectionMBS or SQLiteDatabaseMBS. You need to pass source and dest, even if one is self as we give you the option to decide where to pass the current database connection.

5.17.23 SQLiteBackupPageCount(Backup as SQLite3BackupMBS) as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of pages in total.

Notes: Each call to BackupStep sets two values inside the SQLite3BackupMBS object: the number of pages still to be backed up and the total number of pages in the source database file. The BackupRemaining and

BackupPageCount interfaces retrieve these two values, respectively.

The values returned by these functions are only updated by BackupStep. If the source database is modified during a backup operation, then the values are not updated to account for any extra pages that need to be updated or the size of the source database file changing.

5.17.24 SQLiteBackupRemaining(Backup as SQLite3BackupMBS) as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of pages remaining.

Notes: Each call to BackupStep sets two values inside the SQLite3BackupMBS object: the number of pages still to be backed up and the total number of pages in the source database file. The BackupRemaining and BackupPageCount interfaces retrieve these two values, respectively.

The values returned by these functions are only updated by BackupStep. If the source database is modified during a backup operation, then the values are not updated to account for any extra pages that need to be updated or the size of the source database file changing.

5.17.25 SQLiteBackupStep(Backup as SQLite3BackupMBS, Pages as Integer) as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Copies up to Pages pages between the source and destination databases specified by SQLite3BackupMBS object.

Notes: If N is negative, all remaining source pages are copied. If BackupStep(B,N) successfully copies N pages and there are still more pages to be copied, then the function returns kErrorOK. If BackupStep(B,N) successfully finishes copying all pages from source to destination, then it returns kErrorDone. If an error occurs while running BackupStep(B,N), then an error code is returned. As well as kErrorOK and kErrorDone, a call to BackupStep may return kErrorReadOnly, kErrorNoMem, kErrorBusy, kErrorLocked, or an kErrorIOACCESS | kErrorIOXXX extended error code.

The BackupStep might return kErrorReadOnly if the destination database was opened read-only or if the destination is an in-memory database with a different page size from the source database.

If BackupStep cannot obtain a required file-system lock, then the sqlite3_busy_handler | busy-handler function is invoked (if one is specified). If the busy-handler returns non-zero before the lock is available, then kErrorBusy is returned to the caller. In this case the call to BackupStep can be retried later. If the source database connection is being used to write to the source database when BackupStep is called, then kErrorLocked is returned immediately. Again, in this case the call to BackupStep can be retried later on. (If kErrorIOACCESS | kErrorIOXXX, kErrorNoMem, or kErrorReadOnly is returned, then there is no point in retrying the call to BackupStep. These errors are considered fatal.) The application must accept that the backup operation has failed and pass the backup operation handle to the BackupFinish to release associated resources.

The first call to BackupStep obtains an exclusive lock on the destination file. The exclusive lock is not released until either BackupFinish is called or the backup operation is complete and BackupStep returns kErrorDone. Every call to BackupStep obtains a shared lock on the source database that lasts for the du-

ration of the BackupStep call. Because the source database is not locked between calls to BackupStep, the source database may be modified mid-way through the backup process. If the source database is modified by an external process or via a database connection other than the one being used by the backup operation, then the backup will be automatically restarted by the next call to BackupStep. If the source database is modified by the using the same database connection as is used by the backup operation, then the backup database is automatically updated at the same time.

5.17.26 SQLiteConnectionHandle as Ptr

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the current connection reference for the database.

Notes: sqlite3 pointer for using in declares.

5.17.27 SQLiteEnableLoadExtension(OnOff as boolean)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Enables/disables extension loading for the given connection.

5.17.28 SQLiteLastInsertRowID as Int64

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns Last Insert Rowid.

Notes: Each entry in an SQLite table has a unique 64-bit signed integer key called the ROWID. The rowid is always available as an undeclared column named ROWID, OID, or `__ROWID__` as long as those names are not also used by explicitly declared columns. If the table has a column of type INTEGER PRIMARY KEY then that column is another alias for the rowid.

This routine returns the rowid of the most recent successful INSERT into the database from the database connection in the first argument. If no successful INSERTs have ever occurred on that database connection, zero is returned.

(If an INSERT occurs within a trigger, then the rowid of the inserted row is returned by this routine as long as the trigger is running. But once the trigger terminates, the value returned by this routine reverts to the last value inserted before the trigger fired.)

An INSERT that fails due to a constraint violation is not a successful INSERT and does not change the value returned by this routine. ^Thus INSERT OR FAIL, INSERT OR IGNORE, INSERT OR ROLLBACK, and INSERT OR ABORT make no changes to the return value of this routine when their insertion fails.

^(When INSERT OR REPLACE encounters a constraint violation, it does not fail. The INSERT continues to completion after deleting rows that caused the constraint problem so INSERT OR REPLACE will always change the return value of this interface.)^

For the purposes of this routine, an INSERT is considered to be successful even if it is subsequently rolled back.

This function is accessible to SQL statements via the `last_insert_rowid()` SQL function.

If a separate thread performs a new INSERT on the same database connection while the `LastInsertRowID` function is running and thus changes the last insert rowid, then the value returned by `LastInsertRowID` is unpredictable and might not equal either the old or the new last insert rowid.

5.17.29 `SQLiteLibVersion` as `String`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the version string of the SQLite library.

5.17.30 `SQLiteLoadExtension(file as FolderItem, ByRef ErrorMessage as String) as Integer`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Loads an SQLite extension library from the named file.

Notes: The `LoadExtension` interface attempts to load an SQLite extension library contained in the file.

Returns `kErrorOk` on success and `kErrorError` if something goes wrong.

Extension loading must be enabled using `EnableLoadExtension` prior to calling this API, otherwise an error will be returned.

See also:

- 5.17.31 `SQLiteLoadExtension(path as String, ByRef ErrorMessage as String) as Integer` 139

5.17.31 `SQLiteLoadExtension(path as String, ByRef ErrorMessage as String) as Integer`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Loads an SQLite extension library from the named file.

Notes: The `LoadExtension` interface attempts to load an SQLite extension library contained in the file.

Returns `kErrorOk` on success and `kErrorError` if something goes wrong.

Extension loading must be enabled using `EnableLoadExtension` prior to calling this API, otherwise an error will be returned.

See also:

- 5.17.30 `SQLiteLoadExtension(file as FolderItem, ByRef ErrorMessage as String) as Integer` 139

5.17.32 `SQLiteMemoryHighwater(reset as boolean = false) as Int64`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries maximum memory usage so far.

Notes: Can be reset with `reset` parameter being true.

5.17.33 `SQLiteMemoryUsed as Int64`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries memory in use by SQLite.

Notes: This is memory allocated, but not yet freed.

Value is zero until SQLite3 initialized.

5.17.34 `SQLiteReKey(Key as String) as Integer`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: You can change the key on a database using the Rekey Function.

Notes: An empty key decrypts the database.

Rekeying requires that every page of the database file be read, decrypted, reencrypted with the new key, then written out again. Consequently, rekeying can take a long time on a larger database.

Most SEE variants allow you to encrypt an existing database that was created using the public domain version of SQLite. This is not possible when using the authenticating version of the encryption extension in `see-aes128-ccm`. If you do encrypt a database that was created with the public domain version of SQLite, no nonce will be used and the file will be vulnerable to a chosen-plaintext attack. If you call `SetKey()` immediately after `Open` when you are first creating the database, space will be reserved in the database for a nonce and the encryption will be much stronger. If you do not want to encrypt right away, call `SetKey()` anyway, with an empty key, and the space for the nonce will be reserved in the database even though no encryption is done initially.

A public domain version of the SQLite library can read and write an encrypted database with an empty key. You only need the encryption extension if the key is non-empty.

Returns a SQLite error code.

5.17.35 SQLiteSetBusyHandler(MaxAttempts as Integer = 5)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Installs busy handler for this connection.

Notes: This routine sets a callback function that might be invoked whenever an attempt is made to open a database table that another thread or process has locked.

The plugin has an busy handler which will wait up to MaxAttempts and yield to other Xojo threads while waiting.

Passing 5 should wait up to 100ms.

There can only be a single busy handler defined for each [database connection] . Setting a new busy handler clears any previously set handler.) Note that calling SetBusyTimeout will also set or clear the busy handler.

The busy callback should not take any actions which modify the database connection that invoked the busy handler. Any such actions result in undefined behavior.

5.17.36 SQLiteSetBusyTimeout(TimeOutMS as Integer = 20)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: This routine sets a busy handler that sleeps for a specified amount of time when a table is locked.

Notes: The handler will sleep multiple times until at least "ms" milliseconds of sleeping have accumulated. ^After at least "ms" milliseconds of sleeping, the handler returns 0 which causes SQLite query to return SQLite Busy or IO Blocked error.

Calling this routine with an argument less than or equal to zero turns off all busy handlers.

(There can only be a single busy handler for a particular database connection any any given moment. If another busy handler was defined (using SetBusyHandler prior to calling this routine, that other busy handler is cleared.)

5.17.37 SQLiteSetKey(Key as String) as Integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Applies encryption to a database connection.

Notes: Returns a SQLite error code.

The amount of key material actually used by the encryption extension depends on which variant of SEE you are using. With RC4, the first 256 byte of key are used. With the AES128, the first 16 bytes of the key are used. With AES256, the first 32 bytes of key are used.

If you specify a key that is shorter than the maximum key length, then the key material is repeated as many times as necessary to complete the key. If you specify a key that is larger than the maximum key length, then the excess key material is silently ignored.

The key must begin with an ASCII prefix to specify which algorithm to use. The prefix must be one of "rc4:", "aes128:", or "aes256:". The prefix is not used as part of the key sent into the encryption algorithm. So the real key should begin on the first byte after the prefix.

The string provided to the plugin is used with it's current encoding. So be sure you use right text encoding for what you want. e.g. using "Müller" as key in text encoding Windows ANSI will not open a database which used that key in UTF-8 encoding.

The Xojo database encryption in SQLiteDatabase class uses AES-128 OFB.

5.17.38 SQLiteTableColumnMetaData(DBName as string, TableName as string, ColumnName as string, byref DataType as string, byref CollationSequence as string, byref NotNull as boolean, byref PrimaryKey as boolean, byref AutoIncrement as Boolean) as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extract Metadata About A Column Of A Table

Notes: Not available in all sqlite libraries!

This routine returns metadata about a specific column of a specific database table accessible using the database connection handle passed as the first function argument.

The column is identified by the second, third and fourth parameters to this function. The second parameter is either the name of the database (i.e. "main", "temp", or an attached database) containing the specified table or NULL. If it is NULL, then all attached databases are searched for the table using the same algorithm used by the database engine to resolve unqualified table references.

The third and fourth parameters to this function are the table and column name of the desired column,

respectively. Neither of these parameters may be NULL.

Metadata is returned by writing to the memory locations passed as the 5th and subsequent parameters to this function. Any of these arguments may be NULL, in which case the corresponding element of metadata is omitted.

CollationSequence is assigned the Name of default collation sequence. NotNull is set to true if column has a NOT NULL constraint. PrimaryKey is set to true if column is part of the PRIMARY KEY and AutoIncrement is set to true if column is AUTOINCREMENT.

If the specified table is actually a view, an error code is returned.

If the specified column is "rowid", "oid" or "_rowid_" and an INTEGER PRIMARY KEY column has been explicitly declared, then the output parameters are set for the explicitly declared column. (If there is no explicitly declared INTEGER PRIMARY KEY column, then the output parameters are set as follows:

```
data type: "INTEGER"
collation sequence: "BINARY"
not null: false
primary key: true
auto increment: false
```

(This function may load one or more schemas from database files. If an error occurs during this process, or if the requested table or column cannot be found, an error code is returned and an error message left in the database connection (to be retrieved using ErrorMessage).)

This API is only available if the library was compiled with the `SQLITE_ENABLE_COLUMN_METADATA` C-preprocessor symbol defined.

5.17.39 SQLiteThreadsafe as integer

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Test To See If The Library Is Threadsafe.

Notes: The `threadsafe()` function returns zero if and only if SQLite was compiled mutexing code omitted due to the `SQLITE_THREADSAFE` compile-time option being set to 0.

SQLite can be compiled with or without mutexes. When the `SQLITE_THREADSAFE` C preprocessor macro is 1 or 2, mutexes are enabled and SQLite is threadsafe. When the `SQLITE_THREADSAFE` macro is 0, the mutexes are omitted. Without the mutexes, it is not safe to use SQLite concurrently from more than one thread.

Enabling mutexes incurs a measurable performance penalty. So if speed is of utmost importance, it makes sense to disable the mutexes. But for maximum safety, mutexes should be enabled. The default behavior is for mutexes to be enabled.

This interface can be used by an application to make sure that the version of SQLite that it is linking against was compiled with the desired setting of the `SQLITE_THREADSAFE` macro.

This interface only reports on the compile-time mutex setting of the `SQLITE_THREADSAFE` flag. If SQLite is compiled with `SQLITE_THREADSAFE=1` or `=2` then mutexes are enabled by default but can be fully or partially disabled using a call to `sqlite3_config()` with the verbs `SQLITE_CONFIG_SINGLETHREAD`, `SQLITE_CONFIG_MULTITHREAD`, or `SQLITE_CONFIG_MUTEX`. (The return value of the `sqlite3_threadsafe()` function shows only the compile-time setting of thread safety, not any run-time changes to that setting made by `sqlite3_config()`. In other words, the return value from `sqlite3_threadsafe()` is unchanged by calls to `sqlite3_config()`.)

See the threading mode documentation for additional information.

5.17.40 `SQLSelect(SelectString as string, CommandType as Integer)` as `RecordSet`

Plugin Version: 13.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the `SQLSelect` threaded.

Notes: Same as `SQLSelect`, but with additional `CommandType` parameter.

For this method to work, you need to have somewhere a property with `SQLDatabaseMBS` so Xojo includes our `SQLDatabase` plugin which provides the `RecordSet` functionality.

If `Scrollable` property is true, the recordset will be requested to be scrollable.

The record set may not have a valid `RecordCount` or have working `movefirst/movelast/moveprev` methods unless the underlying database supports those and `Scrollable` result sets is enabled/supported.

5.17.41 `SQLSelectMT(SelectString as string, CommandType as Integer = 0)` as `RecordSet`

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the `SQLSelect` threaded.

Notes: Same as `SQLSelect`, but if you run this on a thread, the plugin gives time to other threads so the rest of your application runs just fine.

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 Scrollable property is true, the recordset will be requested to be scrollable.

The record set may not have a valid RecordCount or have working movefirst/movelast/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

5.17.42 UpdateRecord(TableName as String, Record as Dictionary, Keys as Dictionary)

Plugin Version: 18.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convenience function to update a record.

Example:

```
dim db as SQLiteDatabaseMBS // your database connection

dim d as new Dictionary

d.Value("text")="new text"
d.Value("other")="second value"

db.UpdateRecord("test_tbl", d, new dictionary("ID":2))

if db.Error then
  MsgBox db.ErrorMessage
end if
```

Notes: The plugin builds for you SQL statement with prepared statement and runs the update command with given values for records with given key values.

You can put multiple field names in the keys dictionary.

Lasterror is set or exception raised as with SQLExecute.

Internally this uses a prepared statement. You can check the generated statement via LastStatement property.

5.17.43 Properties

5.17.44 AutoCommit as Integer

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether autocommit is enabled or disabled for the current connection.

Example:

```
Dim db as SQLiteDatabaseMBS // your database connection
db.AutoCommit = SQLiteDatabaseMBS.kAutoCommitOn
```

Notes: If autocommit is on, the database is committed automatically after each SQL command. Otherwise, transaction is committed only after Commit calling.
(Read and Write property)

5.17.45 Client as Integer

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

Function: The current DBMS client assigned for the connection.

Example:

```
dim con as new SQLiteDatabaseMBS
db.client = SQLConnectionMBS.kSQLiteClient
```

Notes: Raises OutOfBoundsException exception if value parameter is out of range on setting.
With SQLiteDatabaseMBS, the client is usually taken from the DatabaseName property with a prefix, e.g. "ODBC:test".
(Read and Write property)

5.17.46 ClientVersion as Integer

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets the DBMS client API version number.

Notes: The higher word contains the major client version (the XX value in the XX.YY version number); the lower word contains the minor client version (the YY value in the XX.YY version number).

If an DBMS client was not set calling ClientVersion method will throw an exception.
(Read only property)

5.17.47 Connection as SQLConnectionMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The connection for this database used in the background.

Notes: Note that methods on this connection object can raise exceptions while methods on the SQL-DatabaseMBS class sets the error properties.

(Read only property)

5.17.48 isAlive as boolean

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the database server connection status for a particular connection object.

Notes: Returns true if the database server is active and accessible; otherwise false.

This method uses the safe query execution for most supported DBMS-es. The query uses the well known database table or procedure (mysql_ping is used for MySQL or MariaDB). If the query fails the method returns false.

(Read only property)

5.17.49 isConnected as boolean

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the connection state for a particular connection object.

Notes: Returns true if connected; otherwise false.

(Read only property)

5.17.50 IsolationLevel as Integer

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The transaction isolation level.

Notes: Use the kReadCommitted, kReadUncommitted, kRepeatableRead, kSerializable and kLevelUnknown constants.

(Read and Write property)

5.17.51 LastStatement as String

Plugin Version: 13.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: The last executed SQL Statement.

Notes: (Read only property)

5.17.52 NativeAPI as Variant

Plugin Version: 16.1, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** Returns a set of functions of native DBMS client API.

Notes: Returns a SQLAPIMBS object.

Deprecated in version 19.5 in favor of direct methods in SQLDatabaseMBS and SQLConnectionMBS classes. (Read only property)

5.17.53 Options as Dictionary

Plugin Version: 18.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a dictionary with all options.

Notes: For debugging, it may be useful to inspect options in debugger. (Read only property)

5.17.54 RaiseExceptions as Boolean

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

Function: Whether to raise exceptions.

Notes: Default is false which means we set error, ErrorCode and ErrorMessage properties and not raise SQLExceptionMBS exception.

If you set to true, we do raise the exception and you have similar behavior as with SQLConnection class.

We recommend to use exceptions as they are not so easily ignored like an error property being true.

(Read and Write property)

5.17.55 RowsAffected as Integer

Plugin Version: 23.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns number of rows affected by last DML operation.

Notes: Returns the number of rows affected by the last insert/update/delete command execution.

Can also return the result set rows count, usually when the result set is cached at the client side.

(Read only property)

5.17.56 Scrollable as Boolean

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

Function: Whether to make internally created SQLCommand objects scrollable.

Notes: Since plugin version 15.0, Scrollable is false by default.

(Read and Write property)

5.17.57 ServerVersion as Integer

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets the currently connected DBMS server version number.

Notes: The higher word contains the major server version (the XX value in the XX.YY version number); the lower word contains the minor server version (the YY value in the XX.YY version number).

(Read only property)

5.17.58 ServerVersionString as string

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets the currently connected DBMS server version string.

Notes: A server version string may contain some useful information about server brand, configuration and so on. It is a good idea to display this information in all your applications.

(Read only property)

5.17.59 SQLiteEncryptionKey as String

Plugin Version: 15.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The encryption key to use.

Example:

```
// enable our built-in SQLite library, which supports encryption
```

```
Call InternalSQLiteLibraryMBS.Use
```

```
// where to store?
```

```
Dim f As FolderItem = SpecialFolder.Desktop.Child("test.db")
```

```
Dim storage_database As New SQLiteDatabaseMBS ' SQLiteDatabase
```

```
storage_database.SQLiteEncryptionKey = "aes256:password" ' <- password with AES256 as prefix to pick algorithm
```

```

storage_database.DatabaseName = "sqlite:" + f.NativePath

If storage_database.Connect Then

// create table if this is not yet here
storage_database.SQLExecute "Create table if not exists pics(pic_id integer PRIMARY KEY AUTOIN-
CREMENT, name varchar(20), pic blob)"

// done
MsgBox "Ready"
Else
MsgBox storage_database.ErrorMessage
End If

```

Notes: This key is applied to the database after connecting. In case of an error, the plugin raises an exception. An empty key can be used for having no encryption. Alternatively you can use `SQLite3MBS.SetKey` yourself.

The amount of key material actually used by the encryption extension depends on which variant of SEE you are using. With RC4, the first 256 byte of key are used. With the AES128, the first 16 bytes of the key are used. With AES256, the first 32 bytes of key are used.

If you specify a key that is shorter than the maximum key length, then the key material is repeated as many times as necessary to complete the key. If you specify a key that is larger than the maximum key length, then the excess key material is silently ignored.

The key must begin with an ASCII prefix to specify which algorithm to use. The prefix must be one of "rc4:", "aes128:", or "aes256:". The prefix is not used as part of the key sent into the encryption algorithm. So the real key should begin on the first byte after the prefix. If no prefix is given, we default to AES 128. To be compatible to Xojo, you can use AES128.

The string provided to the plugin is used with it's current encoding. So be sure you use right text encoding for what you want. e.g. using "Müller" as key in text encoding Windows ANSI will not open a database which used that key in UTF-8 encoding.

The Xojo database encryption in `SQLiteDatabase` class uses AES-128 OFB.
(Read and Write property)

5.17.60 Tag as Variant

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: The tag property.

Notes: You can store here whatever you like.
(Read and Write property)

5.17.61 Option(name as string) as string

Plugin Version: 10.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets an option for the connection.

Example:

```
dim c as SQLiteDatabaseMBS // your database connection

// for Microsoft SQL use OLEDB, so you don't need native SQL drivers installed...
c.Option("UseAPI") = "OLEDB"
c.Option("SQLNCLI.LIBS") = "sqlsrv32.dll" // Library included in Windows Vista and newer

// for SQLite, set flag to open database file read only:
c.Option("SQLiteVFSFlags") = "1"

// turn on auto cache
c.Option("AutoCache") = "true"

// set connection timeout for ODBC:
c.Option("SQL_ATTR_CONNECTION_TIMEOUT") = "10"

// cache insert statements for AddRow/InsertRecord
c.Option("CacheInsertStatement") = "true"
```

Notes: We have a collection of library files here:

<https://www.monkeybreadsoftware.de/xojo/download/plugin/Libs/>
(Read and Write computed property)

5.17.62 Events

5.17.63 DidConnect

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: .

Function: Event called after connection was made.

Notes: After we got connected, you can apply various options on the new connection here.

5.17.64 PostgresNotification(NotificationName as string, PID as Integer, Extras as String)

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: .

Function: A postgresSQL notification was received.

Notes: Provides notification name, process ID of app and optional extra information.

5.17.65 Trace(traceInfo as Integer, SQL as string, Command as SQLCommandMBS)

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: .

Function: The event to trace SQL commands.

5.17.66 WillConnect

Plugin Version: 14.3, Platforms: macOS, Linux, Windows, Targets: .

Function: Event called before connection is established.

Notes: Last chance to set connection options.

5.17.67 Constants

Constants

Constant	Value	Description
kOptionLibraryCubeSQL	"CUBESQL.LIBS"	One of the option constant to specify the library with the SetFileOption method. Tells the plugin where to find the library for CubeSQL. Only needed if you don't use InternalCubeSQLLibraryMBS module! The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux. The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll". You get this library with the CubeSQL download on their homepage. If no value is given, we default to Windows: cubeSQL_64bit.dll;cubesql.dll macOS: libcubesql_r.dylib Linux: libcubesql_r.so The default is set to work in most cases and try various possible library names.
kOptionLibraryDuckDB	"DUCKDB.LIBS"	ConstantsGroup: Options to specify the library with SetFileOption dim con as SQLiteDatabaseMBS // your connection dim f as FolderItem = GetFolderItem("duckdb.dll") con.SetFileOption con.kOptionLibraryDuckDB, f
SQLiteInMemory	"SQLite::memory:"	Connection string for SQLite for a new in-memory database. Prefixed with SQLite to use directly.

Isolation Levels

Constant	Value	Description
kANSILevel0	0	ANSI Level 0
kANSILevel1	1	ANSI Level 1
kANSILevel2	2	ANSI Level 2
kANSILevel3	3	ANSI Level 3
kLevelUnknown	-1	Unknown
kReadCommitted	1	Read committed.
kReadUncommitted	0	Read uncommitted.
kRepeatableRead	2	Repeatable read.
kSerializable	3	Serializable.
kSnapshot	4	Changes made in other transactions can not be seen. For Microsoft SQL Server.

Values for autocommit property

Constant	Value	Description
kAutoCommitOff	0	Autocommit is off.
kAutoCommitOn	1	Autocommit is on.
kAutoCommitUnknown	-1	Autocommit unknown

Command Types

Constant	Value	Description
kCommandTypeSQLStatement	1	Command is an SQL statement.
kCommandTypeSQLStatementRaw	2	Command is an SQL statement that mustn't be interpreted by SQLAPI.
kCommandTypeStoredProcedure	3	Command is a stored procedure or a function.
kCommandTypeUnknown	0	Used by default. Library detects command type automatically.

Error Codes

Constant	Value	Description
kErrorBindVarNotFound	7	Bind variable not found.
kErrorClientInitFails	6	Initialization failed for client.
kErrorClientNotSet	1	Client not set.
kErrorClientNotSupported	2	Unsupported client type for this platform.
kErrorClientVersionOld	5	Library file is too old.
kErrorFieldNotFound	8	Field not found.
kErrorGetLibraryVersionFails	4	Failed to query library version.
kErrorLoadLibraryFails	3	Failed to load a library. For example path could be wrong or 32/64bit mismatch.
kErrorNoMemory	0	Out of memory.
kErrorUnknownColumnType	11	Unknown column type.
kErrorUnknownDataType	9	Unknown data type.
kErrorUnknownParameterType	10	Unknown parameter type.
kErrorWrongConversion	12	Failed to convert a value, e.g. string to number.
kErrorWrongDatetime	13	Can't convert text to date.

Options to specify the library with SetFileOption

Constant	Value	Description
kOptionLibraryDB2	"DB2CLI.LIBS"	<p>Tells the plugin where to find the library for DB2.</p> <p>The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux.</p> <p>The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll".</p> <p>You get this library with the DB2 download on their homepage.</p> <p>If no value is given, we default to</p> <p>Windows: db2clio.dll macOS: libdb2.dylib Linux: libdb2.so</p>
kOptionLibraryFirebird	"IBASE.LIBS"	<p>Tells the plugin where to find the library for FireBird (or Interbase).</p> <p>The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux.</p> <p>The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll".</p> <p>You get this library with the Firebird download on their homepage.</p> <p>If no value is given, we default to</p> <p>Windows: ibclient64.dll;fbclient.dll;gds32.dll macOS: libgds.dylib;libfbclient.dylib Linux: libgds.so;libfbclient.so</p>
kOptionLibraryInformix	"INFCLI.LIBS"	<p>The default is set to work in most cases and try various possible libraries.</p> <p>Tells the plugin where to find the library for Informix.</p> <p>The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux.</p> <p>The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll".</p> <p>You get this library with the Informix download on their homepage.</p> <p>If no value is given, we default to</p> <p>Windows: ICLIT09B.DLL;ICLIT09A.DLL macOS: iclit09b.dylib;iclit09a.dylib;libifcli.dylib Linux: iclit09b.so;iclit09a.so;libifcli.so</p>
kOptionLibraryInterbase	"IBASE.LIBS"	<p>The default is set to work in most cases and try various possible libraries.</p> <p>Tells the plugin where to find the library for FireBird (or Interbase).</p> <p>The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux.</p> <p>The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll".</p> <p>You get this library with the FireBird download on their homepage.</p> <p>If no value is given, we default to</p> <p>Windows: ibclient64.dll;fbclient.dll;gds32.dll macOS: libgds.dylib;libfbclient.dylib Linux: libgds.so;libfbclient.so</p>
kOptionLibraryMySQL	"MYSQL.LIBS"	<p>The default is set to work in most cases and try various possible libraries.</p> <p>Tells the plugin where to find the library for MySQL (or MariaDB).</p> <p>The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux.</p> <p>The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll".</p> <p>You get this library with the MySQL download on their homepage.</p> <p>Libs folder on our website.</p> <p>If no value is given, we default to</p> <p>Windows: libmysql.dll;libmariadb.dll macOS: libmysqlclient.dylib.21:libmysqlclient_r.dylib.21:libmysqlclient_r.18.dylib;libmysqlclient_r.16.dylib;libmysqlclient_r.15.dylib;libmysqlclient.dylib;libmariadb.dylib.3:libmariadb.dylib.2:libmariadb.dylib.1 Linux: libmysqlclient.so.21:libmysqlclient_r.so.21:libmysqlclient_r.so.16:libmysqlclient_r.so.15:libmysqlclient.so;libmariadb.so.3:libmariadb.so.2:libmariadb.so</p>
kOptionLibraryODBC	"ODBC.LIBS"	<p>The default is set to work in most cases and try various possible libraries.</p> <p>Tells the plugin where to find the library for ODBC.</p> <p>The value can contain multiple names and paths separated with ";" on Windows and ":" on macOS/Linux.</p> <p>The library extension on Mac is ".dylib", on Linux ".so" and on Windows ".dll".</p>

5.18 class `SQLDataConsumerMBS`

5.18.1 class `SQLDataConsumerMBS`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for a data consumer.

Notes: If you query a clob/blob value, that value may not fit into memory, so you may prefer to get a callback for data and write it to a file in small chunks.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 16.1pr4](#)

Xojo Developer Magazine

- [14.1, page 30: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz](#)

5.18.2 Events

5.18.3 `Write(PieceType as Integer, data as string, Length as UInt32, BlobSize as UInt32)`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: .

Function: The event called to process data.

Notes: `PieceType` is `kOnePiece`, `kFirstPiece`, `kLastPiece` or `kNextPiece`.

`Data` is the raw data in a binary string.

`Length` is the number of bytes and `BlobSize` the size of data blocks used.

5.18.4 Constants

Constants

Constant	Value	Description
<code>kFirstPiece</code>	1	One of the piece type constants. The first piece is processed. You may setup everything you need to handle the data.
<code>kLastPiece</code>	3	One of the piece type constants. The last piece is processed. You can close files/network connections.
<code>kNextPiece</code>	2	One of the piece type constants. The next piece is processed. Not the first one or the last one, but one between.
<code>kOnePiece</code>	4	One of the piece type constants. The whole data stream is delivered in one call of the event.

5.19 class SQLDataProviderMBS

5.19.1 class SQLDataProviderMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for a data provider.

Notes: Use this to set a blob/clob object with streaming data. For example if you want to add a 1 GB big file to the database without loading it into RAM in one piece, you can use this class to read it in small chunks.

Blog Entries

- [MBS Xojo / Real Studio Plugins, version 16.1pr4](#)

Xojo Developer Magazine

- [14.1, page 30: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz](#)

5.19.2 Events

5.19.3 Read(byref PieceType as Integer, Length as UInt32) as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: .

Function: The event called whenever new data is needed.

Notes: PieceType is kOnePiece, kFirstPiece, kLastPiece or kNextPiece.

If your stream is on the end, you set this to kLastPiece.

Return the raw data in a string.

Length is the number of bytes.

5.19.4 Constants

Constants

Constant	Value	Description
kFirstPiece	1	One of the piece type constants. The first piece is processed. You may setup everything you need to handle the data.
kLastPiece	3	One of the piece type constants. The last piece is processed. You can close files/network connections.
kNextPiece	2	One of the piece type constants. The next piece is processed. Not the first one or the last one, but one between.
kOnePiece	4	One of the piece type constants. The whole data stream is delivered in one call of the event.

5.20 class SQLDateTimeMBS

5.20.1 class SQLDateTimeMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The SQL date/time value class.

Example:

```
dim d as new SQLDateTimeMBS(2008, 3, 4, 23, 10, 20)
```

```
MsgBox d.StringValue // shows "2008-03-04T23:10:20"
```

Notes: see also

https://www.sqlapi.com/ApiDoc/class_s_a_date_time.html

Blog Entries

- [MBS Xojo Plugins, version 21.2pr3](#)
- [MBS Xojo Plugins, version 20.4pr8](#)
- [MBS Xojo Plugins, version 19.6pr1](#)
- [MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 14.1](#)
- [MBS Xojo / Real Studio Plugins, version 14.1pr1](#)

Xojo Developer Magazine

- [19.4, page 53: Maps, Part 10, Mapping GPS data with the MapKitMBS plugin by Markus Winter](#)

5.20.2 Methods

5.20.3 Constructor(DateTimeValue as DateTime)

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initializes the datetime value with the given DateTime object.

See also:

- 5.20.4 Constructor(DateValue as Date) 159
- 5.20.5 Constructor(Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0) 159
- 5.20.6 Constructor(other as SQLDateTimeMBS) 160

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• 5.20.7 Constructor(StringValue as String)	160
• 5.20.8 Constructor(value as Double)	161
• 5.20.9 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0, TimeZone as String = "")	162
• 5.20.10 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer, TimeZone as String)	162

5.20.4 Constructor(DateValue as Date)

Plugin Version: 14.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Initializes the datetime value with the given date.

See also:

• 5.20.3 Constructor(DateTimeValue as DateTime)	158
• 5.20.5 Constructor(Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0)	159
• 5.20.6 Constructor(other as SQLDateTimeMBS)	160
• 5.20.7 Constructor(StringValue as String)	160
• 5.20.8 Constructor(value as Double)	161
• 5.20.9 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0, TimeZone as String = "")	162
• 5.20.10 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer, TimeZone as String)	162

5.20.5 Constructor(Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0)

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new SQL Datetime with the given values.

See also:

• 5.20.3 Constructor(DateTimeValue as DateTime)	158
• 5.20.4 Constructor(DateValue as Date)	159
• 5.20.6 Constructor(other as SQLDateTimeMBS)	160
• 5.20.7 Constructor(StringValue as String)	160
• 5.20.8 Constructor(value as Double)	161

- 5.20.9 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0, TimeZone as String = "") 162
- 5.20.10 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer, TimeZone as String) 162

5.20.6 Constructor(other as SQLDateTimeMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a copy of the SQL Date Time.

Example:

```
dim d as new SQLDateTimeMBS(2008, 3, 4, 23, 10, 20)
dim e as new SQLDateTimeMBS(d)
```

```
MsgBox e.StringValue // shows "2008-03-04T23:10:20"
```

See also:

- 5.20.3 Constructor(DateTimeValue as DateTime) 158
- 5.20.4 Constructor(DateValue as Date) 159
- 5.20.5 Constructor(Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0) 159
- 5.20.7 Constructor(StringValue as String) 160
- 5.20.8 Constructor(value as Double) 161
- 5.20.9 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0, TimeZone as String = "") 162
- 5.20.10 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer, TimeZone as String) 162

5.20.7 Constructor(StringValue as String)

Plugin Version: 21.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initialized a date time value from a string.

Example:

```
Dim d As New SQLDateTimeMBS("2021-04-12T18:46:16.242")
msgbox d.StringValue
```

```
Dim d2 As New SQLDateTimeMBS("now")
```

MsgBox d2.StringValue

Notes: You can pass "now" for current time, a string containing a double value for seconds since epoche or a string formatted with SQL datetime. Either with T or space as separator. If fraction is given, it should be 3 digits for milliseconds.

See also:

- 5.20.3 Constructor(DateTimeValue as DateTime) 158
- 5.20.4 Constructor(DateValue as Date) 159
- 5.20.5 Constructor(Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0) 159
- 5.20.6 Constructor(other as SQLDateTimeMBS) 160
- 5.20.8 Constructor(value as Double) 161
- 5.20.9 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0, TimeZone as String = "") 162
- 5.20.10 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer, TimeZone as String) 162

5.20.8 Constructor(value as Double)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new SQL date time value based on the double value.

Example:

```
dim d as new SQLDateTimeMBS(2008, 3, 4, 23, 10, 20)
dim e as new SQLDateTimeMBS(d.DoubleValue+1) // clone with one day more
```

```
MsgBox e.StringValue // shows "2008-03-05T23:10:20"
```

See also:

- 5.20.3 Constructor(DateTimeValue as DateTime) 158
- 5.20.4 Constructor(DateValue as Date) 159
- 5.20.5 Constructor(Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0) 159
- 5.20.6 Constructor(other as SQLDateTimeMBS) 160
- 5.20.7 Constructor(StringValue as String) 160

- 5.20.9 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0, TimeZone as String = "") 162
- 5.20.10 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer, TimeZone as String) 162

5.20.9 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0, TimeZone as String = "")

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new SQL Datetime with the given values.

Example:

```
dim d as new SQLDateTimeMBS(2008, 3, 4, 23, 10, 20)
```

```
MsgBox d.StringValue // shows "2008-03-04T23:10:20"
```

See also:

- 5.20.3 Constructor(DateTimeValue as DateTime) 158
- 5.20.4 Constructor(DateValue as Date) 159
- 5.20.5 Constructor(Hour as Integer, Minute as Integer, Second as Integer = 0, Fraction as Integer = 0) 159
- 5.20.6 Constructor(other as SQLDateTimeMBS) 160
- 5.20.7 Constructor(StringValue as String) 160
- 5.20.8 Constructor(value as Double) 161
- 5.20.10 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer, TimeZone as String) 162

5.20.10 Constructor(Year as Integer, Month as Integer, Day as Integer, Hour as Integer, Minute as Integer, Second as Integer, TimeZone as String)

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new SQL Datetime with the given values.

See also:

- 5.20.3 Constructor(DateTimeValue as DateTime) 158
- 5.20.4 Constructor(DateValue as Date) 159

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5.20.11 Set(DateTimeValue as DateTime)

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Assigns the datetime value with the given dateTime object.

See also:

- 5.20.12 Set(value as Date) 163

5.20.12 Set(value as Date)

Plugin Version: 14.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Assigns the datetime value with the given date.

See also:

- 5.20.11 Set(DateTimeValue as DateTime) 163

5.20.13 Properties

5.20.14 DateTimeValue as DateTime

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries the value of this datetime object as a date object.

Notes: (Read only property)

5.20.15 DateValue as Date

Plugin Version: 14.1, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Queries the value of this datetime object as a date object.

Notes: (Read only property)

5.20.16 Day as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the day this NSDate object represents (1 -31).

Notes: (Read only property)

5.20.17 DayOfWeek as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the day of the week this NSDate object represents (Sunday = 1).

Notes: (Read only property)

5.20.18 DayOfYear as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the day of the year this NSDate object represents (Jan 1 = 1).

Notes: (Read only property)

5.20.19 DoubleValue as Double

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The double value of this date/time.

Notes: Use these operators to get current date/time value using standard double representation. Days are represented by whole number increments starting with 30 December 1899, midnight as time zero. Hour values are expressed as the absolute value of the fractional part of the number.

Date and time	Representation
30 December 1899, midnight	0.00
1 January 1900, midnight	2.00
4 January 1900, midnight	5.00
4 January 1900, 6 A.M.	5.25
4 January 1900, noon	5.50
4 January 1900, 9 P.M.	5.875

(Read only property)

5.20.20 Fraction as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value of the fraction of second (0 to 999,999,999) this SQLDateTime object represents.

Notes:

The value of the fraction field is the number of billionths of a second and ranges from 0 through 999,999,999 (1 less than 1 billion). For example, the value of the fraction field for a half-second is 500,000,000, for a thousandth of a second (one millisecond) is 1,000,000, for a millionth of a second (one microsecond) is 1,000, and for a billionth of a second (one nanosecond) is 1.

(Read only property)

5.20.21 hasDate as Boolean

Plugin Version: 20.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether this date & time object contains a date.

Notes: (Read only property)

5.20.22 hasTime as Boolean

Plugin Version: 20.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Whether this date & time object contains a time.

Notes: (Read only property)

5.20.23 Hour as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the hour this SDateTime object represents (0 -23).

Notes: (Read only property)

5.20.24 Minute as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the minute this SDateTime object represents (0 -59).

Notes: (Read only property)

5.20.25 Month as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the month this SADateTime object represents (1 –12).

Notes: (Read only property)

5.20.26 Second as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the second this SADateTime object represents (0 –59).

Notes: (Read only property)

5.20.27 StringValue as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The string value for this date/time.

Notes: (Read only property)

5.20.28 TimeZone as String

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: The time zone.

Notes: Should be in format "00:00" and should be supported for Oracle and Postgres.
(Read and Write property)

5.20.29 Year as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the year this SADateTime object represents.

Notes: (Read only property)

5.21 class SQLExceptionMBS

5.21.1 class SQLExceptionMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The error exception class to report SQL errors.

Notes: The SQLiteDatabaseMBS class sets its error properties on an error. All other SQL classes raise exceptions where you can check the message property.

Subclass of the RuntimeException class.

Blog Entries

- [Load PDF from MS SQL Server and display it](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 19.1](#)
- [MBS Xojo Plugins, version 19.1pr2](#)
- [MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 14.0](#)
- [MBS Real Studio Plugins, version 13.1pr4](#)

Xojo Developer Magazine

- [14.1, page 27: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz](#)

5.21.2 Properties

5.21.3 ErrorClass as Integer

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a class of error.

Notes: Returns one of the following values:

SA_No_Error	0	No error occurred.
SA_UserGenerated_Error	1	User-generated error.
SA_Library_Error	2	The Library error occurred.
SA_DBMS_API_Error	3	DBMS API error occurred.

A SQLExceptionMBS object handles the next error classes:

- User-generated errors
- Library errors

- DBMS API errors

The Library errors are generated by the Library itself. It can be like detecting some mistake in passing arguments to the function or referencing the parameter with an inappropriate name. To get a Library-defined error text call `ErrorMessage` method.

The DBMS API errors come to the Library from the DBMS Client or Server. In this case the Library returns an error code and text Client- or Server-defined. To get error code and error text returned by the server call `NativeError` and `ErrorMessage` methods.

The User-generated exception is "SQLAPI++ compatible" exception thrown by the user. To throw user exception use `throwUserException` method.
(Read only property)

5.21.4 ErrorMessage as String

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets an error text.

Notes: A error text depends on a class of error.

If error class is Library error the `ErrorMessage` method returns Library-defined error text. If error class is DBMS API error the `ErrorMessage` method returns an error text gotten from DBMS Server or Client. If error class is User-defined error the `ErrorMessage` method returns an error text specified by user (see `throwUserException` method).

To get the error class call `ErrorClass` method.

(same as `Message` property)

(Read only property)

5.21.5 ErrorPosition as Integer

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets an error position in SQL statement.

Notes: Returns an integer value representing error position.

Not all DBMS servers allow to get error position. See Server specific notes to get detailed information about returned value.

If a command object's associated SQL statement contains any syntax errors, an exception will be thrown when you try to compile. `ErrorPosition` method returns the error position within the command string.

Server specific notes

DBMS server	ErrorPosition method returned value
Oracle	ErrorPosition returns parse error offset.
SQL Server	ErrorPosition returns the number of line within SQL statement where error occurred.
Sybase	ErrorPosition returns the number of line within SQL statement where error occurred.
DB2	ErrorPosition returns -1. DB2 does not support this function.
Informix	ErrorPosition returns -1. Informix does not support this function.
InterBase	ErrorPosition returns -1. InterBase does not support this function.
SQLBase	ErrorPosition returns character position of the syntax error within an SQL statement. The first character is position 0.
MySQL	ErrorPosition returns -1. MySQL does not support this function.
PostgreSQL	ErrorPosition returns -1. PostgreSQL does not support this function.
ODBC	ErrorPosition returns -1. ODBC does not support this function.

(Read only property)

5.21.6 NativeError as Integer

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Gets a native code associated with current error.

Notes: Returns an integer value represents a native code associated with current error.

If error class is DBMS API error the NativeError method returns error code received from DBMS Server or Client. If error class is User-defined error the NativeError method returns an error code specified by user (see throwUserException method). If error class is Library error the NativeError method returns -1.

To get the error class call ErrorClass method.

See server specific documentation to get more information about DBMS API error code.

(same as ErrorNumber property)

(Read only property)

5.21.7 SQL as String

Plugin Version: 19.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: The SQL string set when this error occurred.

Notes: (Read only property)

5.22 class SQLFieldMBS

5.22.1 class SQLFieldMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: This is the class for a SQL field in a record.

Notes: Be aware that field objects exists only as long as their SQLCommand exists.

see also

https://www.sqlapi.com/ApiDoc/class_s_a_field.html

Subclass of the SQLValueReadMBS class.

Blog Entries

- [MBS Xojo Plugins, version 19.5pr4](#)
- [MBS Xojo Plugins, version 19.2pr1](#)
- [MBS Xojo Plugins, version 18.4pr10](#)
- [MBS Xojo / Real Studio Plugins, version 16.4pr5](#)
- [Upcoming Changes for our SQL Plugin](#)

5.22.2 Methods

5.22.3 ReadLongOrLob(toConsumer as SQLDataConsumerMBS, BlockSize as Integer)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Starts reading of Long or BLOB(CLOB) value using the given data consumer.

Notes: BlockSize: Size of piece of data you want to get to the consumer event.

After a command execution all output parameters are updated by their values, including Long and BLOB(CLOB) parameters. If you want to control piecewise reading of Long or BLOB(CLOB) data you should do the following:

Before a command execution set `kLongOrLobReaderManual` reading mode (see `LongOrLobReaderMode`) for Long or BLOB(CLOB) parameters you want to process by a data consumer. After that SQLAPI++ will skip reading output Long and BLOB(CLOB) parameters that you set to be read manually.

After command execution use `ReadLongOrLob` method for each output parameter defined to be read manually.

Note, that if the command has result set(s) (it is possible in some servers, see Server specific notes) then output parameters are available only after all result sets are completely processed using `FetchNext` method. See also:

- 5.22.4 ReadLongOrLob(toFile as FolderItem) 172
- 5.22.5 ReadLongOrLob(toStream as Writeable) 172

5.22.4 ReadLongOrLob(toFile as FolderItem)

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

Function: Starts reading of Long or BLOB(CLOB) value to the given file.

Example:

```
dim cmd as SQLCommandMBS // your command
dim f as FolderItem = SpecialFolder.Desktop.Child("test.jpg")
dim field as SQLFieldMBS = cmd.Field("image")
// read blob content to binarystream
field.ReadLongOrLob(f)
```

Notes: May raise IOExceptions if things go wrong.

See also:

- 5.22.3 ReadLongOrLob(toConsumer as SQLDataConsumerMBS, BlockSize as Integer) 171
- 5.22.5 ReadLongOrLob(toStream as Writeable) 172

5.22.5 ReadLongOrLob(toStream as Writeable)

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

Function: Starts reading of Long or BLOB(CLOB) value to the given writeable stream.

Example:

```
dim cmd as SQLCommandMBS // your command
dim f as FolderItem = SpecialFolder.Desktop.Child("test.jpg")
dim b as BinaryStream = BinaryStream.Create(f, true)
dim field as SQLFieldMBS = cmd.Field("image")
// read blob content to binarystream
field.ReadLongOrLob(b)
```

Notes: This allows you to read in chunks the data to a stream, e.g. binarystream, textoutputstream or socket.

See also:

- 5.22.3 ReadLongOrLob(toConsumer as SQLDataConsumerMBS, BlockSize as Integer) 171
- 5.22.4 ReadLongOrLob(toFile as FolderItem) 172

5.22.6 Properties

5.22.7 FieldNativeType as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** Returns native type code of the field.

Notes: Deprecated. Please use NativeType property instead.
(Read only property)

5.22.8 FieldPrecision as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** Returns precision of the field value (the total number of allowable digits).

Notes: Deprecated. Please use Precision property instead.
(Read only property)

5.22.9 FieldScale as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** Returns scale of the field value (the number of digits to the right of the decimal point).

Notes: Deprecated. Please use Scale property instead.
(Read and Write property)

5.22.10 FieldSize as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** Returns field data size.

Notes: Deprecated. Please use Size property instead.
(Read only property)

5.22.11 FieldType as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** Returns field data type.
Notes: Value is one of the `kDataType*` constants.
Deprecated. Please use `Type` property instead.
(Read and Write property)

5.22.12 `isFieldRequired` as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Shows if it is possible for the field value to be null.
Notes: Returns true if the field value can be null; false otherwise.
(Read only property)

5.22.13 `Name` as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns name of the field.
Notes: (Read only property)

5.22.14 `NativeType` as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns native type code of the field.
Notes: (Read only property)

5.22.15 `Options` as Dictionary

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a dictionary with all options.
Notes: For debugging, it may be useful to inspect options in debugger.
(Read only property)

5.22.16 `Pos` as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a one-based position of the field in a result set.

Notes: (Read only property)

5.22.17 Precision as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns precision of the field value (the total number of allowable digits).

Notes: (Read only property)

5.22.18 Scale as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns scale of the field value (the number of digits to the right of the decimal point).

Notes: (Read and Write property)

5.22.19 Size as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns field data size.

Notes: (Read only property)

5.22.20 Type as Integer

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns field data type.

Example:

```
dim db as SQLConnectionMBS
dim cmd as new SQLCommandMBS(db, "select * from test")
```

```
cmd.Execute
```

```
dim f as SQLFieldMBS = cmd.Field("test")
```

```
if f.Type = f.kDataTypeLong then
  MsgBox "type is long"
end if
```

Notes: Value is one of the `kDataType*` constants.
(Read and Write property)

5.22.21 `Option(name as string) as string`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The string value of a specific field option.

Notes: See for more details:

https://www.sqlapi.com/ApiDoc/class_s_a_field.html

(Read and Write computed property)

5.23 class SQLGlobalsMBS

5.23.1 class SQLGlobalsMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for the global methods of the SQL plugin.

Blog Entries

- [News from the MBS Xojo Plugins Version 21.1](#)
- [MBS Xojo Plugins, version 21.1pr2](#)
- [MBS Xojo Plugins, version 21.1pr1](#)
- [Edit and Update for SQLDatabaseMBS class](#)
- [Register MBS Xojo Plugins](#)
- [MBS Xojo / Real Studio Plugins, version 13.5pr3](#)
- [MBS Real Studio Plugins, version 13.0pr7](#)
- [Accessing Microsoft SQL Database from Mac/Linux](#)
- [SQL Plugin and Textencoding](#)

5.23.2 Methods

5.23.3 FindTableName(SQL as String) as String

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries table name used in a SQL SELECT statement.

Example:

```
Dim sql As String = "SELECT First, Last FROM MyTable WHERE ID = 1"
```

```
Dim TableName As String = SQLGlobalsMBS.FindTableName(sql)
```

```
MessageBox TableName // shows MyTable
```

Notes: This is a helper function used by our Edit/Update methods in RecordSet.

Returns either the found table name or empty text if something got wrong. e.g. multiple tables affected due to JOIN operation.

If you find a case where the parser crashes or reports wrong result, please contact us.

5.23.4 GetEnv(name as string) as string

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries environment variable.

Notes: Returns empty string if variable is undefined.

5.23.5 GetVersion as String

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

Function: The version string of the SQLAPI library.

5.23.6 GetVersionBuild as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The build number of the SQLAPI library.

5.23.7 GetVersionMajor as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The major version number of the SQLAPI library.

5.23.8 GetVersionMinor as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The minor version number of the SQLAPI library.

5.23.9 PutEnv(line as string) as boolean

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets environment variable.

Notes: Line format should be "key=value" and returns true on success and false on failure.

5.23.10 RaiseException(message as string)

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Raises an exception to test exception handling in SQL Plugin.

Notes: Raises directly a SQLExceptionMBS with the given message.

5.23.11 RaiseSQLException(UserCode as Integer, message as string)

Plugin Version: 13.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Raises an exception to test exception handling in SQL Plugin.

Notes: Raises a SAUserException which the plugin catches and translates to a SQLExceptionMBS in Xojo.

5.23.12 SetCurrentWorkingDirectory(path as folderitem) as boolean

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

Function: Sets the current working directory.

Notes: This is often useful to make sure the DLLs in that folder are found.

See also:

- 5.23.13 SetCurrentWorkingDirectory(path as String) as boolean

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5.23.13 SetCurrentWorkingDirectory(path as String) as boolean

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

Function: Sets the current working directory.

Notes: This is often useful to make sure the DLLs in that folder are found.

See also:

- 5.23.12 SetCurrentWorkingDirectory(path as folderitem) as boolean

179

5.23.14 SetEnv(name as string, value as string) as boolean

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets an environment variable.

Notes: Existing variable with same name will be overwritten.

Returns true on success and false on failure.

5.23.15 SetLicenseCode(*n* as string, *enddate* as Integer, *v1* as Integer, *v2* as Integer)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Registers the SQL plugin and library.

Notes: Once you ordered a license, you receive details on how to call this method.

5.23.16 Setlocale(*category* as Integer, *locale* as string)

Plugin Version: 10.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets the locale to use.

Example:

```
// ask for English for USA with 1252 codepage
SQLGlobalsMBS.Setlocale SQLGlobalsMBS.LocaleAll, "English_United States.1252"
```

Notes: The Setlocale function sets the C library's notion of natural language formatting style for particular sets of routines. Each such style is called a 'locale' and is invoked using an appropriate name passed as a C string.

The setlocale() function recognizes several categories of routines. These are the categories and the sets of routines they select:

LocaleAll	Set the entire locale generically.
LocaleCollate	Set a locale for string collation routines. This controls alphabetic ordering in <code>strcoll()</code> and <code>strxfrm()</code> .
LocaleCTYPE	Set a locale for the <code>ctype</code> and multibyte functions. This controls recognition of upper and lower case, alphabetic or non-alphabetic characters, and so on.
LocaleMessages	Set a locale for message catalogs, see <code>catopen</code> function.
LocaleMonetary	Set a locale for formatting monetary values; this affects the <code>localeconv()</code> function.
LocaleNumeric	Set a locale for formatting numbers. This controls the formatting of decimal points in input and output of floating point numbers in functions such as <code>printf()</code> and <code>scanf()</code> , as well as values returned by <code>localeconv()</code> .
LocaleTime	Set a locale for formatting dates and times using the <code>strftime()</code> function.

Only three locales are defined by default: the empty string "" (which denotes the native environment) and the "C" and "POSIX" locales (which denote the C-language environment). By default, C programs start in the "C" locale.

5.23.17 UnInitialize

Plugin Version: 21.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Explicitly shutdown SQL engine.

Notes: You can call this in App Close or Destructor, but only after you destroyed all Connections, e.g. all SQLiteDatabaseMBS and SQLConnectionMBS objects.

5.23.18 UnSetEnv(name as string) as boolean

Plugin Version: 13.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Removes environment variable.

Notes: Returns true on success and false on failure.

5.23.19 Events

5.23.20 Trace(traceInfo as Integer, SQL as string, Connection as SQLConnectionMBS, Command as SQLCommandMBS)

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

Function: The event to trace SQL commands.

5.23.21 Constants

Constants

Constant	Value	Description
LocaleAll	0	One of the locale category constants for SetLocale. Set the entire locale generically.
LocaleCollate	1	One of the locale category constants for SetLocale. Set a locale for string collation routines. This controls alphabetic ordering in <code>strcoll()</code> and <code>strxfrm()</code> .
LocaleCTYPE	2	One of the locale category constants for SetLocale. Set a locale for the <code>ctype(3)</code> and <code>multibyte(3)</code> functions. This controls recognition of upper and lower case, alphabetic or non-alphabetic characters, and so on.
LocaleMessages	6	One of the locale category constants for SetLocale. Set a locale for message catalogs, see <code>catopen(3)</code> function.
LocaleMonetary	3	One of the locale category constants for SetLocale. Set a locale for formatting monetary values; this affects the <code>localeconv()</code> function.
LocaleNumeric	4	One of the locale category constants for SetLocale. Set a locale for formatting numbers. This controls the formatting of decimal points in input and output of floating point numbers in functions such as <code>printf()</code> and <code>scanf()</code> , as well as values returned by <code>localeconv()</code> .
LocaleTime	5	One of the locale category constants for SetLocale. Set a locale for formatting dates and times using the <code>strftime()</code> function.

5.24 class SQLIntervalMBS

5.24.1 class SQLIntervalMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class in the SQL Plugin for an interval.

5.24.2 Methods

5.24.3 Constructor

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new zero interval.

See also:

- 5.24.4 Constructor(days as Integer, hours as Integer, minutes as Integer, seconds as Integer = 0, NanoSeconds as Integer = 0) 183
- 5.24.5 Constructor(value as Double) 183

5.24.4 Constructor(days as Integer, hours as Integer, minutes as Integer, seconds as Integer = 0, NanoSeconds as Integer = 0)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new interval with the given values.

See also:

- 5.24.3 Constructor 183
- 5.24.5 Constructor(value as Double) 183

5.24.5 Constructor(value as Double)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new interval with the given time delta.

Example:

```
dim n as new SQLIntervalMBS(5)
```

```
MsgBox n.StringValue // shows "120:00:00" for 120 hours
```

See also:

- 5.24.3 Constructor 183
- 5.24.4 Constructor(days as Integer, hours as Integer, minutes as Integer, seconds as Integer = 0, NanoSeconds as Integer = 0) 183

5.24.6 Dec(interval as SQLIntervalMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Decrements the interval.

5.24.7 Inc(interval as SQLIntervalMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Increments the interval.

5.24.8 SetInterval(days as Integer, hours as Integer, minutes as Integer, seconds as Integer = 0, NanoSeconds as Integer = 0)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets the interval values.

5.24.9 Properties

5.24.10 Days as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The days in this interval.

Notes: (Read only property)

5.24.11 DoubleValue as Double

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The value of this interval.

Example:

```
dim n as new SQLIntervalMBS(1,2,3,4)
```

```
MsgBox str(n.DoubleValue) // shows "1.085463" for 1 day, 2 hours, 3 minutes and 4 seconds
```

Notes: (Read only property)

5.24.12 Fraction as Integer

Plugin Version: 15.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: The fraction of a second in nano seconds.

Notes: Range 0..999999999.

(Read only property)

5.24.13 Hours as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The hours value.

Notes: (Read only property)

5.24.14 Minutes as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The minutes value.

Notes: (Read only property)

5.24.15 Seconds as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The seconds value.

Notes: (Read only property)

5.24.16 StringValue as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The interval as a string.

Example:

```
dim n as new SQLIntervalMBS(5)
```

```
MsgBox n.StringValue // shows "120:00:00" for 120 hours
```

Notes: (Read only property)

5.24.17 TotalDays as Double

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The total days value.

Example:

```
dim n as new SQLIntervalMBS(1,2,3,4)
```

```
MsgBox str(n.TotalDays) // shows "1"
```

Notes: (Read only property)

5.24.18 TotalHours as Double

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The total hours value.

Example:

```
dim n as new SQLIntervalMBS(1,2,3,4)
```

```
MsgBox str(n.TotalHours) // shows "26"
```

Notes: (Read only property)

5.24.19 TotalMinutes as Double

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The total minutes value.

Example:

```
dim n as new SQLIntervalMBS(1,2,3,4)
```

```
MsgBox str(n.TotalMinutes) // shows "1563"
```

Notes: (Read only property)

5.24.20 TotalSeconds as Double

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The total seconds value.

Notes: dim n as new SQLIntervalMBS(1,2,3,4)

```
MsgBox str(n.GetTotalSeconds) // shows "93784"  
(Read only property)
```

5.25 class SQLite3BackupMBS

5.25.1 class SQLite3BackupMBS

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The object for a running backup.

Notes: The backup object records state information about an ongoing online backup operation. The `sqlite3_backup` object is created by a call to `BackupInit()` and is destroyed by a call to `BackupFinish()`.

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

Blog Entries

- [SQLite Backup Functions](#)

Xojo Developer Magazine

- [14.1, page 30: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz](#)

5.25.2 Methods

5.25.3 Constructor

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

5.25.4 Properties

5.25.5 Handle as Integer

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The internal object reference.

Notes: (Read only property)

5.26 class **SQLite3MBS**

5.26.1 class **SQLite3MBS**

Plugin Version: 9.5, Platforms: macOS, Linux, Windows, Targets: All.

Deprecated: This item is deprecated and should no longer be used. **Function:** The class for the native SQLite API.

Example:

```
dim con as new SQLConnectionMBS
dim path as string = "/tmp/test.db" // change path for Windows!

con.Connect(path,"",",",SQLConnectionMBS.kSQLiteClient)

dim api as SQLAPIMBS = con.NativeAPI
if api isa SQLite3MBS then
dim s as SQLite3MBS = SQLite3MBS(api)
MsgBox s.Version
end if
```

Notes: Deprecated in favor of direct methods on `SQLConnectionMBS`. Please let us know if you need more SQLite specific functions.

Subclass of the `SQLAPIMBS` class.

Blog Entries

- [News from the MBS Xojo Plugins Version 22.2](#)
- [MBS Xojo Plugins, version 22.2pr1](#)
- [MBS Xojo Plugins, version 19.5pr1](#)
- [MonkeyBread Software Releases the MBS Xojo Plugins in version 17.4](#)
- [MBS Releases the MBS Xojo / Real Studio plug-ins in version 16.4](#)
- [MBS Releases the MBS Xojo / Real Studio plug-ins in version 16.1](#)
- [Embedded SQLite and encryption](#)
- [\[ANN \] MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 14.4](#)
- [SQLite Backup Functions](#)
- [MBS REALbasic plug-ins version 9.5](#)

Videos

- [Presentation from London conference about MBS Plugins.](#)

5.26.2 Methods

5.26.3 BackupFinish(Backup as SQLite3BackupMBS) as Integer

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Finishes a backup run.

Notes: When BackupStep has returned kErrorDone, or when the application wishes to abandon the backup operation, the application should destroy the SQLite3BackupMBS by passing it to BackupFinish. The BackupFinish interfaces releases all resources associated with the SQLite3BackupMBS object. If BackupStep has not yet returned kErrorDone, then any active write-transaction on the destination database is rolled back. The SQLite3BackupMBS object is invalid and may not be used following a call to BackupFinish.

The value returned by BackupFinish is kErrorOK if no BackupStep errors occurred, regardless of whether or not BackupStep completed. If an out-of-memory condition or IO error occurred during any prior BackupStep call on the same SQLite3BackupMBS object, then BackupFinish returns the corresponding error code.

A return of kErrorBusy or kErrorLocked from BackupStep is not a permanent error and does not affect the return value of BackupFinish.

5.26.4 BackupInit(Dest as Variant, DestName as String, Source as Variant, SourceName as String) as SQLite3BackupMBS

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Initializes a backup.

Notes: The backup API copies the content of one database into another. It is useful either for creating backups of databases or for copying in-memory databases to or from persistent files.

see also

http://www.sqlite.org/c3ref/backup_finish.html

Exclusive access is required to the destination database for the duration of the operation. However the source database is only read-locked while it is actually being read; it is not locked continuously for the entire backup operation. Thus, the backup may be performed on a live source database without preventing other users from reading or writing to the source database while the backup is underway.

To perform a backup operation:

- BackupInit is called once to initialize the backup,
- BackupStep is called one or more times to transfer the data between the two databases, and finally
- BackupFinish is called to release all resources associated with the backup operation.

There should be exactly one call to `BackupFinish` for each successful call to `BackupInit`.

The `D` and `N` arguments to `BackupInit(D,N,S,M)` are the database connection associated with the destination database and the database name, respectively. The database name is "main" for the main database, "temp" for the temporary database, or the name specified after the `AS` keyword in an `ATTACH` statement for an attached database. The `S` and `M` arguments passed to `BackupInit(D,N,S,M)` identify the database connection and database name of the source database, respectively. The source and destination database connections (parameters `S` and `D`) must be different or else `BackupInit(D,N,S,M)` will file with an error. If an error occurs within `BackupInit(D,N,S,M)`, then `nil` is returned and an error code and error message are stored in the destination database connection `D`. The error code and message for the failed call to `BackupInit` can be retrieved using the `ErrCode` and `ErrMsg` functions. A successful call to `BackupInit` returns a `SQLite3BackupMBS` object. The `SQLite3BackupMBS` object may be used with the `BackupStep` and `BackupFinish` functions to perform the specified backup operation.

Concurrent Usage of Database Handles

The source database connection may be used by the application for other purposes while a backup operation is underway or being initialized. If `SQLite` is compiled and configured to support threadsafe database connections, then the source database connection may be used concurrently from within other threads.

However, the application must guarantee that the destination database connection is not passed to any other API (by any thread) after `BackupInit` is called and before the corresponding call to `BackupFinish`. `SQLite` does not currently check to see if the application incorrectly accesses the destination database connection and so no error code is reported, but the operations may malfunction nevertheless. Use of the destination database connection while a backup is in progress might also cause a mutex deadlock.

If running in shared cache mode, the application must guarantee that the shared cache used by the destination database is not accessed while the backup is running. In practice this means that the application must guarantee that the disk file being backed up to is not accessed by any connection within the process, not just the specific connection that was passed to `BackupInit`.

The `SQLite3BackupMBS` object itself is partially threadsafe. Multiple threads may safely make multiple concurrent calls to `BackupStep`. However, the `BackupRemaining` and `BackupPageCount` APIs are not strictly speaking threadsafe. If they are invoked at the same time as another thread is invoking `BackupStep` it is possible that they return invalid values.

`Source` and `Dest` can be `SQLConnectionMBS` or `SQLDatabaseMBS`. You need to pass source and dest, even if one is self as we give you the option to decide where to pass the current database connection.

5.26.5 `BackupPageCount(Backup as SQLite3BackupMBS)` as Integer

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of pages in total.

Notes: Each call to `BackupStep` sets two values inside the `SQLite3BackupMBS` object: the number of pages still to be backed up and the total number of pages in the source database file. The `BackupRemaining` and `BackupPageCount` interfaces retrieve these two values, respectively.

The values returned by these functions are only updated by `BackupStep`. If the source database is modified

during a backup operation, then the values are not updated to account for any extra pages that need to be updated or the size of the source database file changing.

5.26.6 BackupRemaining(Backup as SQLite3BackupMBS) as Integer

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of pages remaining.

Notes: Each call to BackupStep sets two values inside the SQLite3BackupMBS object: the number of pages still to be backed up and the total number of pages in the source database file. The BackupRemaining and BackupPageCount interfaces retrieve these two values, respectively.

The values returned by these functions are only updated by BackupStep. If the source database is modified during a backup operation, then the values are not updated to account for any extra pages that need to be updated or the size of the source database file changing.

5.26.7 BackupStep(Backup as SQLite3BackupMBS, Pages as Integer) as Integer

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Copies up to Pages pages between the source and destination databases specified by SQLite3BackupMBS object.

Notes: If N is negative, all remaining source pages are copied. If BackupStep(B,N) successfully copies N pages and there are still more pages to be copied, then the function returns kErrorOK. If BackupStep(B,N) successfully finishes copying all pages from source to destination, then it returns kErrorDone. If an error occurs while running BackupStep(B,N), then an error code is returned. As well as kErrorOK and kErrorDone, a call to BackupStep may return kErrorReadOnly, kErrorNoMem, kErrorBusy, kErrorLocked, or an kErrorIOACCESS | kErrorIOXXX extended error code.

The BackupStep might return kErrorReadOnly if the destination database was opened read-only or if the destination is an in-memory database with a different page size from the source database.

If BackupStep cannot obtain a required file-system lock, then the sqlite3_busy_handler | busy-handler function is invoked (if one is specified). If the busy-handler returns non-zero before the lock is available, then kErrorBusy is returned to the caller. In this case the call to BackupStep can be retried later. If the source database connection is being used to write to the source database when BackupStep is called, then kErrorLocked is returned immediately. Again, in this case the call to BackupStep can be retried later on. (If kErrorIOACCESS | kErrorIOXXX, kErrorNoMem, or kErrorReadOnly is returned, then there is no point in retrying the call to BackupStep. These errors are considered fatal.) The application must accept that the backup operation has failed and pass the backup operation handle to the BackupFinish to release associated resources.

The first call to BackupStep obtains an exclusive lock on the destination file. The exclusive lock is not released until either BackupFinish is called or the backup operation is complete and BackupStep returns kErrorDone. Every call to BackupStep obtains a shared lock on the source database that lasts for the duration of the BackupStep call. Because the source database is not locked between calls to BackupStep, the source database may be modified mid-way through the backup process. If the source database is modified

by an external process or via a database connection other than the one being used by the backup operation, then the backup will be automatically restarted by the next call to `BackupStep`. If the source database is modified by the using the same database connection as is used by the backup operation, then the backup database is automatically updated at the same time.

5.26.8 `EnableLoadExtension(OnOff as boolean)`

Plugin Version: 14.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Enables/disables extension loading for the given connection.

5.26.9 `ErrCode as Integer`

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The `ErrCode` function returns the numeric result code or extended result code for the most recent failed `sqlite3` API call associated with a database connection.

Notes: If a prior API call failed but the most recent API call succeeded, the return value from `ErrCode` is undefined.

5.26.10 `ErrorMessage as string`

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the most recent error message in english for the given connection.

5.26.11 `LastInsertRowID as Int64`

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns Last Insert Rowid.

Notes: Each entry in an `SQLite` table has a unique 64-bit signed integer key called the ROWID. The rowid is always available as an undeclared column named `ROWID`, `OID`, or `_ROWID_` as long as those names are not also used by explicitly declared columns. If the table has a column of type `INTEGER PRIMARY KEY` then that column is another alias for the rowid.

This routine returns the rowid of the most recent successful `INSERT` into the database from the database connection in the first argument. If no successful `INSERT`s have ever occurred on that database connection, zero is returned.

(If an INSERT occurs within a trigger, then the rowid of the inserted row is returned by this routine as long as the trigger is running. But once the trigger terminates, the value returned by this routine reverts to the last value inserted before the trigger fired.)

An INSERT that fails due to a constraint violation is not a successful INSERT and does not change the value returned by this routine. Thus INSERT OR FAIL, INSERT OR IGNORE, INSERT OR ROLLBACK, and INSERT OR ABORT make no changes to the return value of this routine when their insertion fails. (When INSERT OR REPLACE encounters a constraint violation, it does not fail. The INSERT continues to completion after deleting rows that caused the constraint problem so INSERT OR REPLACE will always change the return value of this interface.)

For the purposes of this routine, an INSERT is considered to be successful even if it is subsequently rolled back.

This function is accessible to SQL statements via the last_insert_rowid() SQL function.

If a separate thread performs a new INSERT on the same database connection while the LastInsertRowID function is running and thus changes the last insert rowid, then the value returned by LastInsertRowID is unpredictable and might not equal either the old or the new last insert rowid.

5.26.12 LoadExtension(file as FolderItem, ByRef ErrorMessage as String) as Integer

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

Function: Loads an SQLite extension library from the named file.

Notes: The LoadExtension interface attempts to load an SQLite extension library contained in the file.

Returns kErrorOk on success and kErrorError if something goes wrong.

Extension loading must be enabled using EnableLoadExtension prior to calling this API, otherwise an error will be returned.

See also:

- 5.26.13 LoadExtension(path as String, ByRef ErrorMessage as String) as Integer 194

5.26.13 LoadExtension(path as String, ByRef ErrorMessage as String) as Integer

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

Function: Loads an SQLite extension library from the named file.

Notes: The LoadExtension interface attempts to load an SQLite extension library contained in the file.

Returns `kErrorOk` on success and `kErrorError` if something goes wrong.

Extension loading must be enabled using `EnableLoadExtension` prior to calling this API, otherwise an error will be returned.

See also:

- 5.26.12 `LoadExtension(file as FolderItem, ByRef ErrorMessage as String) as Integer` 194

5.26.14 `MemoryHighwater(reset as boolean) as Int64`

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries maximum memory usage so far.

Notes: Can be reset with `reset` parameter being true.

See also:

- 5.26.23 `MemoryHighwater as Int64` 199

5.26.15 `ReKey(Key as String) as Integer`

Plugin Version: 15.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: You can change the key on a database using the Rekey Function.

Notes: An empty key decrypts the database.

Rekeying requires that every page of the database file be read, decrypted, reencrypted with the new key, then written out again. Consequently, rekeying can take a long time on a larger database.

Most SEE variants allow you to encrypt an existing database that was created using the public domain version of SQLite. This is not possible when using the authenticating version of the encryption extension in `see-aes128-ccm`. If you do encrypt a database that was created with the public domain version of SQLite, no nonce will be used and the file will be vulnerable to a chosen-plaintext attack. If you call `SetKey()` immediately after `Open` when you are first creating the database, space will be reserved in the database for a nonce and the encryption will be much stronger. If you do not want to encrypt right away, call `SetKey()` anyway, with an empty key, and the space for the nonce will be reserved in the database even though no encryption is done initially.

A public domain version of the SQLite library can read and write an encrypted database with an empty key. You only need the encryption extension if the key is non-empty.

Returns a SQLite error code.

5.26.16 SetBusyHandler(MaxAttempts as Integer = 5)

Plugin Version: 16.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Installs busy handler for this connection.

Notes: This routine sets a callback function that might be invoked whenever an attempt is made to open a database table that another thread or process has locked.

The plugin has an busy handler which will wait up to MaxAttempts and yield to other Xojo threads while waiting.

Passing 5 should wait up to 100ms.

There can only be a single busy handler defined for each [database connection] . Setting a new busy handler clears any previously set handler.) Note that calling SetBusyTimeout will also set or clear the busy handler.

The busy callback should not take any actions which modify the database connection that invoked the busy handler. Any such actions result in undefined behavior.

5.26.17 SetBusyTimeout(TimeOutMS as Integer = 20)

Plugin Version: 16.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: This routine sets a busy handler that sleeps for a specified amount of time when a table is locked.

Notes: The handler will sleep multiple times until at least "ms" milliseconds of sleeping have accumulated. After at least "ms" milliseconds of sleeping, the handler returns 0 which causes SQLite query to return SQLite Busy or IO Blocked error.

Calling this routine with an argument less than or equal to zero turns off all busy handlers.

(There can only be a single busy handler for a particular database connection any any given moment. If another busy handler was defined (using SetBusyHandler prior to calling this routine, that other busy handler is cleared.)

5.26.18 SetKey(Key as String) as Integer

Plugin Version: 15.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Applies encryption to a database connection.

Notes: Returns a SQLite error code.

The amount of key material actually used by the encryption extension depends on which variant of SEE you

are using. With RC4, the first 256 byte of key are used. With the AES128, the first 16 bytes of the key are used. With AES256, the first 32 bytes of key are used.

If you specify a key that is shorter than the maximum key length, then the key material is repeated as many times as necessary to complete the key. If you specify a key that is larger than the maximum key length, then the excess key material is silently ignored.

The key must begin with an ASCII prefix to specify which algorithm to use. The prefix must be one of "rc4:", "aes128:", or "aes256:". The prefix is not used as part of the key sent into the encryption algorithm. So the real key should begin on the first byte after the prefix.

The string provided to the plugin is used with it's current encoding. So be sure you use right text encoding for what you want. e.g. using "Müller" as key in text encoding Windows ANSI will not open a database which used that key in UTF-8 encoding.

The Xojo database encryption in SQLiteDatabase class uses AES-128 OFB.

5.26.19 **TableColumnMetaData(DBName as string, TableName as string, ColumnName as string, byref DataType as string, byref CollationSequence as string, byref NotNull as boolean, byref PrimaryKey as boolean, byref AutoIncrement as Boolean) as Integer**

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extract Metadata About A Column Of A Table

Notes: Not available in all sqlite libraries!

This routine returns metadata about a specific column of a specific database table accessible using the database connection handle passed as the first function argument.

The column is identified by the second, third and fourth parameters to this function. The second parameter is either the name of the database (i.e. "main", "temp", or an attached database) containing the specified table or NULL. If it is NULL, then all attached databases are searched for the table using the same algorithm used by the database engine to resolve unqualified table references.

The third and fourth parameters to this function are the table and column name of the desired column, respectively. Neither of these parameters may be NULL.

Metadata is returned by writing to the memory locations passed as the 5th and subsequent parameters to this function. Any of these arguments may be NULL, in which case the corresponding element of metadata is omitted.

CollationSequence is assigned the Name of default collation sequence. NotNull is set to true if column has a NOT NULL constraint. PrimaryKey is set to true if column is part of the PRIMARY KEY and AutoIncrement is set to true if column is AUTOINCREMENT.

If the specified table is actually a view, an error code is returned.

If the specified column is "rowid", "oid" or "_rowid_" and an INTEGER PRIMARY KEY column has been explicitly declared, then the output parameters are set for the explicitly declared column. (If there is no explicitly declared INTEGER PRIMARY KEY column, then the output parameters are set as follows:

```
data type: "INTEGER"  
collation sequence: "BINARY"  
not null: false  
primary key: true  
auto increment: false
```

(This function may load one or more schemas from database files. If an error occurs during this process, or if the requested table or column cannot be found, an error code is returned and an error message left in the database connection (to be retrieved using ErrorMessage).)

This API is only available if the library was compiled with the SQLITE_ENABLE_COLUMN_METADATA C-preprocessor symbol defined.

5.26.20 Threadsafe as Integer

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Test To See If The Library Is Threadsafe.

Notes: The threadsafe() function returns zero if and only if SQLite was compiled mutexing code omitted due to the SQLITE_THREADSAFE compile-time option being set to 0.

SQLite can be compiled with or without mutexes. When the SQLITE_THREADSAFE C preprocessor macro is 1 or 2, mutexes are enabled and SQLite is threadsafe. When the SQLITE_THREADSAFE macro is 0, the mutexes are omitted. Without the mutexes, it is not safe to use SQLite concurrently from more than one thread.

Enabling mutexes incurs a measurable performance penalty. So if speed is of utmost importance, it makes sense to disable the mutexes. But for maximum safety, mutexes should be enabled. The default behavior is for mutexes to be enabled.

This interface can be used by an application to make sure that the version of SQLite that it is linking against was compiled with the desired setting of the SQLITE_THREADSAFE macro.

This interface only reports on the compile-time mutex setting of the SQLITE_THREADSAFE flag. If SQLite

is compiled with `SQLITE_THREADSAFE=1` or `=2` then mutexes are enabled by default but can be fully or partially disabled using a call to `sqlite3_config()` with the verbs `SQLITE_CONFIG_SINGLETHREAD`, `SQLITE_CONFIG_MULTITHREAD`, or `SQLITE_CONFIG_MUTEX`. (The return value of the `sqlite3_threadsafe()` function shows only the compile-time setting of thread safety, not any run-time changes to that setting made by `sqlite3_config()`. In other words, the return value from `sqlite3_threadsafe()` is unchanged by calls to `sqlite3_config()`.)

See the threading mode documentation for additional information.

5.26.21 Properties

5.26.22 ConnectionHandle as Ptr

Plugin Version: 22.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the current connection reference for the database.

Notes: `sqlite3` pointer for using in declares.

(Read only property)

5.26.23 MemoryHighwater as Int64

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries maximum memory usage so far.

Notes: Can be reset with `reset` parameter.

(Read only property)

See also:

- 5.26.14 `MemoryHighwater(reset as boolean)` as `Int64`

5.26.24 MemoryUsed as Int64

Plugin Version: 17.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Queries memory in use by SQLite.

Notes: This is memory allocated, but not yet freed.

Value is zero until SQLite3 initialized.

(Read only property)

5.26.25 Version as string

Plugin Version: 9.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The version string of the SQLite library.

Notes: (Read only property)

5.26.26 VersionNumber as Integer

Plugin Version: 9.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: The version number of the SQLite library.

Notes: (Read only property)

5.26.27 Constants

Error Codes

Constant	Value	Description
kErrorAbort	4	Callback routine requested an abort.
kErrorAuth	23	Authorization denied
kErrorBusy	5	The database file is locked.
kErrorCantopen	14	Unable to open the database file.
kErrorConstraint	19	Abort due to constraint violation.
kErrorCorrupt	11	The database disk image is malformed.
kErrorDone	101	sqlite3_step() has finished executing.
kErrorEmpty	16	Database is empty
kErrorError	1	SQL error or missing database.
kErrorFormat	24	Auxiliary database format error.
kErrorFull	13	Insertion failed because database is full.
kErrorInternal	2	Internal logic error in SQLite
kErrorInterrupt	9	Operation terminated by sqlite3_interrupt().
kErrorIoerr	10	Some kind of disk I/O error occurred.
kErrorLocked	6	A table in the database is locked.
kErrorMismatch	20	Data type mismatch.
kErrorMisuse	21	Library used incorrectly.
kErrorNolfs	22	Uses OS features not supported on host.
kErrorNoMem	7	Out of memory.
kErrorNotaDB	26	File opened that is not a database file.
kErrorNotFound	12	NOT USED. Table or record not found.
kErrorOk	0	Successful result
kErrorPerm	3	Access permission denied.
kErrorProtocol	15	NOT USED. Database lock protocol error.
kErrorRange	25	2nd parameter to sqlite3_bind out of range.
kErrorReadOnly	8	Attempt to write a readonly database.
kErrorRow	100	sqlite3_step() has another row ready.
kErrorSchema	17	The database schema changed.
kErrorToobig	18	String or BLOB exceeds size limit.

5.27 class SQLiteFunctionMBS

5.27.1 class SQLiteFunctionMBS

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The class for a custom SQLite function implemented in Xojo.

Example:

```
// Create a custom function with a handler function:
Dim f As New SQLiteFunctionMBS
f.name = "SHA256"
f.ArgumentCount = 1
f.Flags = f.kFlagDeterministic OR f.kFlagUTF8 OR f.kFlagInnocuous
// Text encoding UTF8, function is deterministic and can be cached, function is innocuous as it depends
only on parameters
AddHandler f.Perform, AddressOf PerformSHA256
functions.Append f // keep reference
```

Notes: You can use this with our InternalSQLiteLibraryMBS module and the SQL classes within MBS Plugin to work on SQLite databases and as extension for SQLiteDatabase in Xojo.

Blog Entries

- [Did you know that you can load extensions in SQLite?](#)
- [MBS Xojo Plugins, version 24.1pr1](#)

5.27.2 Methods

5.27.3 Constructor

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The constructor.

Example:

```
Dim f As New SQLiteFunctionMBS
f.name = "SHA256"
```

Notes: Please keep a reference to the function in a global array to avoid it being destroyed.

5.27.4 Destructor

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The destructor.

5.27.5 ResultBlob(data as MemoryBlock)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns a BLOB value to SQLite.

Notes: We have three variants, so you can pass string, MemoryBlock or ptr.
See also:

- 5.27.6 ResultBlob(data as ptr, size as Integer) 203
- 5.27.7 ResultBlob(text as string) 203

5.27.6 ResultBlob(data as ptr, size as Integer)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns a BLOB value to SQLite.

Notes: We have three variants, so you can pass string, MemoryBlock or ptr.
See also:

- 5.27.5 ResultBlob(data as MemoryBlock) 203
- 5.27.7 ResultBlob(text as string) 203

5.27.7 ResultBlob(text as string)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns a BLOB value to SQLite.

Example:

```
me.ResultBlob "Hello World"
```

Notes: We have three variants, so you can pass string, MemoryBlock or ptr.
See also:

- 5.27.5 ResultBlob(data as MemoryBlock) 203
- 5.27.6 ResultBlob(data as ptr, size as Integer) 203

5.27.8 ResultDouble(value as Double)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns a double value back to SQLite.

Example:

```
Sub Perform(ArgumentCount as Integer, Arguments() as Variant) Handles Perform
#Pragma BackgroundTasks False
#Pragma BoundsChecking False
#Pragma StackOverflowChecking False

// square function
dim a as double = arguments(0).DoubleValue
ResultDouble a * a

End Sub
```

5.27.9 ResultError(ErrorMessage as string)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns an error message for the function call.

Example:

```
Sub Perform(ArgumentCount as Integer, Arguments() as Variant) Handles Perform
#Pragma BackgroundTasks False
#Pragma BoundsChecking False
#Pragma StackOverflowChecking False

dim v as string = arguments(0)
if v.length = 0 then
ResultError "Please pass text"
ResultErrorCode 12345 // custom error code
else
ResultText v + v
end if
End Sub
```

Notes: Sets error code to 1. Use ResultErrorCode to change this.

5.27.10 ResultErrorCode(ErrorCode as Integer)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Sets error code for the function call.

5.27.11 ResultInteger(value as Integer)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns an integer value back to SQLite.

Example:

```
Sub Perform(ArgumentCount as Integer, Arguments() as Variant) Handles Perform
#Pragma BackgroundTasks False
#Pragma BoundsChecking False
#Pragma StackOverflowChecking False

// square function
dim a as Integer = arguments(0).IntegerValue
ResultInteger a * a

End Sub
```

5.27.12 ResultNull

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns a null value back to SQLite.

Example:

```
Sub Perform(ArgumentCount as Integer, Arguments() as Variant) Handles Perform
#Pragma BackgroundTasks False
#Pragma BoundsChecking False
#Pragma StackOverflowChecking False

// return NULL value
ResultNull

End Sub
```

5.27.13 ResultText(text as string)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns a string value back to SQLite.

Example:

```
Sub Perform(ArgumentCount as Integer, Arguments() as Variant) Handles Perform
#Pragma BackgroundTasks False
#Pragma BoundsChecking False
```

```
#Pragma StackOverflowChecking False
```

```
ResultText "Hello World"
```

```
End Sub
```

5.27.14 ResultZeroBlob(Length as Integer)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Returns a zero filled BLOB value back to SQLite.

5.27.15 Properties

5.27.16 ArgumentCount as Integer

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The number of arguments expected for this function.

Notes: Pass 0 to 127 for number of arguments or -1 for variable number of arguments.
(Read and Write property)

5.27.17 CallCounter as Integer

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The number of times the function was called.

Notes: (Read only property)

5.27.18 DatabaseCount as Integer

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The number of times the function was registered to a database connection.

Notes: (Read only property)

5.27.19 Enabled as Boolean

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: Whether this function is enabled.

Notes: The value is checked when connecting to a new SQLite database.
Defaults to true.

(Read and Write property)

5.27.20 Flags as Integer

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The flags for the function.

Example:

```
Dim f As New SQLiteFunctionMBS
```

```
f.Flags = f.kFlagDeterministic OR f.kFlagUTF8 OR f.kFlagInnocuous
// Text encoding UTF8, function is deterministic and can be cached, function is innocuous as it depends
only on parameters
```

Notes: See kFlag* constants.

(Read and Write property)

5.27.21 Name as String

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: All.

Function: The name of the function.

Notes: (Read and Write property)

5.27.22 Events

5.27.23 Perform(ArgumentCount as Integer, Arguments() as Variant)

Plugin Version: 24.1, Platforms: macOS, Linux, Windows, iOS, Targets: .

Function: The event called to perform the function.

Example:

```
Sub Perform(ArgumentCount as Integer, Arguments() as Variant) Handles Perform
#Pragma BackgroundTasks False
#Pragma BoundsChecking False
#Pragma StackOverflowChecking False
```

```
ResultText "Hello World"
```

End Sub

Notes: ArgumentCount is the number of arguments passed in the array. Arguments contains values, which may be nil, double, integer, string, Memoryblock for BLOB.

Please use #pragmas like in the sample project to disable stack checking and background tasks for best performance. Also catch all exceptions that may happen to prevent trouble.

Call one of the result functions to return the result.

5.27.24 Constants

Flags

Constant	Value	Description
kFlagDeterministic	&h800	The function always gives the same output when the input parameters are the same.
kFlagDirectOnly	&h80000	The function may only be invoked from top-level SQL, and cannot be used in VIEWS or TRIGGERS nor in schema structures.
kFlagInnocuous	&h200000	The function is unlikely to cause problems even if misused. An innocuous function should have no side effects and should not depend on any values other than its input parameters.
kFlagUTF8	1	Specifies text encoding to be UTF-8.

5.28 class SQLLongBinaryMBS

5.28.1 class SQLLongBinaryMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: A class for a long binary object.

Notes: Basically this is a SQLStringMBS which is always marked to contain binary data. You only need this class to use the constructor with dataprovider to stream data to the database.

Subclass of the SQLLongOrLobMBS class.

Blog Entries

- [MBS Real Studio Plugins, version 12.4pr1](#)

5.28.2 Methods

5.28.3 Constructor

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

See also:

- 5.28.4 Constructor(Data as MemoryBlock) 209
- 5.28.5 Constructor(data as SQLStringMBS) 210
- 5.28.6 Constructor(Data as string, isText as Boolean = True) 210
- 5.28.7 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 210

5.28.4 Constructor(Data as MemoryBlock)

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data, e.g. for blob.

See also:

- 5.28.3 Constructor 209
- 5.28.5 Constructor(data as SQLStringMBS) 210
- 5.28.6 Constructor(Data as string, isText as Boolean = True) 210
- 5.28.7 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 210

5.28.5 Constructor(data as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new long binary object from a string object.

See also:

- 5.28.3 Constructor 209
- 5.28.4 Constructor(Data as MemoryBlock) 209
- 5.28.6 Constructor(Data as string, isText as Boolean = True) 210
- 5.28.7 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 210

5.28.6 Constructor(Data as string, isText as Boolean = True)

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data or text copied from the data string.

Notes: If isText is true, the data is interpreted as text and string encoding conversion may modify it. If isText is false the bytes are copied raw.

See also:

- 5.28.3 Constructor 209
- 5.28.4 Constructor(Data as MemoryBlock) 209
- 5.28.5 Constructor(data as SQLStringMBS) 210
- 5.28.7 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 210

5.28.7 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new long binary object from a data provider.

Notes: The blocksize specifies in which sizes data is requested from the provider.

You must make sure that the data provider and this new blob object life long enough. Because the actual data is requested later when you do the update on the database.

If BlockSize is 0, the default block size is used.

See also:

- 5.28.3 Constructor 209
- 5.28.4 Constructor(Data as MemoryBlock) 209
- 5.28.5 Constructor(data as SQLStringMBS) 210
- 5.28.6 Constructor(Data as string, isText as Boolean = True) 210

5.29 class SQLLongCharMBS

5.29.1 class SQLLongCharMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: A class for the long character data type.

Notes: Basically this is a SQLStringMBS which is always marked to contain text. You only need this class to use the constructor with dataprovider to stream data to the database.

Subclass of the SQLLongOrLobMBS class.

Blog Entries

- [MBS Real Studio Plugins, version 12.4pr1](#)

5.29.2 Methods

5.29.3 Constructor

Plugin Version: 12.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

See also:

- 5.29.4 Constructor(data as SQLStringMBS) 211
- 5.29.5 Constructor(Data as string, isText as boolean=true) 211
- 5.29.6 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 212

5.29.4 Constructor(data as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new long character object from a string object.

See also:

- 5.29.3 Constructor 211
- 5.29.5 Constructor(Data as string, isText as boolean=true) 211
- 5.29.6 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 212

5.29.5 Constructor(Data as string, isText as boolean=true)

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data or text copied from the data string.

Notes: If `isText` is true, the data is interpreted as text and string encoding conversion may modify it. If `isText` is false the bytes are copied raw.

See also:

- 5.29.3 Constructor 211
- 5.29.4 Constructor(data as SQLStringMBS) 211
- 5.29.6 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32) 212

5.29.6 Constructor(dataProvider as SQLDataProviderMBS, BlockSize as UInt32)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new long character object from a data provider.

Notes: The blocksize specifies in which sizes data is requested from the provider.

You must make sure that the data provider and this new long character object life long enough. Because the actual data is requested later when you do the update on the database.

If `BlockSize` is 0, the default block size is used.

See also:

- 5.29.3 Constructor 211
- 5.29.4 Constructor(data as SQLStringMBS) 211
- 5.29.5 Constructor(Data as string, isText as boolean=true) 211

5.30 class SQLLongOrLobMBS

5.30.1 class SQLLongOrLobMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The super class for Long Binary/Text and BLOB/CLOB classes.

Notes: Subclass of the SQLStringMBS class.

5.31 class SQLNotInitializedExceptionMBS

5.31.1 class SQLNotInitializedExceptionMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The exception raised if you call a method on an object which was not properly initialized.

Notes: Subclass of the RuntimeException class.

Blog Entries

- [MBS Xojo Plugins, version 19.2pr1](#)

5.32 class SQLNullMBS

5.32.1 class SQLNullMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class used internally for null values.

5.33 class SQLNumericMBS

5.33.1 class SQLNumericMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for numeric values.

Notes: see also

https://www.sqlapi.com/ApiDoc/class_s_a_numeric.html

Blog Entries

- [MBS Xojo Plugins, version 23.4pr6](#)
- [MBS Xojo Plugins, version 23.3pr7](#)
- [MBS Xojo Plugins, version 17.2pr4](#)
- [MBS Xojo / Real Studio Plugins, version 16.5pr9](#)
- [MBS Xojo / Real Studio plug-ins in version 14.2](#)
- [MBS Xojo / Real Studio Plugins, version 14.2pr1](#)

Xojo Developer Magazine

- [12.4, page 9: News](#)

5.33.2 Methods

5.33.3 Constructor

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates an empty numeric object.

See also:

- [5.33.4 Constructor\(value as Double\)](#) 216
- [5.33.5 Constructor\(value as string\)](#) 217

5.33.4 Constructor(value as Double)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new numeric object based on the given double value.

See also:

- [5.33.3 Constructor](#) 216
- [5.33.5 Constructor\(value as string\)](#) 217

5.33.5 Constructor(value as string)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new numeric object based on the given string.

See also:

- 5.33.3 Constructor 216
- 5.33.4 Constructor(value as Double) 216

5.33.6 NumericWithCurrency(value as Currency) as SQLNumericMBS

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

Function: Creates a new numeric value object with given currency value.

Example:

```
// test code for currency
dim c1 as Currency = 12345678.
dim c2 as Currency = 1234567.8
dim c3 as Currency = 123456.78
dim c4 as Currency = 12345.678
dim c5 as Currency = 1234.5678
dim c6 as Currency = 123.45678

dim n1 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c1)
dim n2 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c2)
dim n3 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c3)
dim n4 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c4)
dim n5 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c5)
dim n6 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c6)

dim s1 as string = n1.StringValue
dim s2 as string = n2.StringValue
dim s3 as string = n3.StringValue
dim s4 as string = n4.StringValue
dim s5 as string = n5.StringValue
dim s6 as string = n6.StringValue

dim d1 as Double = n1.DoubleValue
dim d2 as Double = n2.DoubleValue
dim d3 as Double = n3.DoubleValue
dim d4 as Double = n4.DoubleValue
dim d5 as Double = n5.DoubleValue
dim d6 as Double = n6.DoubleValue

dim x1 as Currency = n1.CurrencyValue
```

```

dim x2 as Currency = n2.CurrencyValue
dim x3 as Currency = n3.CurrencyValue
dim x4 as Currency = n4.CurrencyValue
dim x5 as Currency = n5.CurrencyValue
dim x6 as Currency = n6.CurrencyValue

// check for errors
if x1<>c1 then break
if x2<>c2 then break
if x3<>c3 then break
if x4<>c4 then break
if x5<>c5 then break
if x6<>c6 then break

if x1*10000 <>round(d1 * 10000) then Break
if x2*10000 <>round(d2 * 10000) then Break
if x3*10000 <>round(d3 * 10000) then Break
if x4*10000 <>round(d4 * 10000) then Break
if x5*10000 <>round(d5 * 10000) then Break
if x6*10000 <>round(d6 * 10000) then Break

Break // if no break before, it's okay.

```

5.33.7 NumericWithDouble(value as Double) as SQLNumericMBS

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

Function: Creates a new number with the given double value.

5.33.8 NumericWithInt64(value as Int64) as SQLNumericMBS

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

Function: Creates a new number with the given Int64 value.

5.33.9 NumericWithString(value as string) as SQLNumericMBS

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

Function: Creates a new number with the given string value.

Notes: If string is empty, we return a number with zero as value.

5.33.10 NumericWithUInt64(value as UInt64) as SQLNumericMBS

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

Function: Creates a new number with the given unsigned integer value.

5.33.11 Properties**5.33.12 CurrencyValue as Currency**

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

Function: The currency value.

Example:

```
// test code for currency
dim c1 as Currency = 12345678.
dim c2 as Currency = 1234567.8
dim c3 as Currency = 123456.78
dim c4 as Currency = 12345.678
dim c5 as Currency = 1234.5678
dim c6 as Currency = 123.45678

dim n1 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c1)
dim n2 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c2)
dim n3 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c3)
dim n4 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c4)
dim n5 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c5)
dim n6 as SQLNumericMBS = SQLNumericMBS.NumericWithCurrency(c6)

dim s1 as string = n1.StringValue
dim s2 as string = n2.StringValue
dim s3 as string = n3.StringValue
dim s4 as string = n4.StringValue
dim s5 as string = n5.StringValue
dim s6 as string = n6.StringValue

dim d1 as Double = n1.DoubleValue
dim d2 as Double = n2.DoubleValue
dim d3 as Double = n3.DoubleValue
dim d4 as Double = n4.DoubleValue
dim d5 as Double = n5.DoubleValue
dim d6 as Double = n6.DoubleValue

dim x1 as Currency = n1.CurrencyValue
dim x2 as Currency = n2.CurrencyValue
dim x3 as Currency = n3.CurrencyValue
```

```

dim x4 as Currency = n4.CurrencyValue
dim x5 as Currency = n5.CurrencyValue
dim x6 as Currency = n6.CurrencyValue

// check for errors
if x1<>c1 then break
if x2<>c2 then break
if x3<>c3 then break
if x4<>c4 then break
if x5<>c5 then break
if x6<>c6 then break

if x1*10000 <>round(d1 * 10000) then Break
if x2*10000 <>round(d2 * 10000) then Break
if x3*10000 <>round(d3 * 10000) then Break
if x4*10000 <>round(d4 * 10000) then Break
if x5*10000 <>round(d5 * 10000) then Break
if x6*10000 <>round(d6 * 10000) then Break

Break // if no break before, it's okay.

```

Notes: (Read and Write property)

5.33.13 DoubleValue as Double

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The double value for this number.

Notes: (Read and Write property)

5.33.14 Int64Value as Int64

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number value as an int64.

Notes: (Read and Write property)

5.33.15 precision as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The maximum number of digits in base 10.

Notes: (Read only property)

5.33.16 scale as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number of digits to the right of the decimal point.

Notes: (Read only property)

5.33.17 sign as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The sign: 1 for positive numbers, 0 for negative numbers.

Notes: (Read only property)

5.33.18 StringValue as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The string value of this number.

Notes: (Read and Write property)

5.33.19 UInt64Value as UInt64

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The number value as an uint64.

Notes: (Read and Write property)

5.34 class SQLParamMBS

5.34.1 class SQLParamMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The SQL class for parameters.

Notes: see also

https://www.sqlapi.com/ApiDoc/class_s_a_param.html

Subclass of the SQLValueMBS class.

Blog Entries

- [MBS SQL Plugin Tips and Tricks](#)
- [MBS Xojo Plugins, version 20.3pr3](#)
- [MBS Xojo Plugins, version 19.5pr4](#)
- [MBS Xojo Plugins, version 19.2pr1](#)
- [MBS Xojo Plugins, version 18.4pr10](#)
- [MBS Xojo / Real Studio Plugins, version 16.4pr5](#)
- [Upcoming Changes for our SQL Plugin](#)

5.34.2 Methods

5.34.3 ReadLongOrLob(toConsumer as SQLDataConsumerMBS, BlockSize as Integer)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The Long or Lob data reading mode.

Notes: SQLAPI++ Library provides two ways to read Long or BLOB(CLOB) object's value (usually SQL-Field or SQLParam objects):

1. reading of Long or Lob data at once into an internal buffer (like ordinary string or binary values);
2. piecewise reading of Long or Lob data using user defined callback.

kLongOrLobReaderDefault reading mode used by default.

If you want to control piecewise reading of Long or BLOB(CLOB) data you should set LongOrLobReaderMode and use kLongOrLobReaderManual reading mode for Long or BLOB(CLOB) parameters or fields you want to process with your data consumer. After that each fetch will skip reading Long and BLOB(CLOB) parameters that you set to be read manually. To read field or parameter defined to be read manually you should call ReadLongOrLob method for each of them after the fetch. ReadLongOrLob method will repeatedly call the data consumer Write event.

See also:

5.34. CLASS SQLPARAMMBS	223
• 5.34.4 ReadLongOrLob(toFile as FolderItem)	223
• 5.34.5 ReadLongOrLob(toStream as Writeable)	223

5.34.4 ReadLongOrLob(toFile as FolderItem)

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

Function: Starts reading of Long or BLOB(CLOB) value to the given file.

Example:

```
dim cmd as SQLCommandMBS // your command
dim f as FolderItem = SpecialFolder.Desktop.Child("test.jpg")
dim Param as SQLParamMBS = cmd.Param("image")
// read blob content to binarystream
Param.ReadLongOrLob(f)
```

Notes: May raise IOExceptions if things go wrong.

See also:

- 5.34.3 ReadLongOrLob(toConsumer as SQLDataConsumerMBS, BlockSize as Integer) 222
- 5.34.5 ReadLongOrLob(toStream as Writeable) 223

5.34.5 ReadLongOrLob(toStream as Writeable)

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

Function: Starts reading of Long or BLOB(CLOB) value to the given writeable stream.

Example:

```
dim cmd as SQLCommandMBS // your command
dim f as FolderItem = SpecialFolder.Desktop.Child("test.jpg")
dim b as BinaryStream = BinaryStream.Create(f, true)
dim param as SQLParamMBS = cmd.param("image")
// read blob content to binarystream
param.ReadLongOrLob(b)
```

Notes: This allows you to read in chunks the data to a stream, e.g. binarystream, textoutputstream or socket.

See also:

- 5.34.3 ReadLongOrLob(toConsumer as SQLDataConsumerMBS, BlockSize as Integer) 222
- 5.34.4 ReadLongOrLob(toFile as FolderItem) 223

5.34.6 Properties

5.34.7 DirType as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The direction type of parameter (input, output, etc.).

Notes: Use the kParamDirType* constants.

Usually the Library automatically detects parameter's direction type and implicitly creates an appropriate SAParam object. But not all of DBMS clients/servers provide complete parameters information. In that situation programmer need to describe parameter's direction type explicitly. See Server specific notes for details.

https://www.sqlapi.com/ApiDoc/class_s_a_param.html

(Read and Write property)

5.34.8 IsInput as Boolean

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

Function: Whether this is an input paramater.

Notes: Checks ParamType property internally.

(Read only property)

5.34.9 IsOutput as Boolean

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

Function: Whether this is an output paramater.

Notes: Checks ParamType property internally.

(Read only property)

5.34.10 Name as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The name of the parameter.

Notes: (Read only property)

5.34.11 NativeType as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The native type code of the parameter.

Notes: (Read and Write property)

5.34.12 Options as Dictionary

Plugin Version: 18.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a dictionary with all options.

Notes: For debugging, it may be useful to inspect options in debugger.
(Read only property)

5.34.13 Precision as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The precision of the parameter value (the total number of allowable digits).

Notes: (Read and Write property)

5.34.14 Scale as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The scale of the parameter value (the number of digits to the right of the decimal point).

Notes: (Read and Write property)

5.34.15 Size as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The parameter's data size.

Notes: (Read and Write property)

5.34.16 Type as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The parameter's data type.

Notes: See the `kDataType` constants.
(Read and Write property)

5.34.17 `Option(name as string) as string`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The string value of a specific parameter option.

Notes: see also:

https://www.sqlapi.com/ApiDoc/class_s_a_param.html

(Read and Write computed property)

5.34.18 Constants

Constants

Constant	Value	Description
<code>kParamDirTypeInput</code>	0	One of the parameter direction type constants. Input parameter.
<code>kParamDirTypeInputOutput</code>	1	One of the parameter direction type constants. Input/output parameter.
<code>kParamDirTypeOutput</code>	2	One of the parameter direction type constants. Output parameter.
<code>kParamDirTypeReturn</code>	3	One of the parameter direction type constants. Returning parameter.

5.35 class SQLPositionMBS

5.35.1 class SQLPositionMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for a position value.

5.35.2 Methods

5.35.3 Constructor(withID as Integer)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new Position value with an ID.

See also:

- 5.35.4 Constructor(withName as string)

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5.35.4 Constructor(withName as string)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new Position value with a name.

See also:

- 5.35.3 Constructor(withID as Integer)

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5.36 class SQLPreparedStatementMBS

5.36.1 class SQLPreparedStatementMBS

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for prepared statements if you work with SQLDatabaseMBS class.

Notes: If you work with SQLCommandMBS class, you can set parameters there directly.

For the SQL string you number parameters with colon and number. Like this: :1, :2, :3.

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

Blog Entries

- [Load PDF from MS SQL Server and display it](#)
- [MBS SQL Plugin Tips and Tricks](#)
- [RowSet in MBS Xojo SQL Plugin](#)
- [MBS Plugins updated for Xojo 2019r2.1](#)
- [Problems with killing Xojo threads with plugin calls.](#)
- [MBS Releases the MBS Xojo / Real Studio plug-ins in version 16.4](#)
- [MBS Xojo / Real Studio plug-ins in version 16.3](#)
- [MonkeyBread Software Releases the MBS Xojo / Real Studio plug-ins in version 14.1](#)
- [SQLPreparedStatementMBS improvements](#)
- [Release notes for SQL or ChartDirector?](#)

Videos

- [MBS SQL Plugin Presentation](#)

Xojo Developer Magazine

- [14.1, page 30: The MBS SQL Plugin, An alternative way to connect to databases by Christian Schmitz](#)
- [12.3, page 10: News](#)

Interfaces: PreparedStatement

5.36.2 Methods

5.36.3 Bind(name As String, value as Variant)

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

Function: Defines the value for one parameter.

Example:

```
dim db as SQLDatabaseMBS // your db connection
dim sql as string = "Insert into test_tbl(fid, fvarchar20) values(:fid, :fvarchar20)"
dim v as Variant = db.Prepare(sql)
dim p as SQLPreparedStatementMBS = v

p.BindType("fid", SQLPreparedStatementMBS.kTypeLong)
p.BindType("fvarchar20", SQLPreparedStatementMBS.kTypeString)
p.Bind("fid", 2345)
p.Bind("fvarchar20", "Hello World by name")

p.SQLExecute
```

Notes: Version 16.4 and newer allow you to bind BLOB fields using a Memoryblock or a String value. Older versions only accepted string.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

See also:

- 5.36.4 Bind(name As String, value as Variant, type as Integer) 229
- 5.36.5 Bind(Values as Dictionary) 230
- 5.36.6 Bind(values() as Variant) 231
- 5.36.7 Bind(zeroBasedIndex as Integer, value as Variant) 232
- 5.36.8 Bind(zeroBasedIndex as Integer, value as Variant, type as Integer) 233

5.36.4 Bind(name As String, value as Variant, type as Integer)

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

Function: Defines one parameter with value and type.

Example:

```
dim db as SQLiteDatabaseMBS // your db connection
dim sql as string = "Insert into test_tbl(fid, fvarchar20) values(:fid, :fvarchar20)"
dim v as Variant = db.Prepare(sql)
dim p as SQLPreparedStatementMBS = v

p.Bind("fid", 2345, SQLPreparedStatementMBS.kTypeLong)
p.Bind("fvarchar20", "Hello World by name", SQLPreparedStatementMBS.kTypeString)

p.SQLExecute
```

Notes: Version 16.4 and newer allow you to bind BLOB fields using a Memoryblock or a String value. Older versions only accepted string.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

With plugin version 16.4 and newer binding type is optional. In that case the type is determined from the value type.

See also:

- 5.36.3 Bind(name As String, value as Variant) 229
- 5.36.5 Bind(Values as Dictionary) 230
- 5.36.6 Bind(values() as Variant) 231
- 5.36.7 Bind(zeroBasedIndex as Integer, value as Variant) 232
- 5.36.8 Bind(zeroBasedIndex as Integer, value as Variant, type as Integer) 233

5.36.5 Bind(Values as Dictionary)

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

Function: Sets the parameters based on the keys and values in the dictionary.

Example:

```
dim db as SQLiteDatabaseMBS // your database
dim pic as Picture // some picture
```

```

dim jpegData as MemoryBlock = pic.GetData(Picture.FormatJPEG, 80)

// get an insert command
dim sql as string = "Insert into BlobTest(name, image) values (:name, :image)"
dim p as SQLPreparedStatementMBS = db.Prepare(sql)

// put parameter values in a dictionary
dim d as new Dictionary

// by param index
d.Value(0) = "logo.jpg"
// by param name
d.Value("image") = jpegData

// bind values and run it
p.Bind(d)
p.SQLExecute

```

Notes: The dictionary is saved to fill parameters later.

Keys can be String, Text or numeric types. Text and String are used to pick parameters by name. Numeric values are used to pick parameter by index (zero based).

MemoryBlock and Strings without text encoding are converted to byte values (BLOB).

Texts and Strings with encoding are converted to text values.

Raises exceptions if you pass anything which is not recognized.

Other types are translated as good as possible.

See also:

- 5.36.3 Bind(name As String, value as Variant) 229
- 5.36.4 Bind(name As String, value as Variant, type as Integer) 229
- 5.36.6 Bind(values() as Variant) 231
- 5.36.7 Bind(zeroBasedIndex as Integer, value as Variant) 232
- 5.36.8 Bind(zeroBasedIndex as Integer, value as Variant, type as Integer) 233

5.36.6 Bind(values() as Variant)

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets the value list with the given values.

Notes: You can either pass values to the SQLExecute/SQLSelect method or call Bind methods to set values. You have to define for each parameter both the type and the value.

Version 16.4 and newer allow you to bind BLOB fields using a Memoryblock or a String value. Older versions only accepted string.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

See also:

- 5.36.3 Bind(name As String, value as Variant) 229
- 5.36.4 Bind(name As String, value as Variant, type as Integer) 229
- 5.36.5 Bind(Values as Dictionary) 230
- 5.36.7 Bind(zeroBasedIndex as Integer, value as Variant) 232
- 5.36.8 Bind(zeroBasedIndex as Integer, value as Variant, type as Integer) 233

5.36.7 Bind(zeroBasedIndex as Integer, value as Variant)

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Defines the value for one parameter.

Notes: You can either pass values to the SQLExecute/SQLSelect method or call Bind methods to set values. You have to define for each parameter both the type and the value.

Version 16.4 and newer allow you to bind BLOB fields using a Memoryblock or a String value. Older versions only accepted string.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

Raises OutOfBoundsException exception if index parameter is out of range.

See also:

- 5.36.3 Bind(name As String, value as Variant) 229
- 5.36.4 Bind(name As String, value as Variant, type as Integer) 229

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5.36.8 Bind(zeroBasedIndex as Integer, value as Variant, type as Integer)

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Defines one parameter with value and type.

Notes: You can either pass values to the `SQLExecute/SQLSelect` method or call `Bind` methods to set values. You have to define for each parameter both the type and the value.

Version 16.4 and newer allow you to bind BLOB fields using a `MemoryBlock` or a `String` value. Older versions only accepted string.

When passing variant for value, `MemoryBlock` and `Strings` without text encoding are converted to byte values (BLOB). `Texts` and `Strings` with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

With plugin version 16.4 and newer binding type is optional. In that case the type is determined from the value type.

With version 19.0 or later, you can pass `folderitem` to stream blob from file. This may raise exception if file can't be opened.

Raises `OutOfBoundsException` exception if index parameter is out of range.
See also:

• 5.36.3 Bind(name As String, value as Variant)	229
• 5.36.4 Bind(name As String, value as Variant, type as Integer)	229
• 5.36.5 Bind(Values as Dictionary)	230
• 5.36.6 Bind(values() as Variant)	231
• 5.36.7 Bind(zeroBasedIndex as Integer, value as Variant)	232

5.36.9 BindType(name As String, type as Integer)

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

Function: Defines the type of one value.

Example:

```

dim db as SQLDatabaseMBS // your db connection
dim sql as string = "Insert into test_tbl(fid, fvarchar20) values(:fid, :fvarchar20)"
dim v as Variant = db.Prepare(sql)
dim p as SQLPreparedStatementMBS = v

p.BindType("fid", SQLPreparedStatementMBS.kTypeLong)
p.BindType("fvarchar20", SQLPreparedStatementMBS.kTypeString)
p.Bind("fid", 2345)
p.Bind("fvarchar20", "Hello World by name")

p.SQLExecute

```

Notes: With plugin version 16.4 and newer binding type is optional. In that case the type is determined from the value type.

See also:

- 5.36.10 BindType(types() as Integer) 234
- 5.36.11 BindType(zeroBasedIndex as Integer, type as Integer) 234

5.36.10 BindType(types() as Integer)

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Defines the types for all values.

Notes: You can either pass values to the SQLExecute/SQLSelect method or call Bind methods to set values. You have to define for each parameter both the type and the value.

With plugin version 16.4 and newer binding type is optional. In that case the type is determined from the value type.

See also:

- 5.36.9 BindType(name As String, type as Integer) 233
- 5.36.11 BindType(zeroBasedIndex as Integer, type as Integer) 234

5.36.11 BindType(zeroBasedIndex as Integer, type as Integer)

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Defines the type of one value.

Notes: You can either pass values to the SQLExecute/SQLSelect method or call Bind methods to set values. You have to define for each parameter both the type and the value.

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With plugin version 16.4 and newer binding type is optional. In that case the type is determined from the value type.

See also:

- 5.36.9 BindType(name As String, type as Integer) 233
- 5.36.10 BindType(types() as Integer) 234

5.36.12 Clear

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

Function: Clears all parameters for reusing the SQL Prepared statement.

5.36.13 Constructor

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: The private constructor.

Notes: This constructor makes sure you don't create useless SQLPreparedStatementMBS objects by error. The only way to create an object is to use the prepare method in the database class.

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.

5.36.14 ExecuteSQL(ParamArray bindItems As Variant)

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the SQL command with the given parameters.

Notes: You can decide whether you pass values here or call Bind methods.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

If bindItems is not nil, we bind parameters using it.

If you like to pass an array of variant for the values, please pass this to Bind() and no parameters here. Otherwise passing an array here would create a variant array with your array as content.

This version of the function raises always exceptions, while `SQLExecute` only if you set `RaiseException` property to true.

5.36.15 `ExecuteSQLMT(ParamArray bindItems As Variant)`

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the SQL command with the given parameters.

Notes: You can decide whether you pass values here or call `Bind` methods.

When passing variant for value, `MemoryBlock` and `Strings` without text encoding are converted to byte values (BLOB). Texts and `Strings` with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

If `bindItems` is not nil, we bind parameters using it.

With version 19.0 or later, you can pass `folderitem` to stream blob from file. This may raise exception if file can't be opened.

This version of the function raises always exceptions, while `SQLExecuteMT` only if you set `RaiseException` property to true.

If you like to pass an array of variant for the values, please pass this to `Bind()` and no parameters here. Otherwise passing an array here would create a variant array with your array as content.

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.

5.36.16 `SelectSQL(ParamArray bindItems As Variant) As RowSet`

Plugin Version: 19.4, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the query with the given parameters.

Notes: Returns the `RowSet` object or nil on error.

You can decide whether you pass values here or call `Bind` methods.

For this method to work, you need to have somewhere a property with `SQLDatabaseMBS` so Xojo includes our `SQLDatabase` plugin which provides the `RecordSet` functionality.

The record set may not have a valid RecordCount or have working movefirst/movelast/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

If bindItems is not nil, we bind parameters using it.

If you like to pass an array of variant for the values, please pass this to Bind() and no parameters here. Otherwise passing an array here would create a variant array with your array as content.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

This version of the function raises always exceptions, while SQLSelect only if you set RaiseException property to true.

5.36.17 SelectSQLMT(ParamArray bindItems As Variant) As Rowset

Plugin Version: 19.5, Platforms: macOS, Linux, Windows, Targets: All.

Function:

Returns the RowSet object or nil on error.

You can decide whether you pass values here or call Bind methods.

For this method to work, you need to have somewhere a property with SQLDatabaseMBS so Xojo includes our SQLDatabase plugin which provides the RecordSet functionality.

The record set may not have a valid RecordCount or have working movefirst/movelast/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

If bindItems is not nil, we bind parameters using it.

If you like to pass an array of variant for the values, please pass this to Bind() and no parameters here. Otherwise passing an array here would create a variant array with your array as content.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

This version of the function raises always exceptions, while SQLSelectMT only if you set RaiseException property to true.

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.

5.36.18 SQLExecute(ParamArray bindItems as Variant)

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the SQL command with the given parameters.

Notes: You can decide whether you pass values here or call Bind methods.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

If you like to pass an array of variant for the values, please pass this to Bind() and no parameters here. Otherwise passing an array here would create a variant array with your array as content.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

5.36.19 SQLExecuteMT(ParamArray bindItems as Variant)

Plugin Version: 16.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the SQL command with the given parameters.

Notes: You can decide whether you pass values here or call Bind methods.

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.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

If you like to pass an array of variant for the values, please pass this to Bind() and no parameters here. Otherwise passing an array here would create a variant array with your array as content.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

5.36.20 SQLSelect(ParamArray bindItems as Variant) As RecordSet

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the query with the given parameters.

Notes: Returns the recordset object or nil on error.

You can decide whether you pass values here or call Bind methods.

For this method to work, you need to have somewhere a property with SQLDatabaseMBS so Xojo includes our SQLDatabase plugin which provides the RecordSet functionality.

The record set may not have a valid RecordCount or have working movefirst/movelastr/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

If you like to pass an array of variant for the values, please pass this to Bind() and no parameters here. Otherwise passing an array here would create a variant array with your array as content.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

5.36.21 SQLSelectMT(ParamArray bindItems as Variant) As RecordSet

Plugin Version: 16.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Runs the query with the given parameters.

Notes: Returns the recordset object or nil on error.

You can decide whether you pass values here or call Bind methods.

For this method to work, you need to have somewhere a property with SQLDatabaseMBS so Xojo includes our SQLDatabase plugin which provides the RecordSet functionality.

The record set may not have a valid RecordCount or have working movefirst/movelastr/moveprev methods unless the underlying database supports those and Scrollable result sets is enabled/supported.

If you like to pass an array of variant for the values, please pass this to Bind() and no parameters here.

Otherwise passing an array here would create a variant array with your array as content.

When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

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.

5.36.22 Properties

5.36.23 BoundTypes as Dictionary

Plugin Version: 19.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The binded types to inspect in debugger.

Notes: When queried, the plugin creates a copy of the dictionary for you to inspect in debugger. Changes to the dictionary do not bind types.

Renamed to BoundTypes in version 19.4. Was BindedTypes, but that was not proper english.
(Read only property)

5.36.24 BoundValues as Dictionary

Plugin Version: 19.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The binded values to inspect in debugger.

Notes: When queried, the plugin creates a copy of the dictionary for you to inspect in debugger. Changes to the dictionary do not bind values.

Renamed to BoundValues in version 19.4. Was BindedValues, but that was not proper english.
(Read only property)

5.36.25 Scrollable as Boolean

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

Function: Whether the plugin will ask for a scrollable recordset when doing SQLSelect.

Notes: Since plugin version 15.0, Scrollable is false by default.

(Read and Write property)

5.36.26 SQL as String

Plugin Version: 12.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The SQL command for this prepared statement.

Notes: (Read and Write property)

5.36.27 Constants

Data Type Constants

Constant	Value	Description
kTypeBlob	16	Binary large Object. Pass a string or memoryblock.
kTypeBool	1	Boolean
kTypeBytes	13	a binary string or MemoryBlock. (which is a string without text encoding) This is usually a varbinary field. kTypeLongBinary is used for bigger binary data and streamed. And kTypeBlob is used for huge streams of bytes and also transferred in chunks. In most data base systems the varchar field is stored within the record, while BLOB and CLOB are stored separately.
kTypeClob	17	Character Large Object.
kTypeDateTime	10	Date and/or Time.
kTypeDouble	8	double float value.
kTypeInt32	4	signed 32 bit integer
kTypeInt64	6	Signed 64-bit integer.
kTypeInterval	11	An interval. Please pass SQLIntervalMBS in the variant. If the variant contains anything else, the plugin will pass nil value. When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.
kTypeLong	4	signed 32 bit integer
kTypeLongBinary	14	Long binary.
kTypeLongChar	15	Long string.
kTypeNull	99	NULL value
kTypeNumeric	9	A number (Int64 or double). This can be used for Int64 or Double values. Depending of the type of number in the variant, the plugin will either make an Int64 or a double internally. When passing variant for value, MemoryBlock and Strings without text encoding are converted to byte values (BLOB). Texts and Strings with encoding are converted to text values. Other types are translated as good as possible. Raises exceptions if you pass anything which is not recognized.
kTypeShort	2	signed 16 bit integer
kTypeString	12	String. This is usually a varchar field. kTypeLongChar is used for bigger varchars and streamed. And kTypeClob is used for huge streams of characters (BLOB for text) and also transferred in chunks. In most data base systems the varchar field is stored within the record, while BLOB and CLOB are stored separately.
kTypeUInt32	5	unsigned 32 bit integer
kTypeUInt64	7	Unsigned 64-bit integer.
kTypeULong	5	unsigned 32 bit integer
kTypeUnknown	0	unknown type
kTypeUShort	3	unsigned 16 bit integer

5.37 class SQLStringMBS

5.37.1 class SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for strings in this plugin.

Example:

```
dim s as new SQLStringMBS("Hello √§√√°")
```

```
MsgBox "Characters: "+str(s.GetLength)+" Bytes: "+str(s.GetBinaryLength)
```

```
dim a as string= s.CopyBinaryData
```

```
dim b as string= s.CopyText
```

```
MsgBox a // RB shows garbage as it tries to display bytes as UTF8 which does not work
```

```
MsgBox b // displays correct
```

Notes: A string can be text (with text encoding) or bytes (raw binary data).

see also

https://www.sqlapi.com/ApiDoc/class_s_a_string.html

Blog Entries

- [MBS Xojo Plugins, version 24.0pr6](#)
- [MBS Real Studio Plugins, version 12.4pr9](#)

5.37.2 Methods

5.37.3 Compare(text as SQLStringMBS) as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Compares this string object with another string.

Notes: Function performs a case-sensitive comparison of the strings, and is not affected by locale.

Returns zero if the strings are identical, <0 if this string object is less than text, or >0 if this string object is greater than text.

See also:

- 5.37.4 Compare(text as string) as Integer

5.37.4 Compare(text as string) as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Compares this string object with another string.

Notes: Function performs a case-sensitive comparison of the strings, and is not affected by locale.

Returns zero if the strings are identical, <0 if this string object is less than text, or >0 if this string object is greater than text.

See also:

- 5.37.3 Compare(text as SQLStringMBS) as Integer 243

5.37.5 CompareNoCase(text as SQLStringMBS) as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Compares this string object with another string.

Notes: Function performs a case-insensitive comparison of the strings, and is not affected by locale.

Returns zero if the strings are identical (ignoring case), <0 if this string object is less than text (ignoring case), or >0 if this string object is greater than text (ignoring case).

See also:

- 5.37.6 CompareNoCase(text as string) as Integer 244

5.37.6 CompareNoCase(text as string) as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Compares this string object with another string.

Notes: Function performs a case-insensitive comparison of the strings, and is not affected by locale.

Returns zero if the strings are identical (ignoring case), <0 if this string object is less than text (ignoring case), or >0 if this string object is greater than text (ignoring case).

See also:

- 5.37.5 CompareNoCase(text as SQLStringMBS) as Integer 244

5.37.7 Constructor

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new empty string object.

See also:

5.37. CLASS SQLSTRINGMBS	245
• 5.37.8 Constructor(Data as MemoryBlock)	245
• 5.37.9 Constructor(Data as string, isText as Boolean = True)	245
• 5.37.10 Constructor(other as SQLStringMBS)	245

5.37.8 Constructor(Data as MemoryBlock)

Plugin Version: 15.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data, e.g. for blob.

See also:

• 5.37.7 Constructor	244
• 5.37.9 Constructor(Data as string, isText as Boolean = True)	245
• 5.37.10 Constructor(other as SQLStringMBS)	245

5.37.9 Constructor(Data as string, isText as Boolean = True)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data or text copied from the data string.

Notes: If isText is true, the data is interpreted as text and string encoding conversion may modify it. If isText is false the bytes are copied raw.

See also:

• 5.37.7 Constructor	244
• 5.37.8 Constructor(Data as MemoryBlock)	245
• 5.37.10 Constructor(other as SQLStringMBS)	245

5.37.10 Constructor(other as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new string object with data copied from the other string object.

See also:

• 5.37.7 Constructor	244
• 5.37.8 Constructor(Data as MemoryBlock)	245
• 5.37.9 Constructor(Data as string, isText as Boolean = True)	245

5.37.11 CopyBinaryData as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Copies the bytes from the internal buffer ignoring any text encoding.

5.37.12 CopyMemoryBlock as MemoryBlock

Plugin Version: 24.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Copies the content of the string/BLOB as MemoryBlock.

5.37.13 CopyText as string

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Copies the characters of this string as text.

Notes: Text encoding conversion may happen.

5.37.14 Empty

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Forces a string to have 0 length.

5.37.15 GetBinaryLength as UInt32

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

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

Function: Returns a count of the bytes in the binary data buffer.

Notes: Deprecated. Please use BinaryLength property.

5.37.16 GetLength as UInt32

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

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

tion: Returns the number of characters in a SAString object.

Notes: Deprecated. Please use Length property.

For multibyte character sets, GetLength counts each 8-bit character; that is, a lead and trail byte in one multibyte character are counted as two bytes.

5.37.17 Left(count as Integer) as SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extracts the left part of a string.

5.37.18 MakeLower

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Changes all characters in the string to lower case.

5.37.19 MakeUpper

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Changes all characters in the string to upper case.

5.37.20 Mid(first as Integer) as SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extracts the middle part of a string.

Notes: first: The zero-based index of the first character in this string object that is to be included in the extracted substring.

See also:

- 5.37.21 Mid(first as Integer, Count as Integer) as SQLStringMBS

5.37.21 Mid(first as Integer, Count as Integer) as SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extracts the middle part of a string.

Notes: first: The zero-based index of the first character in this string object that is to be included in the extracted substring.

count: The number of characters to extract from this string object. If this parameter is not supplied, then

the remainder of the string is extracted.

See also:

- 5.37.20 Mid(first as Integer) as SQLStringMBS 247

5.37.22 Operator_Convert as string

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convert operation for assignment to string.

See also:

- 5.37.23 Operator_Convert(text as string) 248

5.37.23 Operator_Convert(text as string)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Convert operation for assigning text string.

See also:

- 5.37.22 Operator_Convert as string 248

5.37.24 Right(count as Integer) as SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Extracts the right part of a string.

5.37.25 TrimLeft

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Trim leading whitespace characters from the string.

5.37.26 TrimRight

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Trim trailing whitespace characters from the string.

5.37.27 Properties

5.37.28 BinaryLength as UInt32

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns a count of the bytes in the binary data buffer.

Notes: (Read only property)

5.37.29 DebugText as String

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Text content for debugging.

Notes: We show up to 1000 characters here for debugger.

(Read only property)

5.37.30 IsEmpty as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Tests whether a String object contains no characters.

Notes: Returns true if length is zero.

(Read only property)

5.37.31 Length as UInt32

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the number of characters in a SString object.

Notes: For multibyte character sets, GetLength counts each 8-bit character; that is, a lead and trail byte in one multibyte character are counted as two bytes.

(Read only property)

5.38 class `SQLUnsupportedExceptionMBS`

5.38.1 class `SQLUnsupportedExceptionMBS`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class for an exception to report that the function is not supported on this platform.

Notes: This one raises only if the plugin is compiled for Mac OS Classic.

Subclass of the `RuntimeException` class.

5.39 class SQLValueMBS

5.39.1 class SQLValueMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The SQL class for mutable values.

Notes: Subclass of the SQLValueReadMBS class.

Blog Entries

- [MBS Xojo Plugins, version 20.5pr2](#)
- [MBS Xojo Plugins, version 19.2pr1](#)
- [MBS Releases the MBS Xojo / Real Studio plug-ins in version 16.4](#)
- [MBS Xojo / Real Studio Plugins, version 16.4pr5](#)
- [Upcoming Changes for our SQL Plugin](#)
- [Text data type](#)
- [MBS Xojo / Real Studio Plugins, version 14.0pr6](#)
- [Release notes for SQL or ChartDirector?](#)
- [MBS Real Studio Plugins, version 11.2pr3](#)

Videos

- [Presentation from London conference about MBS Plugins.](#)

5.39.2 Methods

5.39.3 Constructor(DataType as Integer)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new empty value object with the given data type.

5.39.4 setAsBlob(data as MemoryBlock)

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

Function: Sets parameter's value as BLOB data using a memoryblock.

See also:

- 5.39.5 `setAsBlob(data as SQLDataProviderMBS, BlockSize as UInt32)` 252
- 5.39.6 `setAsBlob(data as SQLStringMBS)` 252
- 5.39.7 `setAsBlob(data as string)` 253
- 5.39.8 `setAsBlob(file as folderItem)` 253
- 5.39.9 `setAsBlob(stream as Readable)` 254

5.39.5 `setAsBlob(data as SQLDataProviderMBS, BlockSize as UInt32)`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as BLOB data (SQLString)

Notes: When you call the `SQLCommandMBS.Execute` method all input parameters are bound with their values, including Long and BLOB(CLOB) parameters.

That is the time when the data provider Read event runs to get the values in the block size you specify.

The default value for the block size is 0. If you use the default value, SQLAPI++ Library will automatically use the most appropriate size for current DBMS.

See also:

- 5.39.4 `setAsBlob(data as MemoryBlock)` 251
- 5.39.6 `setAsBlob(data as SQLStringMBS)` 252
- 5.39.7 `setAsBlob(data as string)` 253
- 5.39.8 `setAsBlob(file as folderItem)` 253
- 5.39.9 `setAsBlob(stream as Readable)` 254

5.39.6 `setAsBlob(data as SQLStringMBS)`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as BLOB data (SQLString)

See also:

- 5.39.4 `setAsBlob(data as MemoryBlock)` 251
- 5.39.5 `setAsBlob(data as SQLDataProviderMBS, BlockSize as UInt32)` 252
- 5.39.7 `setAsBlob(data as string)` 253
- 5.39.8 `setAsBlob(file as folderItem)` 253
- 5.39.9 `setAsBlob(stream as Readable)` 254

5.39.7 setAsBlob(data as string)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as BLOB data (SQLString)

Example:

```
dim c as SQLCommandMBS // your command object
dim JPEGData as string // some data
```

```
c.Param("imageData").setAsBlob JPEGData
```

See also:

- 5.39.4 setAsBlob(data as MemoryBlock) 251
- 5.39.5 setAsBlob(data as SQLDataProviderMBS, BlockSize as UInt32) 252
- 5.39.6 setAsBlob(data as SQLStringMBS) 252
- 5.39.8 setAsBlob(file as folderItem) 253
- 5.39.9 setAsBlob(stream as Readable) 254

5.39.8 setAsBlob(file as folderItem)

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

Function: Sets field with content of file.

Example:

```
dim cmd as SQLCommandMBS // your command object

// pass folderitem to BLOB field
dim f as FolderItem = SpecialFolder.Desktop.Child("test.jpg")
cmd.Param("image").setAsBlob(f)
```

Notes: The file will be read later when statement is executed.

May not work when using preemptive threads.

See also:

- 5.39.4 setAsBlob(data as MemoryBlock) 251
- 5.39.5 setAsBlob(data as SQLDataProviderMBS, BlockSize as UInt32) 252
- 5.39.6 setAsBlob(data as SQLStringMBS) 252

- 5.39.7 setAsBlob(data as string) 253
- 5.39.9 setAsBlob(stream as Readable) 254

5.39.9 setAsBlob(stream as Readable)

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

Function: Sets field with content of stream.

Example:

```
dim cmd as SQLCommandMBS // your command object

// pass BinaryStream to BLOB field
dim f as FolderItem = SpecialFolder.Desktop.Child("test.jpg")
dim b as BinaryStream = BinaryStream.open(f)
cmd.Param("image").setAsBlob(b)
```

Notes: The stream will be read later when statement is executed.

May not work when using preemptive threads.

See also:

- 5.39.4 setAsBlob(data as MemoryBlock) 251
- 5.39.5 setAsBlob(data as SQLDataProviderMBS, BlockSize as UInt32) 252
- 5.39.6 setAsBlob(data as SQLStringMBS) 252
- 5.39.7 setAsBlob(data as string) 253
- 5.39.8 setAsBlob(file as folderItem) 253

5.39.10 setAsBool(value as boolean)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as bool data.

5.39.11 setAsBytes(data as MemoryBlock)

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

Function: Sets parameter's value as binary data from memoryblock.

See also:

- 5.39.12 setAsBytes(data as string) 255

5.39. CLASS SQLVALUEMBS	255
• 5.39.13 setAsBytes(value as SQLBytesMBS)	255
• 5.39.14 setAsBytes(value as SQLStringMBS)	255

5.39.12 setAsBytes(data as string)

Plugin Version: 14.0, Platforms: macOS, Linux, Windows, Targets: All.

Function: Set the value to be bytes with content of given string.

Notes: For BLOB fields or parameters.

Same as the other variant, but avoids creating extra SQLStringMBS object.

See also:

• 5.39.11 setAsBytes(data as MemoryBlock)	254
• 5.39.13 setAsBytes(value as SQLBytesMBS)	255
• 5.39.14 setAsBytes(value as SQLStringMBS)	255

5.39.13 setAsBytes(value as SQLBytesMBS)

Plugin Version: 16.1, Platforms: macOS, Linux, Windows, Targets: All.

Function: Set the value to be bytes with content of given Bytes object.

Notes: For BLOB fields or parameters.

Same as the other variant, but avoids creating extra SQLStringMBS object.

See also:

• 5.39.11 setAsBytes(data as MemoryBlock)	254
• 5.39.12 setAsBytes(data as string)	255
• 5.39.14 setAsBytes(value as SQLStringMBS)	255

5.39.14 setAsBytes(value as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as binary string data (SQLString).

See also:

• 5.39.11 setAsBytes(data as MemoryBlock)	254
• 5.39.12 setAsBytes(data as string)	255
• 5.39.13 setAsBytes(value as SQLBytesMBS)	255

5.39.15 setAsClob(data as MemoryBlock)

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

Function: Private method.

Notes: This method should make sure you don't accidentally a memoryblock instead of a text.

See also:

- 5.39.16 setAsClob(data as SQLDataProviderMBS, BlockSize as UInt32) 256
- 5.39.17 setAsClob(file as folderItem) 256
- 5.39.18 setAsClob(stream as Readable) 257
- 5.39.19 setAsClob(text as SQLStringMBS) 257
- 5.39.20 setAsClob(text as string) 258

5.39.16 setAsClob(data as SQLDataProviderMBS, BlockSize as UInt32)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as Clob data (SQLString)

Notes: nWhen you call the SQLCommandMBS.Execute method all input parameters are bound with their values, including Long and BLOB(CLOB) parameters.

That is the time when the data provider Read event runs to get the values in the block size you specify.

The default value for the block size is 0. If you use the default value, SQLAPI++ Library will automatically use the most appropriate size for current DBMS.

See also:

- 5.39.15 setAsClob(data as MemoryBlock) 256
- 5.39.17 setAsClob(file as folderItem) 256
- 5.39.18 setAsClob(stream as Readable) 257
- 5.39.19 setAsClob(text as SQLStringMBS) 257
- 5.39.20 setAsClob(text as string) 258

5.39.17 setAsClob(file as folderItem)

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

Function: Sets field with content of file.

Notes: The file will be read later when statement is executed.

May not work when using preemptive threads.

See also:

5.39. CLASS SQLVALUEMBS	257
• 5.39.15 setAsClob(data as MemoryBlock)	256
• 5.39.16 setAsClob(data as SQLDataProviderMBS, BlockSize as UInt32)	256
• 5.39.18 setAsClob(stream as Readable)	257
• 5.39.19 setAsClob(text as SQLStringMBS)	257
• 5.39.20 setAsClob(text as string)	258

5.39.18 setAsClob(stream as Readable)

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

Function: Sets field with content of stream.

Notes: The stream will be read later when statement is executed.

May not work when using preemptive threads.

See also:

• 5.39.15 setAsClob(data as MemoryBlock)	256
• 5.39.16 setAsClob(data as SQLDataProviderMBS, BlockSize as UInt32)	256
• 5.39.17 setAsClob(file as folderItem)	256
• 5.39.19 setAsClob(text as SQLStringMBS)	257
• 5.39.20 setAsClob(text as string)	258

5.39.19 setAsClob(text as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as Clob data (SQLString)

See also:

• 5.39.15 setAsClob(data as MemoryBlock)	256
• 5.39.16 setAsClob(data as SQLDataProviderMBS, BlockSize as UInt32)	256
• 5.39.17 setAsClob(file as folderItem)	256
• 5.39.18 setAsClob(stream as Readable)	257
• 5.39.20 setAsClob(text as string)	258

5.39.20 setAsClob(text as string)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as Clob data (SQLString)

See also:

- 5.39.15 setAsClob(data as MemoryBlock) 256
- 5.39.16 setAsClob(data as SQLDataProviderMBS, BlockSize as UInt32) 256
- 5.39.17 setAsClob(file as folderItem) 256
- 5.39.18 setAsClob(stream as Readable) 257
- 5.39.19 setAsClob(text as SQLStringMBS) 257

5.39.21 setAsDate(value as date)

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Sets parameter's value with a date.

Example:

```
dim cmd as SQLCommandMBS // your command object
dim d as new date(2012,12,24,16,0,0) // some date
cmd.Param(3).setAsDate(d) // set third parameter
```

Notes: Same as setAsDateTime, but here we take a date object to make it more convenient.

5.39.22 setAsDateTime(value as dateTime)

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value with a dateTime.

Notes: Same as setAsDate, but here we take a dateTime object to make it more convenient.

See also:

- 5.39.23 setAsDateTime(value as SQLDateTimeMBS) 258

5.39.23 setAsDateTime(value as SQLDateTimeMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as SQLDateTime data.

See also:

- 5.39.22 setAsDateTime(value as dateTime)

5.39.24 setAsDefault

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Forces to use the default parameter's value.

Notes: Forces DBMS API to use the default parameter value as the input value for an input or input/output parameter in a procedure.

If DBMS API does not support the concept of "default parameter values" in stored procedures, this setting will be ignored.

If you set this flag for the parameter that doesn't have a default value, the effect is DBMS defined (e.g. an error can be returned or NULL can be bound).

To cancel using the default parameter value you should call any other SQLValue::setAs... method to bind a parameter value.

To check whether this flag is set or not use isDefault method.

5.39.25 setAsDouble(value as Double)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as Double data.

5.39.26 setAsInt32(value as Int32)

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as Int32 data.

5.39.27 setAsInt64(value as Int64)

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as Int64 data.

5.39.28 setAsInteger(value as Integer)

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as Integer data.

Notes: Int32 or Int64 depending whether app is 32 or 64 bit.

5.39.29 setAsInterval(value as SQLIntervalMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets an interval value.

5.39.30 setAsLong(value as Int32)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as Int32 data.

5.39.31 setAsLongBinary(data as MemoryBlock)

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

Function: Sets parameter's value as long binary data from memoryblock.

See also:

- 5.39.32 setAsLongBinary(data as SQLDataProviderMBS, BlockSize as UInt32) 260
- 5.39.33 setAsLongBinary(data as SQLStringMBS) 261
- 5.39.34 setAsLongBinary(data as string) 261
- 5.39.35 setAsLongBinary(file as folderItem) 262
- 5.39.36 setAsLongBinary(stream as Readable) 262

5.39.32 setAsLongBinary(data as SQLDataProviderMBS, BlockSize as UInt32)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as long binary data (SQLString)

Notes: When you call the SQLCommandMBS.Execute method all input parameters are bound with their values, including Long and BLOB(CLOB) parameters.

That is the time when the data provider Read event runs to get the values in the block size you specify.

The default value for the block size is 0. If you use the default value, SQLAPI++ Library will automatically use the most appropriate size for current DBMS.

See also:

- 5.39.31 setAsLongBinary(data as MemoryBlock) 260
- 5.39.33 setAsLongBinary(data as SQLStringMBS) 261
- 5.39.34 setAsLongBinary(data as string) 261
- 5.39.35 setAsLongBinary(file as folderItem) 262
- 5.39.36 setAsLongBinary(stream as Readable) 262

5.39.33 setAsLongBinary(data as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as long binary data (SQLString)

See also:

- 5.39.31 setAsLongBinary(data as MemoryBlock) 260
- 5.39.32 setAsLongBinary(data as SQLDataProviderMBS, BlockSize as UInt32) 260
- 5.39.34 setAsLongBinary(data as string) 261
- 5.39.35 setAsLongBinary(file as folderItem) 262
- 5.39.36 setAsLongBinary(stream as Readable) 262

5.39.34 setAsLongBinary(data as string)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as long binary data (SQLString)

See also:

- 5.39.31 setAsLongBinary(data as MemoryBlock) 260
- 5.39.32 setAsLongBinary(data as SQLDataProviderMBS, BlockSize as UInt32) 260
- 5.39.33 setAsLongBinary(data as SQLStringMBS) 261
- 5.39.35 setAsLongBinary(file as folderItem) 262
- 5.39.36 setAsLongBinary(stream as Readable) 262

5.39.35 setAsLongBinary(file as folderItem)

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

Function: Sets field with content of file.

Notes: The file will be read later when statement is executed.

May not work when using preemptive threads.

See also:

- 5.39.31 setAsLongBinary(data as MemoryBlock) 260
- 5.39.32 setAsLongBinary(data as SQLDataProviderMBS, BlockSize as UInt32) 260
- 5.39.33 setAsLongBinary(data as SQLStringMBS) 261
- 5.39.34 setAsLongBinary(data as string) 261
- 5.39.36 setAsLongBinary(stream as Readable) 262

5.39.36 setAsLongBinary(stream as Readable)

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

Function: Sets field with content of stream.

Notes: The stream will be read later when statement is executed.

May not work when using preemptive threads.

See also:

- 5.39.31 setAsLongBinary(data as MemoryBlock) 260
- 5.39.32 setAsLongBinary(data as SQLDataProviderMBS, BlockSize as UInt32) 260
- 5.39.33 setAsLongBinary(data as SQLStringMBS) 261
- 5.39.34 setAsLongBinary(data as string) 261
- 5.39.35 setAsLongBinary(file as folderItem) 262

5.39.37 setAsLongChar(data as MemoryBlock)

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

Function: Private method.

Notes: This method should make sure you don't accidentally a memoryblock instead of a text.

See also:

- 5.39.38 setAsLongChar(data as SQLDataProviderMBS, BlockSize as UInt32) 263
- 5.39.39 setAsLongChar(file as folderItem) 263

5.39. CLASS SQLVALUEMBS	263
• 5.39.40 setAsLongChar(stream as Readable)	264
• 5.39.41 setAsLongChar(text as SQLStringMBS)	264
• 5.39.42 setAsLongChar(text as string)	264

5.39.38 setAsLongChar(data as SQLDataProviderMBS, BlockSize as UInt32)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as long character data (SQLString)

Notes: When you call the SQLCommandMBS.Execute method all input parameters are bound with their values, including Long and BLOB(CLOB) parameters.

That is the time when the data provider Read event runs to get the values in the block size you specify.

The default value for the block size is 0. If you use the default value, SQLAPI++ Library will automatically use the most appropriate size for current DBMS.

See also:

• 5.39.37 setAsLongChar(data as MemoryBlock)	262
• 5.39.39 setAsLongChar(file as folderItem)	263
• 5.39.40 setAsLongChar(stream as Readable)	264
• 5.39.41 setAsLongChar(text as SQLStringMBS)	264
• 5.39.42 setAsLongChar(text as string)	264

5.39.39 setAsLongChar(file as folderItem)

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

Function: Sets field with content of file.

Notes: The file will be read later when statement is executed.

May not work when using preemptive threads.

See also:

• 5.39.37 setAsLongChar(data as MemoryBlock)	262
• 5.39.38 setAsLongChar(data as SQLDataProviderMBS, BlockSize as UInt32)	263
• 5.39.40 setAsLongChar(stream as Readable)	264
• 5.39.41 setAsLongChar(text as SQLStringMBS)	264
• 5.39.42 setAsLongChar(text as string)	264

5.39.40 setAsLongChar(stream as Readable)

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

Function: Sets field with content of stream.

Notes: The stream will be read later when statement is executed.

May not work when using preemptive threads.

See also:

- 5.39.37 setAsLongChar(data as MemoryBlock) 262
- 5.39.38 setAsLongChar(data as SQLDataProviderMBS, BlockSize as UInt32) 263
- 5.39.39 setAsLongChar(file as folderItem) 263
- 5.39.41 setAsLongChar(text as SQLStringMBS) 264
- 5.39.42 setAsLongChar(text as string) 264

5.39.41 setAsLongChar(text as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as long character data (SQLString)

See also:

- 5.39.37 setAsLongChar(data as MemoryBlock) 262
- 5.39.38 setAsLongChar(data as SQLDataProviderMBS, BlockSize as UInt32) 263
- 5.39.39 setAsLongChar(file as folderItem) 263
- 5.39.40 setAsLongChar(stream as Readable) 264
- 5.39.42 setAsLongChar(text as string) 264

5.39.42 setAsLongChar(text as string)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as long character data (SQLString)

See also:

- 5.39.37 setAsLongChar(data as MemoryBlock) 262
- 5.39.38 setAsLongChar(data as SQLDataProviderMBS, BlockSize as UInt32) 263
- 5.39.39 setAsLongChar(file as folderItem) 263
- 5.39.40 setAsLongChar(stream as Readable) 264
- 5.39.41 setAsLongChar(text as SQLStringMBS) 264

5.39.43 setAsNull

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets value to null.

5.39.44 setAsNumeric(value as SQLNumericMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as SQLNumeric data.

5.39.45 setAsShort(value as Int16)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as short data.

5.39.46 setAsString(data as MemoryBlock)

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

Function: Private method.

Notes: This method should make sure you don't accidentally a memoryblock instead of a text.

See also:

- 5.39.47 setAsString(value as SQLStringMBS) 265
- 5.39.48 setAsString(value as string) 266

5.39.47 setAsString(value as SQLStringMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as character string data (SQLString)

See also:

- 5.39.46 setAsString(data as MemoryBlock) 265
- 5.39.48 setAsString(value as string) 266

5.39.48 `setAsString(value as string)`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as character string data.

Notes: Same as `setAsString`, but for your convenience with a Xojo string instead of a `SQLStringMBS` object. See also:

- 5.39.46 `setAsString(data as MemoryBlock)` 265
- 5.39.47 `setAsString(value as SQLStringMBS)` 265

5.39.49 `setAsUInt32(value as UInt32)`

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as `UInt32` data.

5.39.50 `setAsULong(value as UInt32)`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as unsigned long data.

5.39.51 `setAsUnknown`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's type as unknown.

5.39.52 `setAsUShort(value as UInt16)`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value as unsigned short data.

Notes: Sets value as unsigned short data.

5.39.53 `setAsValueRead(value as SQLValueReadMBS)`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Sets parameter's value from SQLParam or SQLField objects.

Notes: This method allows using SQLField or SQLParam object received from one SQL statement as a parameter for another SQL statement.

5.39.54 setVariant(value as Variant)

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

Function: Sets the value based on a variant.

Example:

```
dim con as SQLConnectionMBS // your connection
dim pic as picture // some picture

// get picture data
dim jpegData as MemoryBlock = pic.GetData(Picture.FormatJPEG, 80)

// get a command for an Insert command
dim sql as string = "Insert into BlobTest(name, image) values (:name, :image)"
dim cmd as new SQLCommandMBS(con, sql)

// set values by variant
cmd.Param("name").setVariant "logo.jpg"
cmd.Param("image").setVariant jpegData

// do the insert
cmd.Execute
```

Notes: MemoryBlock and Strings without text encoding are converted to byte values (BLOB).

Texts and Strings with encoding are converted to text values.

Raises exceptions if you pass anything which is not recognized.

Other types are translated as good as possible.

With version 19.0 or later, you can pass folderitem to stream blob from file. This may raise exception if file can't be opened.

5.39.55 Properties

5.39.56 isDefault as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns true if the plugin has been forced to use parameter's default value by calling setAsDe-

fault method; false otherwise.

Notes: (Read only property)

5.40 class SQLValueReadMBS

5.40.1 class SQLValueReadMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The class used in the SQL Plugin for value objects which can be read.

Blog Entries

- [MBS Xojo Plugins, version 20.5pr9](#)
- [MBS Xojo Plugins, version 20.5pr7](#)
- [MBS Xojo Plugins, version 19.5pr2](#)
- [MBS Xojo Plugins in version 19.2](#)
- [MBS Xojo Plugins, version 19.2pr1](#)
- [MBS Xojo / Real Studio Plugins, version 16.4pr5](#)
- [Text data type](#)
- [MBS Real Studio Plugins, version 12.5pr4](#)
- [Release notes for SQL or ChartDirector?](#)
- [MBS Real Studio Plugins, version 11.2pr3](#)

5.40.2 Methods

5.40.3 asBlob as SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as BLOB (SQLString) data.

Notes: If the value of current object is NULL, asBlob method returns an empty string. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is string (kDataTypeString), bytes (kDataTypeBytes), long binary (kDataTypeLongBinary), long character (kDataTypeLongChar), BLOB (kDataTypeBlob) or CLOB (kDataTypeCLOB), asBlob method returns the object's value as SQLString object.

If the value's type of current object is bool (kDataTypeBool), short (kDataTypeShort), long (kDataTypeLong), double (kDataTypeDouble), numeric (kDataTypeNumeric), date-time (kDataTypeDateTime) or cursor (kDataTypeCursor), the result is undefined and debug version asserts.

Use DataType method to get the value's type of SQLValueRead object.

5.40.4 asBLobMemory as MemoryBlock

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

Function: Returns the value as BLOB data in a memoryblock.

5.40.5 asBLobString as String

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

Function: Returns the value as BLOB data in a string.

5.40.6 asBytes as SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as binary string data (SQLString).

Notes: If the value of current object is NULL, asBytes method returns an empty string. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is string (kDataTypeString), bytes (kDataTypeBytes), long binary (kDataTypeLongBinary), long character (kDataTypeLongChar), BLOB (kDataTypeBLOB) or CLOB (kDataTypeCLOB), asBytes method returns the object's value as SQLString object.

If the value's type of current object is bool (kDataTypeBool), short (kDataTypeShort), long (kDataTypeLong), double (kDataTypeDouble), numeric (kDataTypeNumeric) or date-time (kDataTypeDateTime), asBytes method returns a block of data with size sizeof(value's type) as SQLString object.

If the value's type of current object is cursor (kDataTypeCursor), the result is undefined and debug version asserts.

Use DataType method to get the value's type of SQLValueRead object.

5.40.7 asCLOB as SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as CLOB (SQLString) data.

Notes: If the value of current object is NULL, asCLOB method returns an empty string. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is string (kDataTypeString), bytes (kDataTypeBytes), long binary (kDataTypeLongBinary), long character (kDataTypeLongChar), BLOB (kDataTypeBlob) or CLOB (kDataTypeClob), asCLOB method returns the object's value as SQLString object.

If the value's type of current object is bool (kDataTypeBool), short (kDataTypeShort), long (kDataTypeLong), double (kDataTypeDouble), numeric (kDataTypeNumeric), date-time (kDataTypeDateTime) or cursor (kDataTypeCursor), the result is undefined and debug version asserts.

Use DataType method to get the value's type of SQLValueRead object.

5.40.8 asDate as Date

Plugin Version: 11.2, Platforms: macOS, Linux, Windows, Targets: Desktop, Console & Web.

Function: Returns the value as date.

Example:

```
dim cmd as SQLCommandMBS // your command object
dim d as date = cmd.Field("mydate").asDate // read date value
```

Notes: If the value of current object is NULL, asDate method returns an empty date object. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is kDataTypeDateTime, asDate method returns date object.

If the value's type of current object is any data type except kDataTypeDateTime, the result is undefined and debug version asserts.

Use DataType method to get the value's type of SQLValueRead object.

5.40.9 asDateTime as SQLDateTimeMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as SQLDateTimeMBS object.

Notes: If the value of current object is NULL, asDateTime method returns an empty SQLDateTime object. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is kDataTypeDateTime, asDateTime method returns SQLDateTime object.

If the value's type of current object is any data type except `kDataTypeDateTime`, the result is undefined and debug version asserts.

Use `DataType` method to get the value's type of `SQLValueRead` object.

5.40.10 `asDateTimeValue` as `DateTime`

Plugin Version: 20.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as date.

Notes: If the value of current object is `NULL`, `asDate` method returns an empty date object. Use `isNull` method to make sure if the value is `NULL` or not.

If the value's type of current object is `kDataTypeDateTime`, `asDate` method returns date object.

If the value's type of current object is any data type except `kDataTypeDateTime`, the result is undefined and debug version asserts.

Use `DataType` method to get the value's type of `SQLValueRead` object.

5.40.11 `asInterval` as `SQLIntervalMBS`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as interval (`SQLIntervalMBS`).

5.40.12 `asLongBinary` as `SQLStringMBS`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as long binary (`SQLString`) data.

Notes: If the value of current object is `NULL`, `asLongBinary` method returns an empty string. Use `isNull` method to make sure if the value is `NULL` or not.

If the value's type of current object is string (`kDataTypeString`), bytes (`kDataTypeBytes`), long binary (`kDataTypeLongBinary`), long character (`kDataTypeLongChar`), BLOB (`kDataTypeBlob`) or CLOB (`kDataTypeClob`), `asLongBinary` method returns the object's value as `SQLString` object.

If the value's type of current object is bool (kDataTypeBool), short (kDataTypeShort), long (kDataTypeLong), double (kDataTypeDouble), numeric (kDataTypeNumeric), date-time (kDataTypeDateTime) or cursor (kDataTypeCursor), the result is undefined and debug version asserts.

Use DataType method to get the value's type of SQLValueRead object.

5.40.13 asLongChar as SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as long character (SQLString) data.

Notes: If the value of current object is NULL, asLongChar method returns an empty string. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is string (kDataTypeString), bytes (kDataTypeBytes), long binary (kDataTypeLongBinary), long character (kDataTypeLongChar), BLOB (kDataTypeBLOB) or CLOB (kDataTypeCLOB), asLongChar method returns the object's value as SQLString object.

If the value's type of current object is bool (kDataTypeBool), short (kDataTypeShort), long (kDataTypeLong), double (kDataTypeDouble), numeric (kDataTypeNumeric), date-time (kDataTypeDateTime) or cursor (kDataTypeCursor), the result is undefined and debug version asserts.

Use DataType method to get the value's type of SQLValueRead object.

5.40.14 asNumeric as SQLNumericMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as SQLNumeric data.

Notes: If the value of current object is NULL, asNumeric method returns 0. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is exact numeric value (kDataTypeNumeric), asNumeric method returns the original value with no conversion.

If the value's type of current object is bool (kDataTypeBool), short (kDataTypeShort), double (kDataTypeDouble) or long (kDataTypeLong), asNumeric method converts it to SQLNumeric .

If the value's type of current object is string (kDataTypeString), asNumeric method tries to convert it from SQLChar* value. If the conversion is possible and correct, asNumeric converts to SQLNumeric from

SQLChar* value. If conversion is incorrect asNumeric method throws an exception.

If the value's type of current object is any data type except the described above, the result is undefined and debug version asserts.

Use DataType method to get the value's type of SQLValueRead object.

5.40.15 asString as SQLStringMBS

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: returns the value as string (SQLString) data.

Notes: If the value of current object is NULL, asString method returns an empty string. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is bool (kDataTypeBool), asString method returns "true" or "false" string (SQLString object).

If the value's type of current object is short (kDataTypeShort), asString method converts it to decimal string (SQLString object) like function printf("%hd", ...) does.

If the value's type of current object is long (kDataTypeLong), asString method converts it to decimal string (SQLString object) like function printf("%ld", ...) does.

If the value's type of current object is double (kDataTypeDouble), asString method converts it to decimal string (SQLString object) like function printf("%g", ...) does.

If the value's type of current object is numeric (kDataTypeNumeric), asString method converts it to decimal string (SQLString object) without precision loss.

If the value's type of current object is date-time (kDataTypeDateTime), asString method converts it to string (SQLString object) like function asctime(...) does.

If the value's type of current object is string (kDataTypeString, kDataTypeLongChar, kDataTypeCLob), asString method returns the original object's value as SQLString object.

If the value's type of current object is binary (kDataTypeBytes, kDataTypeLongBinary, kDataTypeBLob), asString method converts it to hexadecimal string (SQLString object).

If the value's type of current object is cursor (kDataTypeCursor), the result is undefined and debug version

asserts.

Use `DataType` method to get the value's type of `SQLValueRead` object. For numbers, this may give english decimal separator. For getting localized one, please use `AsDoubleValue` and use `cstr()` function.

5.40.16 Constructor(DataType as Integer)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new empty value object for the given data type.
See also:

- 5.40.17 Constructor(value as SQLValueReadMBS) 275

5.40.17 Constructor(value as SQLValueReadMBS)

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Creates a new value object by copying the given one.
See also:

- 5.40.16 Constructor(DataType as Integer) 275

5.40.18 Properties

5.40.19 asBool as boolean

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value of current object as bool data.

Notes: If the value of current object is NULL, `asBool` method returns false. Use `isNull` method to make sure if the value is NULL or not.

If the value's type of current object is bool (`kDataTypeBool`), `asBool` method returns the original value with no conversion.

If the value's type of current object is short (`kDataTypeShort`), long (`kDataTypeLong`) or double (`kDataTypeDouble`), `asBool` method converts it to bool data type. Conversion returns false if the value is 0; true otherwise.

If the value's type of current object is any data type except the described above, the result is undefined and debug version asserts.

Use `DataType` method to get the value's type of `SQLValueRead` object.
(Read only property)

5.40.20 `asDouble` as `Double`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: returns the value as `Double` data.

Notes: If the value of current object is `NULL`, `asDouble` method returns 0. Use `isNull` method to make sure if the value is `NULL` or not.

If the value's type of current object is `double` (`kDataTypeDouble`), `asDouble` method returns the original value with no conversion.

If the value's type of current object is `bool` (`kDataTypeBool`), `short` (`kDataTypeShort`), `long` (`kDataTypeLong`) or `numeric` (`kDataTypeNumeric`), `asDouble` method converts it to `double` (`kDataTypeDouble`) data type.

If the value's type of current object is `string` (`kDataTypeString`), `asDouble` method tries to convert it to `double` value. If the conversion is possible and correct, `asDouble` returns `kDataTypeDouble` value. If conversion is incorrect `asDouble` method throws an exception.

If the value's type of current object is `kDataTypeDateTime`, `asDouble` method converts it to standard `double` representation. Days are represented by whole number increments starting with 30 December 1899, mid-night as time zero. Hour values are expressed as the absolute value of the fractional part of the number. See `SQLDateTime::operator double()` for more details.

If the value's type of current object is any data type except the described above, the result is undefined and debug version asserts.

Use `DataType` method to get the value's type of `SQLValueRead` object.
(Read only property)

5.40.21 `asInt32` as `Int32`

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as Int32 data.

Notes: (Read only property)

5.40.22 asInt64 as Int64

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as Int64 data.

Notes: (Read only property)

5.40.23 asInteger as Integer

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as Integer data.

Notes: Either Int32 or Int64 depending on whether the application is 32 or 64 bit.
(Read only property)

5.40.24 asLong as Int32

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as Int32 data.

Notes: If the value of current object is NULL, asLong method returns 0. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is long (kDataTypeLong), asLong method returns the original value with no conversion.

If the value's type of current object is bool (kDataTypeBool), short (kDataTypeShort), double (kDataTypeDouble) or numeric (kDataTypeNumeric), asLong method converts it to long data type. Note, that in this case the returned value can be truncated.

If the value's type of current object is string (kDataTypeString), asLong method tries to convert it to long (kDataTypeLong) value. If the conversion is possible and correct, asLong returns kDataTypeLong value. If conversion is incorrect asLong method throws an exception.

If the value's type of current object is any data type except the described above, the result is undefined and debug version asserts.

Use `DataType` method to get the value's type of `SQLValueRead` object.
(Read only property)

5.40.25 `asShort` as `Int16`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as short.

Notes: If the value of current object is NULL, `asShort` method returns 0. Use `isNull` method to make sure if the value is NULL or not.

If the value's type of current object is short, `asShort` method returns the original value with no conversion.

If the value's type of current object is `bool` (`kDataTypeBool`), `long` (`kDataTypeLong`), `unsigned long` (`SkDataTypeULong`), `double` (`kDataTypeDouble`) or `numeric` (`kDataTypeNumeric`), `asShort` method converts it to short data type. Note, that in this case the returned value can be truncated.

If the value's type of current object is `string` (`kDataTypeString`), `asShort` method tries to convert it to short value. If the conversion is possible and correct, `asShort` returns the value. If conversion is incorrect `asShort` method throws an exception.

If the value's type of current object is any data type except the described above, the result is undefined and debug version asserts.

Use `DataType` method to get the value's type of `SAValueRead` object.
(Read only property)

5.40.26 `asStringValue` as `String`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value string.

Notes: Same as `asString` but returns a Xojo string.

Please use `SQLStringMBS` and `CopyBinaryData` if the string you want to read is a BLOB value, else text encoding will change your data!

For numbers, this may give english decimal separator. For getting localized one, please use `AsDoubleValue` and use `cstr()` function.

(Read only property)

5.40.27 asUInt32 as UInt32

Plugin Version: 19.2, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as UInt32 data.

Notes: (Read only property)

5.40.28 asULong as UInt32

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as an unsigned 32 bit integer value.

Notes: If the value of current object is NULL, asULong method returns 0. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is long (kDataTypeLong), asULong method returns the original value with no conversion.

If the value's type of current object is bool (kDataTypeBool), short (kDataTypeShort), double (kDataTypeDouble) or numeric (kDataTypeNumeric), asULong method converts it to long data type. Note, that in this case the returned value can be truncated.

If the value's type of current object is string (kDataTypeString), asULong method tries to convert it to long (kDataTypeLong) value. If the conversion is possible and correct, asULong returns kDataTypeLong value. If conversion is incorrect asULong method throws an exception.

If the value's type of current object is any data type except the described above, the result is undefined and debug version asserts.

Use DataType method to get the value's type of SQLValueRead object.
(Read only property)

5.40.29 asUShort as UInt16

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as unsigned short.

Notes: If the value of current object is NULL, asUShort method returns 0. Use isNull method to make sure if the value is NULL or not.

If the value's type of current object is unsigned short, asUShort method returns the original value with no

conversion.

If the value's type of current object is bool (`kDataTypeBool`), long (`kDataTypeLong`), unsigned long (`SkDataTypeULong`), double (`kDataTypeDouble`) or numeric (`kDataTypeNumeric`), `asUShort` method converts it to unsigned short data type. Note, that in this case the returned value can be truncated.

If the value's type of current object is string (`kDataTypeString`), `asUShort` method tries to convert it to unsigned short value. If the conversion is possible and correct, `asUShort` returns the value. If conversion is incorrect `asUShort` method throws an exception.

If the value's type of current object is any data type except the described above, the result is undefined and debug version asserts.

Use `DataType` method to get the value's type of `SARValueRead` object.
(Read only property)

5.40.30 `asVariant` as `Variant`

Plugin Version: 12.5, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns the value as a variant.

Notes: This is a convenience function.

May return nil, date, number or string.

BLOB strings without encoding and text strings as UTF-8.

(Read only property)

5.40.31 `DataType` as `Integer`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns `SARValueRead` object's data type.

Notes: One of the `kDataType` constants.

(Read only property)

5.40.32 `isNull` as `boolean`

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: Returns true if the value of current object is NULL; otherwise false.

Notes: (Read only property)

5.40.33 LongOrLobReaderMode as Integer

Plugin Version: 9.3, Platforms: macOS, Linux, Windows, Targets: All.

Function: The Long or Lob data reading mode.

Notes: SQLAPI++ Library provides two ways to read Long or BLOB(CLOB) object's value (usually SQL-Field or SQLParam objects):

1. reading of Long or Lob data at once into an internal buffer (like ordinary string or binary values);
 2. piecewise reading of Long or Lob data using user defined callback.
- kLongOrLobReaderDefault reading mode used by default.

If you want to control piecewise reading of Long or BLOB(CLOB) data you should set LongOrLobReaderMode and use kLongOrLobReaderManual reading mode for Long or BLOB(CLOB) parameters or fields you want to process with your data consumer. After that each fetch will skip reading Long and BLOB(CLOB) parameters that you set to be read manually. To read field or parameter defined to be read manually you should call ReadLongOrLob method for each of them after the fetch. ReadLongOrLob method will repeatedly call the data consumer Write event.
(Read and Write property)

5.40.34 Constants

Constants

Constant	Value	Description
kDataTypeInt64	6	One of the field type constants Signed 64-bit integer.
kDataTypeUInt64	7	One of the field type constants Unsigned 64-bit integer.

Data Types

Constant	Value	Description
kDataTypeBlob	16	Data type is BLOB data (SQLStringMBS).
kDataTypeBool	1	Data type is a boolean.
kDataTypeBytes	13	Data type is binary string (SQLStringMBS).
kDataTypeClob	17	Data type is CLOB data (SQLStringMBS).
kDataTypeCursor	18	Data type is Oracle REF CURSOR (SQLCommand).
kDataTypeDateTime	10	Data type is SQLDateTime.
kDataTypeDouble	8	This is a normal double variable.
kDataTypeInterval	11	Data type is an interval (SQLIntervalMBS).
kDataTypeLong	4	A 32 bit integer.
kDataTypeLongBinary	14	Data type is long binary data (SQLStringMBS).
kDataTypeLongChar	15	Data type is long character data (SQLStringMBS).
kDataTypeNumeric	9	Data type is SQLNumeric (used internally).
kDataTypeShort	2	Data type is a 16 bit signed integer.
kDataTypeSpecificToDBMS	19	Data type is server-specific.
kDataTypeString	12	Data type is character string (SQLString).
kDataTypeULong	5	Data type is a 32 bit unsigned integer.
kDataTypeUnknown	0	Data type is unknown.
kDataTypeUShort	3	A 16 bit unsigned integer.

Read Modes

Constant	Value	Description
kLongOrLobReaderModeDefault	0	Long or Lob(CLOB) data reading mode is default (automatic).
kLongOrLobReaderModeManual	1	Long or Lob(CLOB) data reading mode is manual.

Chapter 6

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Chapter 7

The FAQ

7.0.1 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)

7.0.2 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.

7.0.3 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:

- 7.0.4 How to catch delete key? 295
- 7.0.5 How to convert cmyk to rgb? 296
- 7.0.6 How to delete a folder? 297
- 7.0.7 How to detect if CPU is 64bit processor? 298
- 7.0.8 How to query variant type string for a variant? 299
- 7.0.9 How to refresh a htmlviewer on Windows? 300

7.0.4 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:

- 7.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 294

- 7.0.5 How to convert cmyk to rgb? 296
- 7.0.6 How to delete a folder? 297
- 7.0.7 How to detect if CPU is 64bit processor? 298
- 7.0.8 How to query variant type string for a variant? 299
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7.0.5 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:

- 7.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 294
- 7.0.4 How to catch delete key? 295
- 7.0.6 How to delete a folder? 297
- 7.0.7 How to detect if CPU is 64bit processor? 298
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7.0.6 How to delete a folder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: The following is the code that deletes a folder recursively.

Example:

```
Sub deletefolder(f as folderitem)
dim files(-1) as FolderItem

if f=nil then Return

// delete single file
if f.Directory=false then
f.Delete
Return
end if

// get a list of all items in that folder
dim i,c as Integer
c=F.Count
for i=1 to c
files.Append f.TrueItem(i)
next

// delete each item
for each fo as FolderItem in files
if fo=nil then
' ignore
elseif fo.Directory then
deletefolder fo
fo.delete
else ' file
```

```
fo.Delete
end if
next
```

```
f.Delete
End Sub
```

See also:

- 7.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 294
- 7.0.4 How to catch delete key? 295
- 7.0.5 How to convert cmyk to rgb? 296
- 7.0.7 How to detect if CPU is 64bit processor? 298
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7.0.7 How to detect if CPU is 64bit processor?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Via CPUID you can ask CPU:

Example:

```
dim c as new CPUIDMBS

if c.Flags(CPUIDMBS.kFeatureLM) then
MsgBox "64-bit CPU"
else
MsgBox "32-bit CPU"
end if
```

Notes: Should work on all intel compatible CPUs.

See also:

- 7.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 294
- 7.0.4 How to catch delete key? 295
- 7.0.5 How to convert cmyk to rgb? 296
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7.0.8 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:

- 7.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 294
- 7.0.4 How to catch delete key? 295
- 7.0.5 How to convert cmyk to rgb? 296
- 7.0.6 How to delete a folder? 297
- 7.0.7 How to detect if CPU is 64bit processor? 298
- 7.0.9 How to refresh a htmlviewer on Windows? 300

7.0.9 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:

- 7.0.3 How do I get the proper highlight color on Mac OS X for active/inactive selection? 294
- 7.0.4 How to catch delete key? 295
- 7.0.5 How to convert cmyk to rgb? 296

- 7.0.6 How to delete a folder? 297
- 7.0.7 How to detect if CPU is 64bit processor? 298
- 7.0.8 How to query variant type string for a variant? 299

7.0.10 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
```

7.0.11 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.

7.0.12 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
```

7.0.13 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.

7.0.14 Can I access Access Database with Java classes?

Plugin Version: all, Platform: Windows.

Answer: You can use `ucanaccess` to access databases created with Microsoft

Example:

```

dim options(-1) as string

// load all the jar files we have in a folder called java:

dim appFolder as FolderItem = GetFolderItem("")

Dim count as Integer = appFolder.Parent.Child("java").Count
dim libjs() as string
For i as Integer = 1 to count
Dim f As FolderItem = appFolder.Parent.Child("java").item(i)
If f <> Nil and f.Exists Then
libjs.append f.NativePath+";"
End If
Next

// now init virtual machine
dim library as string = Join(libjs, "")
dim vm as new JavaVMMBS(library)

if vm.Handle = 0 then
MsgBox "Failed to initialize virtual machine"
else
// now make a new database connection with ucanaccess
dim d as new JavaDatabaseMBS(vm,"net.ucanaccess.jdbc.UcanaccessDriver")
Dim DbFile as FolderItem = appFolder.Parent.Child("Database11.accdb")
dim j as JavaConnectionMBS = d.getConnection("jdbc:ucanaccess://" + DbFile.NativePath)

// select and show values
dim r as JavaResultSetMBS = j.MySelectSQL("Select * From test")
while r.NextRecord
MsgBox r.getString("FirstName") + " " + r.getString("LastName")
wend

end if

```

Exception e as JavaExceptionMBS
MsgBox e.message+" **errorcode:** "+str(e.ErrorNumber)

Notes: see website:
<http://ucanaccess.sourceforge.net/site.html>

7.0.15 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.

7.0.16 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.

7.0.17 Can I use graphics class with DynaPDF?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Sorry, no. We can't provide a graphics subclass from plugin.

Notes: This is a feature request to allow graphics subclasses:

Feedback case 11391: [feedback://showreport?report_id=11391](https://feedback.apple.com/showreport?report_id=11391)

7.0.18 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.

7.0.19 Can I use your ChartDirector plugin on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, our ChartDirector plugin works just fine on the Xojo Web Edition.

Example:

```
// The data for the pie chart
dim data(-1) as Double=array(55.0, 18.0, 25.0, 22.0, 18.0, 30.0, 35.0)

// The labels for the pie chart, Words are chosen random to check font!
dim labels(-1) as string=array("Germany", "Italy", "France", "Spain", "UK", "Poland", "Russia")

// The colors to use for the sectors
dim colors(-1) as Integer

colors.Append &h66aaee
colors.Append &heebb22
colors.Append &hbbsbbb
colors.Append &h8844ff

if TargetLinux then
  CDBaseChartMBS.SetFontSearchPath "/usr/share/fonts/truetype/msttcorefonts"
end if

// Create a PieChart object of size 360 x 300 pixels
dim c as new CDPieChartMBS(700, 600)
```

```

c.setBackground(c.linearGradientColor(0, 0, 0, c.getHeight(), &h0000cc, &h000044))
c.setRoundedFrame(&hffffff, 16)
dim tt as CDTextBoxMBS = c.addTitle("ChartDirector Demonstration", "timesbi.ttf", 18)
tt.setMargin(0, 0, 16, 0)
tt.setFontColor(&hFFFFFF)

// Set the center of the pie at (180, 140) and the radius to 100 pixels
c.setPieSize 350,300,150
// Set the sector colors
c.setColors(c.kDataColor, colors)

// Draw the pie in 3D with a pie thickness of 20 pixels
c.set3D(20)

dim t as CDTextBoxMBS = c.setLabelStyle("arialbd.ttf", 10, &h000000)
t.setBackground(CDPieChartMBS.kSameAsMainColor, CDPieChartMBS.kTransparent, CDPieChartMBS.soft-
Lighting(CDPieChartMBS.kRight, 0))
t.setRoundedCorners(8)

// Use local gradient shading for the sectors, with 5 pixels wide
// semi-transparent white (bbffffff) borders
c.setSectorStyle(CDPieChartMBS.kLocalGradientShading, &hbbffffff, 0)

// Set the pie data and the pie labels
c.setData data,labels
call c.setLabelStyle "arialbd.ttf",18

dim pic as picture = c.makeChartPicture
dim wp as new WebPicture(pic, Picture.FormatJPEG) // JPEG makes it smaller and faster

ImageView1.Picture=wp

```

Notes: Be aware that our plugin produces pictures for you, which you assign to ImageViews. Transferring those pictures takes time, so you can optimize that with using WebPicture class. There you can decide between different compressions to improve speed (use JPEG instead of PNG).

e.g. if you use ubuntu, you can install the ttf-mscorefonts-installer package and call this method with `"/usr/share/fonts/truetype/msttcorefonts"` as the path. No backslash on the end of a path, please.

7.0.20 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.

7.0.21 Can I use your plugin controls on a web application?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: No.

7.0.22 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.

7.0.23 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.

7.0.24 ChartDirector: Color Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

Answer: ChartDirector: Color Specification

Notes: Many functions in the ChartDirector API accept colors as parameters. ChartDirector supports col-

ors specified in web and HTML compatible ARGB format, in which ARGB refers to the Alpha transparency, Red, Green and Blue components of the color.

In addition to ARGB colors, ChartDirector supports "dynamic" colors. A dynamic color is a color that changes depending on the position of the pixels. The "dynamic" colors that ChartDirector supports include "pattern colors", "metal colors", "gradient colors", "zone colors" and "dash line colors".

ChartDirector supports specifying colors indirectly using "palette colors". When a "palette color" is used, the color is specified as an index to a palette. The actual color is looked up from the palette. ARGB Color ARGB color consists of 4 components - alpha transparency, red, green and blue. The four components are encoded as a 32-bit number, with each component occupying 8 bits. In hexadecimal notation, it is AAR-RGGBB, where AA, RR, GG and BB are the alpha transparency, red, green and blue components.

Each component ranges from 00 - FF (0 - 255), representing its intensity. For example, pure red color is 00FF0000, pure green color is 0000FF00, and pure blue color is 000000FF. White color is 00FFFFFF, and black color is 00000000.

Most programming language requires you to put special prefix in front of hexadecimal characters. For C++, the prefix is "0x". For example, the syntax for the hexadecimal number 00FFFFFF is 0x00FFFFFF, or simply 0xFFFFFF.

For the alpha transparency component, a zero value means the color is not transparent at all. This is equivalent to traditional RGB colors. A non-zero alpha transparency means the color is partially transparent. The larger the alpha transparency, the more transparent the color will be. If a partially transparent color is used to draw something, the underlying background can still be seen.

For example, 80FF0000 is a partially transparent red color, while 00FF0000 is a non-transparent red color.

Note that ChartDirector's ARGB color is web and HTML compatible. For example, red is FF0000, the same as in HTML. There are many resources on the web that provide tables in which you can click a color and it will show its HTML color code. These color codes can be used in ChartDirector.

If alpha transparency is FF (255), the color is totally transparent. That means the color is invisible. It does not matter what the RGB components are. So in ChartDirector, only one totally transparent color is used - FF000000. All other colors of the form FFnnnnnn are reserved to represent palette colors and dynamic colors, and should not be interpreted as the normal ARGB colors.

The totally transparent color FF000000 is often used in ChartDirector to disable drawing something. For example, if you want to disable drawing the border of a rectangle, you can set the border color to totally transparent.

For convenience, ChartDirector defines a constant called Transparent, which is equivalent to FF000000. Pattern Color

A pattern color is a dynamic color that changes according to a 2D periodic pattern. When it is used to fill an area, the area will look like being tiled with a wallpaper pattern.

Pattern colors are created using `BaseChart.patternColor`, `BaseChart.patternColor2`, `DrawArea.patternColor` and `DrawArea.patternColor2`. The `patternColor` method creates pattern colors using an array of colors as a bitmap. The `patternColor2` method creates pattern colors by loading the patterns from image files.

These methods return a 32-bit integer acting as a handle to the pattern color. The handle can be used in any `ChartDirector` API that expects a color as its input.

A metal color is a color of which the brightness varies smoothly across the chart surface as to make the surface look shiny and metallic. `ChartDirector` supports using any color as the base color of the metal color. In particular, using yellow and grey as the base colors will result in metal colors that look gold and silver.

Metal colors are most often used as background colors of charts. They are created using `CDBaseChartMBS.metalColor`, `CDBaseChartMBS.goldColor` and `CDBaseChartMBS.silverColor`. The first method allows you to specify an arbitrary base color. The second and third methods use yellow and grey as the base colors, resulting in gold and silver metal colors.

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any `ChartDirector` API that expects a color as its input.

A gradient color is a color that changes progressively across a direction.

Gradient colors are created using `BaseChart.gradientColor`, `BaseChart.gradientColor2`, `DrawArea.gradientColor` and `DrawArea.gradientColor2`. The `gradientColor` method creates a 2-point gradient color that changes from color A to color B. The `gradientColor2` method creates a multi-point gradient colors that changes from color A to B to C

These methods return a 32-bit integer acting as a handle to the gradient color. The handle can be used in any `ChartDirector` API that expects a color as its input.

One common use of multi-point gradient colors is to define colors that have metallic look and feel. Please refer to `DrawArea.gradientColor2` for details.

A dash line color is a color that switches on and off periodically. When used to draw a line, the line will appear as a dash line.

Dash line colors are created using `BaseChart.dashLineColor` and `DrawArea.dashLineColor`. They accept a line color and a dash pattern code as arguments, and return a 32-bit integer acting as a handle to the dash line color. The handle can be used in any `ChartDirector` API that expects a color as its input.

Zone Colors
A zone color is for XY charts only. It is a color that automatically changes upon reaching a data threshold value along the x-axis or y-axis. Zone colors are created using `Layer.xZoneColor`, `Layer.yZoneColor`, `XYChart.xZoneColor` or `XYChart.yZoneColor`.

Palette Colors
Palette colors are colors of the format `FFFFnnnn`, where the least significant 16 bits (`nnnn`) are the index to the palette. A palette is simply an array of colors. For a palette color, the actual color is obtained by

looking up the palette using the index. For example, the color FFFF0001 is the second color in the palette (first color is index 0).

The colors in the palette can be ARGB colors or "dynamic" colors (pattern, gradient and dash line colors).

The first eight palette colors have special significance. The first three palette colors are the background color, default line color, and default text color of the chart. The 4th to 7th palette colors are reserved for future use. The 8th color is a special dynamic color that is equal to the data color of the "current data set".

The 9th color (index = 8) onwards are used for automatic data colors. For example, in a pie chart, if the sector colors are not specified, ChartDirector will automatically use the 9th color for the first sector, the 10th color for the second sector, and so on. Similarly, for a multi-line chart, if the line colors are not specified, ChartDirector will use the 9th color for the first line, the 10th color for the second line, and so on.

The ChartDirector API defines several constants to facilitate using palette colors.

ConstantValueDescription

Palette	FFFF0000	The starting point of the palette. The first palette color is (Palette + 0). The nth palette color is (Palette + n - 1).
BackgroundColor	FFFF0000	The background color.
LineColor	FFFF0001	The default line color.
TextColor	FFFF0002	The default text color.
[Reserved]	FFFF0003 - FFFF0006	These palette positions are reserved. Future versions of ChartDirector may use these palette positions for colors that have special significance.
SameAsMainColor	FFFF0007	A dynamic color that is equal to the data color of the current data set. This color is useful for objects that are associated with data sets. For example, in a pie chart, if the sector label background color is SameAsMainColor, its color will be the same as the corresponding sector color.
DataColor	FFFF0008	The starting point for the automatic data color allocation.

When a chart is created, it has a default palette. You may modify the palette using BaseChart.setColor, BaseChart.setColors, or BaseChart.setColors2.

The advantages of using palette colors are that you can change the color schemes of the chart in one place. ChartDirector comes with several built-in palettes represented by the following predefined constants.

ConstantDescription

7.0.25 ChartDirector: Font Specification

Plugin Version: 8.2, Platforms: macOS, Linux, Windows.

defaultPalette	An array of colors representing the default palette. This palette is designed for drawing charts on white backgrounds (or lightly colored backgrounds).
whiteOnBlackPalette	An array of colors useful for drawing charts on black backgrounds (or darkly colored backgrounds).
transparentPalette	An array of colors useful drawing charts on white backgrounds (or lightly colored backgrounds). The data colors in this palette are all semi-transparent.

Answer: ChartDirector: Font Specification

Notes: Font Name

In ChartDirector, the font name is simply the file name that contains the font. For example, under the Windows platform, the "Arial" font is "arial.ttf", while the "Arial Bold" font is "arialbd.ttf".

NOTE: Mac OS X Specific Information

In Mac OS X, in addition to ".ttf", ChartDirector also supports Mac OS X font file formats, such as Font Suitcase files and Datafork files (.dfont). These files often contain multiple fonts. For example, the "GillSans.dfont" file contains 6 fonts.

So in addition to the file name, an index is needed to determine the font. The index is specified by appending a " | " character to the font name, followed by the index number. For example, the third font in "GillSans.dfont" is denoted as "GillSans.dfont | 2". (Note: The first font starts at 0.) If no index number is provided, the first font is assumed.

ChartDirector also supports using Mac OS X Font Manager names. For example, one may use "Gill Sans Light Italic" instead of using "GillSans.dfont | 1" as the font name. However, the Mac OS X Font Manager is active only if someone has logged into the Mac GUI console, so this method is only recommended for developing applications that run on the GUI console.

The sample programs that come with ChartDirector are designed to run on all operating systems, so they use generic font file names (eg. "arial.ttf") instead of Mac OS X specific names. To allow them to run on Mac OS X, ChartDirector on Mac OS X has a built-in table to map common font file names to Mac OS X font names:

"arial.ttf", "arialbd.ttf", "ariali.ttf" and "arialbi.ttf" are mapped to "Arial | 0" (Arial), "Arial | 1" (Arial Bold), "Arial | 2" (Arial Italic) and "Arial | 3" (Arial Bold Italic)

"times.ttf", "timesbd.ttf", "timesi.ttf" and "timesbi.ttf" are mapped to "Times New Roman | 0" (Times New Roman), "Times New Roman | 1" (Times New Roman Bold), "Times New Roman | 2" (Times New Roman Italic) and "Times New Roman | 3" (Times New Roman Bold Italic)

"cour.ttf", "courbd.ttf", "couri.ttf" and "courbi.ttf" are mapped to "Courier New | 0" (Courier New), "Courier New | 1" (Courier New Bold), "Courier New | 2" (Courier New Italic) and "Courier New | 3" (Courier New Bold Italic)

Font Location

ChartDirector on Windows does not come with any font files. It relies on the operating system's font files in the " [windows] \Fonts" directory. To see what fonts are installed in your operating system and their file names, use the File Explorer to view that directory.

ChartDirector on Windows will also search for the font files in the "fonts" subdirectory (if it exists) under the directory where the ChartDirector DLL "chartdir.dll" is installed. This is useful for private fonts. Also, for some especially secure web servers, the web anonymous user may not have access to the " [windows] \Fonts" directory. In this case, you may copy the font files to the above subdirectory.

ChartDirector on Mac OS X relies on operating system font files in "/Library/Fonts" and "/System/Library/Fonts".

ChartDirector on Linux, FreeBSD and Solaris assume the fonts files are in the "fonts" subdirectory under the directory where the ChartDirector shared object "libchartdir.so" is installed. ChartDirector on Linux, FreeBSD and Solaris come with a number of font files in the "fonts" subdirectory.

To keep the download size small, ChartDirector on Linux, FreeBSD and Solaris only come with some commonly used fonts. You may download additional fonts from the Internet. In particular, the Microsoft fonts at

http://sourceforge.net/project/showfiles.php?group_id=34153&release_id=105355

is highly recommended. Please refer to

<http://www.microsoft.com/typography/faq/faq8.htm>

on how you could use the fonts legally in your system.

ChartDirector supports True Type fonts (.ttf), Type 1 fonts (.pfa and .pfb) and Windows bitmap fonts (.fon). On Mac OS X, ChartDirector also supports Font Suitcase and Datafork (.dfont) files. On Linux, FreeBSD and Solaris, ChartDirector also supports Portable Compiled Fonts (.pcf fonts).

If you want ChartDirector to search other directories for the font files, you may list the directories in an environment variable called "FONTSPATH".

If you specify an absolute path name for the font file, ChartDirector will use the absolute path name and will not search other directories.

Artificial Boldening and Italicizing
Whereas most popular font comes with different styles for "normal", "bold", "italic" and "bold italic", some fonts only come with one style (the normal style). For example, the Monotype Corsiva font that comes with MS Office only has the normal style (mtcorsva.ttf). For these cases, you may append the "Bold" and/or "Italic" words after the font file name (separated with a space) to ask ChartDirector to artificially bolden and/or italicize the font. For example, you may specify the font name as "mtcorsva.ttf Bold".

Font List
Instead of specifying a single font file as the font name, you may specify a list of font files as the font name, separated by semi-colons. This is useful when using international characters that are only available in some fonts.

For example, if you would like to use the Arial font ("arial.ttf") for western characters, and the MingLiu font "mingliu.ttc" for Chinese characters (since the Arial font does not have Chinese characters), you may specify the font name as "arial.ttf;mingliu.ttc". In this case, ChartDirector will try the Arial font first. If it cannot find a certain character there, it will try the MingLiu font.

ChartDirector supports several special keywords for specifying the font name indirectly. When these keywords are used as font names, ChartDirector will look up the actual font names from a font table. The keywords are as follows:

KeywordsDescription

"normal"	This default normal font, which is the first font in the font table. This is initially mapped to "arial.ttf" (Arial).
"bold"	The default bold font, which is the second font in the font table. This is initially mapped to "arialbd.ttf" (Arial Bold).
"italic"	The default italic font, which is the third font in the font table. This is initially mapped to "ariali.ttf" (Arial Italic).
"boldItalic"	The default bold-italic font, which is the fourth font in the font table. This is initially mapped to "arialbi.ttf" (Arial Bold Italic).
"fontN"	The (N + 1)th font in the font table (the first font is "font0").

The font table can be modified using `BaseChart.setFontTable` or `DrawArea.setFontTable`.

The advantage of using indirect font names is that you can change the fonts in your charts in one place.

Most font files contain one font. However, it is possible a font file contains multiple fonts (that is, a font collection). For example, in True Type fonts, font files with extension ".ttc" may represent a font collection.

If a font file contains multiple font, the font index can be used to specify which font to use. By default, the font index is 0, which means the first font in the font file will be used.

The font size decides how big a font will appear in the image. The font size is expressed in a font unit called points. This is the same unit used in common word processors.

Instead of specifying font size, some ChartDirector API (eg. `TextBox.setFontSize`) allow you to specify font height and font width separately. You may use different point sizes for font height and font width to create special effects.

This is the color to draw the font. (See Color Specification on how colors are represented in ChartDirector.)

This is the angle in degrees by which the font should be rotated anti-clockwise.

By default, text are laid out horizontally, with characters being drawn from left to right.

ChartDirector also supports vertical layout, with characters being drawn from top to bottom. For example, you may use `BaseChart.addText` to add text that are laid out vertically. Vertical layout is common for

oriental languages such as Chinese, Japanese and Korean.

7.0.26 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.

Attribute	Description
super	Set the following text to be in superscript style. This attribute does not need to have a value. (You may use "super" as the attribute instead of "super=1".)

Note that unlike HTML tags, no double or single quotes are used in the tags. It is because CDML tags are often embedded as string literals in source code. The double or single quotes, if used, will conflict with the string literal quotes in the source code. Therefore in CDML, no quotes are necessary and they must not be used.

Also, unlike HTML tags, CDML uses the comma character as the delimiter between attributes. It is because certain attributes may contain embed spaces (such as the font file name). So space is not used as the delimiter and the comma character is used instead.

Note the font attribute above starts a new style section, while other attributes just modify the current style

font	Starts a new style section, and sets the font name. You may use this attribute without a value (that is, use "font" instead of "font=arial.ttf") to create a new style section without modifying the font name.
size	The font size.
width	The font width. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
height	The font height. This attribute is used to set the font width and height to different values. If the width and height are the same, use the size attribute.
color	The text color in hex format.
bgColor	The background color of the text in hex format.
underline	The line width of the line used to underline the following characters. Set to 0 to disable underline.
sub	Set the following text to be in subscript style. This attribute does not need to have a value. (You may use "sub" as the attribute instead of "sub=1".)
super	Set the following text to be in superscript style.
xoffset	Draw the following the text by shifting the text horizontally from the original position by the specified offset in pixels.
yoffset	Draw the following the text by shifting the text vertically from the original position by the specified offset in pixels.
advance	Move the cursor forward (to the right) by the number of pixels as specified by the value this attribute.
advanceTo	Move the cursor forward (to the right) to the position as specified by the value this attribute. The position is specified as the number of pixels to the right of the left border of the block. If the cursor has already passed through the specified position, the cursor is not moved.

section. You may use `</font*>` to terminate a style section, which will restore the font styles to the state before the style section.

Blocks and Lines

In CDML, a text string may contain multiple blocks. A block may contain multiple lines of text by separating them with new line characters ("`\n`") or with `<br*>`. The latter is useful for programming languages that cannot represent new line characters easily.

For example, the line:

```
<*size=15*><*block*><*color=FF*>BLOCK<*br*>ONE<*/*>and <*block*><*color=FF00*>BLOCK<*br*>TWO
```

will result in the following text rendered:

The above example contains a line of text. The line contains two blocks with the characters " and " in between. Each block in turn contains two lines. The blocks are defined using `<*block*>` as the start tag and

`<*/*>` as the end tag.

When a block ends, font styles will be restored to the state before entering the block. Embedding Images
CDML supports embedding images in text using the following syntax:

```
<*img=my_image_file.png*>
where my_image_file.png is the path name of the image file.
```

For example, the line:

```
<*size=20*>A <*img=sun.png*>day
will result in the following text rendered:
```

ChartDirector will automatically detect the image file format using the file extension, which must either png, jpg, jpeg, gif, wbmp or wmp (case insensitive).

Please refer to `BaseChart.setSearchPath` or `DrawArea.setSearchPath` on the directory that ChartDirector will search for the file.

The `<*img*>` tag may optionally contain width and height attributes to specify its pixel width and height. In this case, ChartDirector will stretch or compress the image if necessary to the required width and height. Blocks Attributes

CDML supports nesting blocks, that is, a block can contain other sub-blocks. Attributes are supported in the `<*block*>` tag to control the alignment and orientation of the sub-blocks. The `<*img=my_image_file.png*>` is treated as a block for layout purposes.

For example, the line:

```
<*block,valign=absmiddle*><*img=molecule.png*><*block*>Hydrazino\nMolecule<*/*><*/*>
will result in the following text rendered:
```

The the above starts `<*block,valign=absmiddle*>` which specifies its content should align with each others in the vertical direction using the absolute middle alignment. The block contains an image, followed by a space characters, and then another block which has two lines of text.

The following table describes the supported attributes inside `<*block*>` tag:

Attribute	Description
-----------	-------------

The value `baseline` means the baseline of sub-blocks should align with the baseline of the block. The `baseline`

width	The width of the block in pixels. By default, the width is automatically determined to be the width necessary for the contents of the block. If the width attribute is specified, it will be used as the width of the block. If the width is insufficient for the contents, the contents will be wrapped into multiple lines.
height	The height of the block in pixels. By default, the height is automatically determined to be the height necessary for the contents of the block. If the height attribute is specified, it will be used as the height of the block.
maxwidth	The maximum width of the block in pixels. If the content is wider than maximum width, it will be wrapped into multiple lines.
truncate	The maximum number of lines of the block. If the content requires more than the maximum number of lines, it will be truncated. In particular, if truncate is 1, the content will be truncated if it exceeds the maximum width (as specified by maxwidth or width) without wrapping. The last few characters at the truncation point will be replaced with "...".
linespacing	The spacing between lines as a ratio to the default line spacing. For example, a line spacing of 2 means the line spacing is two times the default line spacing. The default line spacing is the line spacing as specified in the font used.
bgColor	The background color of the block in hex format.
valign	The vertical alignment of sub-blocks. This is for blocks that contain sub-blocks. Supported values are baseline, top, bottom, middle and absmiddle.

is the underline position of text. This is normal method of aligning text, and is the default in CDML. For images or blocks that are rotated, the baseline is the same as the bottom.

The value top means the top line of sub-blocks should align with the top line of the block.

The value bottom means the bottom line of sub-blocks should align with the bottom line of the block.

The value middle means the middle line of sub-blocks should align with the the middle line of the block. The middle line is the middle position between the top line and the baseline.

The value absmiddle means the absolute middle line of sub-blocks should align with the absolute middle line of the block. The absolute middle line is the middle position between the top line and the bottom line.

halign The horizontal alignment of lines. This is for blocks that contain multiple lines. Supported values are left, center and right.

The value left means the left border of each line should align with the left border of the block. This is the default.

The value center means the horizontal center of each line should align with the horizontal center of the block.

The value right means the right border of each line should align with the right border of the block.

angle Rotate the content of the block by an angle. The angle is specified in degrees in counter-clockwise direction.

7.0.27 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.

7.0.28 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
```

7.0.29 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.

7.0.30 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)

7.0.31 Do you have plugins for X-Rite EyeOne, eXact or i1Pro?

Plugin Version: all.

Answer: Our EyeOne plugin is available on request for licensees of the X-Rite SDKs.

Notes: Please first go to X-Rite and get a SDK license.

Then we can talk about the plugin.

7.0.32 Does SQL Plugin handle stored procedures with multiple result sets?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Yes, the plugin can work with multiple recordsets.

Notes: You need to use SQLCommandMBS class. When you get back results, you use FetchNext to walk over all records in the first result set. Then you simply start again with FetchNext to get the second record set.

Even the RecordSet functions should work, just use them twice to get all records from both record sets.

7.0.33 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.

7.0.34 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
```

7.0.35 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.

7.0.36 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.

7.0.37 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.

7.0.38 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.

7.0.39 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.

7.0.40 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.

7.0.41 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.

7.0.42 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.

7.0.43 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.

7.0.44 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
```

7.0.45 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 name. If a library is missing, you usually see the address missing there or being zero.


```

while theRegexMatch <>nil
theStart = theRegexMatch.subExpressionStartB(0) + len(theRegexMatch.subExpressionString(0))

result = result + theRegexMatch.subExpressionString(1)
infoCharset = theRegexMatch.subExpressionString(2)
encodedPart = theRegexMatch.subExpressionString(4)
if theRegexMatch.subExpressionString(3) = "B" then
encodedPart = DecodeBase64(encodedPart)
elseif theRegexMatch.subExpressionString(3) = "Q" then
encodedPart = DecodeQuotedPrintable(encodedPart)
end if
if right(result, 1) = " " then
result = mid(result, 1, len(result)-1)
end if
encodedPart = encodedPart.DefineEncoding(GetInternetTextEncoding(infoCharset))
result = result + encodedPart

theRegex.SearchStartPosition = theStart
theRegexMatch = theRegex.search()
wend

result = result + mid(src, theStart+1)

else
result = src
end if
// theRegexMatch = theRegex.search

msgbox result

```

Notes: May not look nice depending on the controls used.
This is no longer needed when using MimeEmailMBS class which decodes for you.

7.0.48 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.

7.0.49 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
```

7.0.50 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.

7.0.51 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.

7.0.52 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.

7.0.53 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.

7.0.54 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.

7.0.55 How do I read the applications in the dock app?

Plugin Version: all, Platform: macOS.

Answer: Use CFPreferencesMBS class like in this example:

Example:

```

// Reads file names from persistent dock applications and puts them into the list

dim pref as new CFPreferencesMBS

dim persistentapps as CFStringMBS = NewCFStringMBS("persistent-apps")
dim ApplicationID as CFStringMBS = NewCFStringMBS("com.apple.dock")
dim tiledata as CFStringMBS = NewCFStringMBS("tile-data")
dim filelabel as CFStringMBS = NewCFStringMBS("file-label")

// get the array of persistent applications from dock preferences
dim o as CObjectMBS = pref.CopyValue(persistentapps, ApplicationID, pref.kCFPreferencesCurrentUser,
pref.kCFPreferencesAnyHost)

if o isa CFArrayMBS then
dim a as CFArrayMBS = CFArrayMBS(o)

// walk over all items in array
dim c as Integer = a.Count-1
for i as Integer = 0 to c

// get dictionary describing item
o = a.Item(i)

if o isa CFDictionaryMBS then
dim d as CFDictionaryMBS = CFDictionaryMBS(o)

```

```

// and pick tile data dictionary
o = d.Value(tiledata)
if o isa CFDictionaryMBS then
d = CFDictionaryMBS(o)

// and pick there the file label
o = d.Value(filelabel)
if o isa CFStringMBS then
// and display it
dim name as string = CFStringMBS(o).str
List.AddRow name
end if
end if
end if

next

else
MsgBox "Failed to read dock preferences."
end if

```

Notes: You can use the `CFPreferencesMBS.SetValue` to change a value and `CFPreferencesMBS.Synchronize` to write the values to disc. You may need to restart the `Dock.app` if you modified things.

7.0.56 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.

7.0.57 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.

7.0.58 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.

7.0.59 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.

7.0.60 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).

7.0.61 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.

7.0.62 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.

7.0.63 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>
```

7.0.64 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

7.0.65 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.

7.0.66 How to bring my application to front?

Plugin Version: all, Platform: macOS.

Answer: This makes SimpleText (Code txt) to the frontmost application:

Example:

```
Dim A As AppleEvent
```

```
A = NewAppleEvent("misc", "actv", "")
```

```
If Not A.Send then
```

```
Beep
```

```
end if
```

Notes: (Code is Mac only)

7.0.67 How to catch Control-C on Mac or Linux in a console app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use SignalHandlerMBS class for this.

Example:

```
// watch for Control-C on Mac
call SignalHandlerMBS.SetFlagHandler(2)

dim ende as boolean = false
do
if SignalHandlerMBS.IsFlagSet(2) then
Print "Flag 2 set. Existing..."
ende = true
end if

DoEvents 1
loop until ende
```

Notes: The signal is caught, a flag is set and you can ask later in your normal application flow for the result.

7.0.68 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.

7.0.69 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/>.

7.0.70 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.

7.0.71 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.

7.0.72 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
```

7.0.73 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.

7.0.74 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.

7.0.75 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.

7.0.76 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.

7.0.77 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.

7.0.78 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
```

7.0.79 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
```

7.0.80 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

7.0.81 How to convert a text to iso-8859-1 using the TextEncoder?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you although it's not perfect.
You need to set lc to the current color you use.

Example:

```

dim outstring as string
dim theMac, thePC as textencoding
dim Mac2PC as textconverter

theMac = getTextEncoding(0) // MacRoman
thePC = getTextEncoding(&h0201) // ISOLatin1

Mac2PC = getTextConverter(theMac, thePC)
// if you wanted to do the opposite just create a converter
// PC2Mac = getTextConverter(thePC, theMac)

outstring = Mac2PC.convert("Bj√rn, this text should be converted")
Mac2PC.clear

```

Notes:

You have to call Mac2PC.clear after every conversion to reset the encoding engine.
See also newer TextConverterMBS class.

7.0.82 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.

7.0.83 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.

7.0.84 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`

7.0.85 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.

7.0.86 How to copy a dictionary?

Plugin Version: all, Platform: macOS.

Answer: You can use a function like this to copy a dictionary:

Example:

```
Function CopyDictionary(d as Dictionary) As Dictionary
dim r as new Dictionary
for each key as Variant in d.keys
r.Value(key) = d.Value(key)
next
Return r
End Function
```

Notes: If needed make several copies of this method with different data types, not just double. For a deep copy of a dictionary of objects, you need to change code to also make a copy of those objects.

7.0.87 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.

7.0.88 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.

7.0.89 How to create a GUID?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use the UUIDMBS class for this.

7.0.90 How to create a Mac picture clip file?

Plugin Version: all, Platform: Windows.

Answer: You can use code like this one.

Example:

```

dim f As FolderItem
dim p As Picture

f=SpecialFolder.Desktop.Child("Test.pictClipping")
if f=nil then Return

p=new Picture(300,200,32) 'Make a sample picture
p.Graphics.ForeColor=RGB(0,255,255)
p.Graphics.FillOval 0,0,99,99

```

```
p.Graphics.ForeColor=RGB(255,0,0)
p.Graphics.DrawOval 0,0,99,99
```

```
dim r As ResourceFork 'ResourceFork is needed for a clip file
```

```
// Please define a file type Any
r=f.CreateResourceFork("Any")
```

```
// get PICT data using plugin function
dim pictdata as string = p.PicHandleDataMBS
r.AddResource(pictdata,"PICT",256,"Picture")
```

```
dim m as new MemoryBlock(8)
```

```
m.LittleEndian = false
m.Int16Value(0) = 0
m.Int16Value(2) = 0
m.Int16Value(4) = p.Width
m.Int16Value(6) = p.Height
```

```
r.AddResource(m,"RECT",256,"")
```

```
'Values taken from a sample file and irrelevant to the problem
```

```
dim data as string = DecodeBase64("AQAAAAAAAAAAAAAAAAACAFRDRVIAAABAAAAAAAAAAAAAAAAABUQ0IQAAAAA")
r.AddResource(data,"drag",128,"") 'ditto
r.Close
```

Notes: In general Apple has deprecated this, but a few application still support clippings.

7.0.91 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.

7.0.92 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.

7.0.93 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.

7.0.94 How to CURL Options translate to Plugin Calls?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below a few tips on how to translate command line CURL calls to plugin calls.

Notes: `curl -vX PUT http://localhost:5984/appserials/78569238475/DocumentRegister.docx?rev=3-25634563456 -data-binary @DocumentRegister.docx -H "Content-Type: application/msword"`

- The option `-v` means verbose. You can use `OptionVerbose` and listen for messages in the `DebugMessage` event.
- The option `-X PUT` means we want to do a HTTP PUT Request. So set `OptionPut` to true. Also you will want to set `OptionUpload` to true as you upload data.
- We have the URL which you put into `OptionURL` property.

- The `-data-binary` option tells CURL to pass the given data. With the `@` before the data, it is interpreted as a file name, so the data is read from the given file. You'll need to open this file and pass data with the Read event as needed. (See CURLS ftp file upload example project)
- The last option `-H` specifies an additional header for the upload. Pass this additional header with the `SetOptionHTTPHeader` method.

```
curl -X PUT http://127.0.0.1:5984/appserials/f2f4e540bf8bb60f61cfd4328001c59 -d '{ "type": "Product", "description": "Application Serial", "acronym": "AppSerial", "dateAdded": "2011-03-21 14:57:36" } '
```

- Option `-X PUT` like above.
- Pass the URL again in `OptionURL`
- This time data is passed in command line for CURL. You'd put this data in the quotes into a string and make it available in the Read event. (See CURLS ftp upload example project)

7.0.95 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.

7.0.96 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".

7.0.97 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)
```

7.0.98 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.

7.0.99 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.

7.0.100 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.

7.0.101 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
```



```

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.

7.0.104 How to draw a nice antialiased line?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

This code can help you although it's not perfect.
You need to set lc to the current color you use.

Example:

```

Sub drawLine(xs as Integer, ys as Integer, xe as Integer, ye as Integer, face as RGBSurface, lineColor as
color)
  dim intX, intY, count, n, xDiff, yDiff as Integer
  dim v, v1, floatX, floatY, xx, yy, xStep, yStep as Double
  dim c as color

  const st=1.0

  xDiff=xe-xs
  yDiff=ye-ys
  count=max(abs(xDiff), abs(yDiff))
  xStep=xDiff/count
  yStep=yDiff/count

```

```

xx=xs
yy=ys
for n=1 to count
intX=xx
intY=yy
floatX=xx-intX
floatY=yy-intY

v=(1-floatX)*(1-floatY)*st
v1=1-v
c=face.pixel(intX, intY)
face.pixel(intX, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*(1-floatY)*st
v1=1-v
c=face.pixel(intX+1, intY)
face.pixel(intX+1, intY)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=(1-floatX)*floatY*st
v1=1-v
c=face.pixel(intX, intY+1)
face.pixel(intX, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)
v=floatX*floatY*st
v1=1-v
c=face.pixel(intX+1, intY+1)
face.pixel(intX+1, intY+1)=rgb(v*lineColor.red+v1*c.red, v*lineColor.green+v1*c.green, v*lineColor.blue+v1*c.blue)

xx=xx+xStep
yy=yy+yStep
next

End Sub

```

Notes:

PS: st should be 1 and face should be a RGBSurface or a Graphics object.

7.0.105 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

7.0.106 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.

7.0.107 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.

7.0.108 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.

7.0.109 How to extract text from HTML?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use both RemoveHTMLTagsMBS and DecodingFromHTMLMBS like this:

Example:

```
dim html as string = "<p><B>Gr&uuml;&szlig;e</B></P>"
dim htmltext as string = RemoveHTMLTagsMBS(html)
dim text as string = DecodingFromHTMLMBS(htmltext)
```

MsgBox text // shows: Gr√üë

Notes: You can use it together with RemoveHTMLTagsMBS to remove html tags. What you get will be the text without tags.

DecodingFromHTMLMBS turns HTML escapes back to unicode characters. Like ä to √§.

7.0.110 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
```

7.0.111 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
```

7.0.112 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.

7.0.113 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".

7.0.114 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/>

7.0.115 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.

7.0.116 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
```

7.0.117 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
```

7.0.118 How to get CFAbsoluteTime from date?

Plugin Version: all, Platforms: macOS, Windows.

Answer: Use code like this:

Example:

```
dim d as new date
dim t as CFTimeZoneMBS = SystemCFTimeZoneMBS
dim g as new CFGregorianCalendarMBS
g.Day = d.Day
g.Month = d.Month
g.Year = d.Year
g.Minute = d.Minute
g.Hour = d.Hour
g.Second = d.Second

dim at as CFAbsoluteTimeMBS = g.AbsoluteTime(t)
dim x as Double = at.Value
```

```
MsgBox str(x)
```

Notes: As you see we need a timezone and put the date values in a gregorian date record. Now we can query absolute time for the given timezone.

7.0.119 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
```

7.0.120 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.

7.0.121 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.

7.0.122 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.

7.0.123 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>

7.0.124 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.

7.0.125 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.

7.0.126 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" ...

7.0.127 How to get the current free stack space?

Plugin Version: all, Platform: macOS.

Answer: You can something like the code below:

Example:

```
Sub ShowStackSize()
```

```
dim threadid as Integer
```

```
dim size as Integer
```

```
declare function GetCurrentThread lib "Carbon" (byref threadid as Integer) as short
```

```
declare function ThreadCurrentStackSize lib "Carbon" (threadid as Integer, byref size as Integer) as short
```

```
if GetCurrentThread(threadid)=0 then
```

```
if 0=ThreadCurrentStackSize(threadid,size) then
```

```
MsgBox str(size)
```

```
end if
```

```
end if
```

End Sub

Notes: For Mac OS 9, use "ThreadLib" instead of "CarbonLib". You can use #if if you like for that.

7.0.128 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

```

7.0.129 How to get the current window title?

Plugin Version: all, Platform: macOS.

Answer: The code below returns the current window title for the frontmost window on Mac OS X if Accessibility services are

Example:

```

Function CurrentWindowTitle() As string
// your application needs permissions for accessibility to make this work!

dim SystemWideElement,FocusedApplicationElement,FocusedWindowElement as AXUIElementMBS
dim FocusedApplication,FocusedWindow,Title as AXValueMBS
dim s as String
dim cs as CFStringMBS

```

```

SystemWideElement=AccessibilityMBS.SystemWideAXUIElement
if SystemWideElement<>nil then
FocusedApplication=SystemWideElement.AttributeValue(AccessibilityMBS.kAXFocusedApplicationAttribute)
if FocusedApplication.Type=AccessibilityMBS.kAXUIElementMBSTypeID then
FocusedApplicationElement=new AXUIElementMBS
FocusedApplicationElement.Handle=FocusedApplication.Handle
FocusedApplicationElement.RetainObject

FocusedWindow=FocusedApplicationElement.AttributeValue(AccessibilityMBS.kAXFocusedWindowAttribute)

if FocusedWindow<>nil and AccessibilityMBS.kAXUIElementMBSTypeID=FocusedWindow.Type then

FocusedWindowElement=new AXUIElementMBS
FocusedWindowElement.Handle=FocusedWindow.Handle
FocusedWindowElement.RetainObject

Title=FocusedWindowElement.AttributeValue(AccessibilityMBS.kAXTitleAttribute)
if Title<>nil and Title.Type=kCFStringMBSTypeID then
cs=new CFStringMBS
cs.handle=Title.Handle
cs.RetainObject
Return cs.str
end if
end if
end if
end if
End Function

```

7.0.130 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.

7.0.131 How to get the list of the current selected files in the Finder?

Plugin Version: all, Platform: macOS.

Answer:

Use the AppleScript like this one:

```
tell application "finder"
return selection
end tell
```

Which translates into this AppleEvent:

```
Process("Finder").SendAE "core,getd,'—':obj { form:prop, want:type(prop), seld:type(sele), from:'null'() }
"
```

and as Xojo code it looks like this:

Example:

```
dim ae as appleEvent
dim o1 as appleEventObjectSpecifier
dim f as folderItem
dim alist as appleEventDescList
dim i as Integer
dim dateiname as string

// setup the AppleEvent
o1=getpropertyObjectDescriptor( nil, "sele")
ae= newappleEvent("core", "getd", "MACS")
ae.objectSpecifierParam("—")=o1

// send it
if ae.send then
// got the list
alist=ae.replyDescList

// now show the list of filename into an editfield:

for i=1 to alist.count
f=alist.folderItem(i)

dateiname=f.name
// editfield1 with property "multiline=true"!
editfield1.text=editfield1.text + dateiname + chr(13)
next
```

end if

7.0.132 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

```

7.0.133 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.

7.0.134 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.

7.0.135 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!

7.0.136 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
```

7.0.137 How to get Xojo apps running Linux?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You need to install some require packages.

Notes: You need CUPS as well as GTK packages. On 64 bit systems also the ia32-libs package.

Please note that you need a x86 compatible Linux. So no PPC, Power, ARM or other CPUs.

7.0.138 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.

7.0.139 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.

7.0.140 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.

7.0.141 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.

7.0.142 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
```

7.0.143 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).

7.0.144 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.

7.0.145 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.

7.0.146 How to insert image to NSTextView or TextArea?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to insert file:

Example:

```
// insert a file to textview
```

```
Public Sub InsertFile(textview as NSTextViewMBS, f as FolderItem)
```

```
// read to file
```

```

dim b as BinaryStream = BinaryStream.Open(f)
dim s as string = b.Read(b.Length)

// build wrapper
dim fileWrapper as NSFileWrapperMBS = NSFileWrapperMBS.initRegularFileWithContents(s)
fileWrapper.preferredFilename = f.name

// make attachment
dim fileAttachment as new NSTextAttachmentMBS(fileWrapper)
dim attributedString as NSAttributedStringMBS = NSAttributedStringMBS.attributedStringWithAttachment(fileAttachment)

// add to a NSTextViewMBS
textview.insertText attributedString

End Sub

```

Notes: For TextArea you can query the underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

7.0.147 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

```

7.0.148 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
```

7.0.149 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.

7.0.150 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.

7.0.151 How to know how many CPUs are present?

Plugin Version: all, Platform: macOS.

Answer: Try this function:

Example:

```
Function GetCPUCount() as Integer
Declare Function MPPProcessors Lib "Carbon" () as Integer
```

```
Return MPPProcessors()
End Function
```

Notes: Your app will than need that library to launch on Classic. To avoid this the MBS plugin checks if this library is available and return 1 if it's not available.

7.0.152 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.

7.0.153 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
```

7.0.154 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.

7.0.155 How to make a lot of changes to a REAL SQL Database faster?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You may try to embed your changes to the database between two transaction calls.

Example:

```
dim db as Database // some database

db.SQLiteExecute "BEGIN TRANSACTION"
// Do some Stuff
db.SQLiteExecute "END TRANSACTION"
```

Notes: This can increase speed by some factors.

7.0.156 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.

7.0.157 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
```

7.0.158 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

7.0.159 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

```

7.0.160 How to make double clicks on a canvas?

Plugin Version: all, Platform: macOS.

Answer:

Update: Newer Xojo versions support DoubleClick event, so you don't need this code.

Here's my tip from the tips list on how to add a double-click event to the Canvas control. The technique could easily be used for a window or any Rectcontrol:

Because of its built-in drawing methods, the Canvas control is often used to create custom interface controls. But while the Canvas control has event handlers for most mouse events, it doesn't have an event handler for DoubleClick events. Fortunately, you can add a double-click event handler to a Canvas control easily. Basically, you're going to create a new class based on Canvas and add a double-click event to that. You can then use the new class anytime you need a Canvas with a double-click event.

To create a new Canvas class with a DoubleClick event handler, do this:

1. Add a new class to your project.
2. Set the Super property of the new class to "Canvas".
3. Change the name of this new class to "DoubleClickCanvas".

A double-click occurs when two clicks occur within the users double-click time (set in the Mouse control panel on both Macintosh and Windows) and within five pixels of each other. So, you'll need a few properties to store when and where the last click occurred.

4. Add a new property with the following declaration and mark it as private: lastClickTicks as Integer
5. Add a new property with the following declaration and mark it as private: lastClickX as Integer
6. Add a new property with the following declaration and mark it as private: lastClickY as Integer

Since the Canvas control doesn't have a DoubleClick event, you will need to add one.

7. Add a new event to your class by choosing New Event from the Edit menu and enter "DoubleClick" as the event name.

Double-clicks occur on MouseUp. In order for the mouseUp event to fire, you must return True in the MouseDown event.

8. In the MouseDown event, add the following code:
Return True

In the MouseUp event, you will need to determine what the users double-click time is. This value is represented on both the Mac and Windows in ticks. A tick is 1/60th of a second. Since there isn't a built-in function for this, you'll need to make a toolbox call. The mouseUp event code below makes the appropriate toolbox call for both Macintosh and Windows. It then compares the time of the users last click to the time of the current click and compares the location of the users last click to the location of the current click.

9. Add the following code to the MouseUp event:

```
dim doubleClickTime, currentClickTicks as Integer

#if targetMacOS then
Declare Function GetDbtTime Lib "Carbon" () as Integer
doubleClickTime = GetDbtTime()
#endif

#if targetWin32 then
Declare Function GetDoubleClickTime Lib "User32.DLL" () as Integer
```

```

doubleClickTime = GetDoubleClickTime()/60 // convert to ticks from milliseconds
#endif

currentClickTicks = ticks
//if the two clicks happened close enough together in time
if (currentClickTicks - lastClickTicks) <= doubleClickTime then
//if the two clicks occurred close enough together in space
if abs(X - lastClickX) <= 5 and abs(Y - LastClickY) <= 5 then
DoubleClick //a double click has occurred so call the event
end if
end if
lastClickTicks = currentClickTicks
lastClickX = X
lastClickY = Y

```

10. Now to test out your new DoubleClickCanvas, drag the class from the Project window to a window in your project to create an instance of it.

11. Double-click on the canvas you just added to your window to open the Code Editor. Notice that the canvas has a DoubleClick event handler. In this event handler, add the following code:
BEEP

7.0.161 How to make my Mac not sleeping?

Plugin Version: all, Platform: macOS.

Answer: Just inform the Mac OS about some system activity with code like this:

Example:

```

Sub UpdateSystemActivity()

#if TargetCarbon
declare function myUpdateSystemActivity lib "Carbon" alias "UpdateSystemActivity" (activity as Integer)
as short

const OverallAct = 0 // Delays idle sleep by small amount */
const UsrActivity = 1 // Delays idle sleep and dimming by timeout time */
const NetActivity = 2 // Delays idle sleep and power cycling by small amount */
const HDAActivity = 3 // Delays hard drive spindown and idle sleep by small amount */
const IdleActivity = 4 // Delays idle sleep by timeout time */

dim e as Integer

e=myUpdateSystemActivity(UsrActivity)

```

```
// you may react on an error if e is not 0 after the call.
```

```
#endif
End Sub
```

Notes: You may use another constant if you prefer some different behavior. Call it maybe every second.

7.0.162 How to make my own registration code scheme?

Plugin Version: all, Platform: Windows.

Answer: There are excellent articles about how to make a registration code scheme, but you can also simply use our RegistrationEngineMBS class.

Notes: If you need a license text, why not use the one from Xojo as a starting point?

7.0.163 How to make small controls on Mac OS X?

Plugin Version: all, Platform: macOS.

Answer: You can try this code on Mac OS X:

Example:

```

'/*
** Use the control's default drawing variant. This does not apply to
** Scroll Bars, for which Normal is Large.
**/
const kControlSizeNormal = 0

'/*
** Use the control's small drawing variant. Currently supported by
** the Check Box, Combo Box, Radio Button, Scroll Bar, Slider and Tab
** controls.
**/
const kControlSizeSmall = 1

'/*
** Use the control's small drawing variant. Currently supported by
** the Indeterminate Progress Bar, Progress Bar and Round Button
** controls.
**/
const kControlSizeLarge = 2

```

```

'/*
' * Control drawing variant determined by the control's bounds. This
' * ControlSize is only available with Scroll Bars to support their
' * legacy behavior of drawing differently within different bounds.
' */
const kControlSizeAuto = &hFFFF

const kControlSizeTag = "size"

declare function SetControlData lib "Carbon" (controlhandle as Integer, part as short, tagname as OS-
Type, size as Integer, data as ptr) as short

dim m as MemoryBlock

m=NewMemoryBlock(2)
m.UShort(0)=kControlSizeSmall

Title=str(SetControlData(CheckBox1.Handle, 0, kControlSizeTag, 2, m))

```

7.0.164 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.

7.0.165 How to move a file or folder to trash?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Use code like below:

Example:

```

Function MoveToTrash(f as FolderItem) As Boolean
#if TargetMacOS then
dim r as FolderItem
dim e as Integer = MacFileOperationMBS.MoveObjectToTrashSync(f, r, MacFileOperationMBS.kFSFile-
OperationDefaultOptions)

```

```

if e = 0 then
Return true // Ok
end if

#elseif TargetWin32 then
dim w as new WindowsFileCopyMBS

dim flags as Integer = w.FileOperationAllowUndo + w.FileOperationNoErrorUI + w.FileOperationSilent
+ w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if

flags = w.FileOperationNoErrorUI + w.FileOperationSilent + w.FileOperationNoConfirmation
if w.FileOperationDelete(f, flags) then
Return true // OK
end if
#else
// Target not supported
break
Return false
#endif
End Function

```

Notes: If you want to move a file to trash, you could use `f.movefileto f.trashfolder`, but that will overwrite existing files in the trash. You can use our `MacFileOperationMBS` class to move a file on Mac to the trash. And it uses the same code as the Finder, so files are renamed when the same name is already in use in the trash:

On Windows we use `WindowsFileCopyMBS` class.
Requires Mac OS X 10.5.

7.0.166 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)

7.0.167 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 RNTD with the new file name. To delete use DELE and the file path.

7.0.168 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.

7.0.169 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.

7.0.170 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
```

7.0.171 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.

7.0.172 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

```

7.0.173 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.

7.0.174 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.

7.0.175 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.

7.0.176 How to play audio in a web app?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can use the HTML5 audio tag and control it with javascript.

Notes: This is just another example app I made today. It plays a christmas song. The audio file is provided by the application to the server, so no external web server is needed and this application can run stand alone. To compile and run you need Xojo 2010r5.

In the open event we search the audio files and open them as binarystreams. We create the two webfile objects. Those webfiles are part of the app class, so we have them globally. There we set the data with the content of our streams. We also define file names and mime types. They are needed so browser know what we have here:

```

audioFileM4V = new WebFile
audioFileM4V.Data = bM.Read(BM.Length)
audioFileM4V.Filename = "music.m4a"
audioFileM4V.MIMEType = "audio/m4a"

```

```

audioFileOGG = new WebFile
audioFileOGG.Data = bO.Read(BO.Length)
audioFileOGG.Filename = "music.ogg"
audioFileOGG.MIMEType = "audio/ogg"

```

Next in the open event of the webpage we have a PageSource control. The location is set to be before content. In the open event we define the html code for this. First we pick the URLs for the audio files. Than we build the html to use the audio tag. As you see, we give it an ID for later use and have it preload automatically. If you add an autoplay tag, you can have the audio play right away. Inside the audio tag we have two sources so we provide audio for both Firefox (OGG) and Safari (MPEG4). Finally we have a text to display if HTML5 audio tag is not supported.

You can set the source in the EditSource event:

```
dim urlO as string = app.audioFileOGG.URL
dim urlM as string = app.audioFileM4V.URL
me.Source = "<audio id=""mymusic"" preload=""auto""><source src="""+urlO+""" type=""audio/ogg""
/><source src="""+urlM+""" type=""audio/mpeg"" />Your browser does not support the audio ele-
ment.</audio>"
```

Next in the Play button we execute code to play the audio. This is a short javascript code which searches in the html document for the element with the ID "mymusic" which is the ID of our audio tag above. Once we got the object, we call it's play method to start playback.

```
me.ExecuteJavaScript("document.getElementById('mymusic').play();")
```

same for pause:

```
me.ExecuteJavaScript("document.getElementById('mymusic').pause();")
```

and finally for changing volume:

```
me.ExecuteJavaScript("document.getElementById('mymusic').volume="+str(me.Value/100.0)+"");")
```

7.0.177 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>

7.0.178 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.

7.0.179 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.

7.0.180 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.

7.0.181 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.

7.0.182 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.

7.0.183 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.

7.0.184 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

```

7.0.185 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.

7.0.186 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.

7.0.187 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
```

7.0.188 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.

7.0.189 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.

7.0.190 How to save RTFD?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: With NSTextViewMBS you can use this code to save to RTFD:

Example:

```
// save text as RTFD including image attachments
dim f as FolderItem = GetSaveFolderItem(FileTypes1.ApplicationRtfd, "test.rtf")

if f = nil then Return

dim a as NSAttributedStringMBS = textView.textStorage
dim w as NSFileWrapperMBS = a.RTFDFileWrapperFromRange(0, a.length, DocumentAttributes)

dim e as NSErrorMBS
if w.writeToFile(f, e) then
```

```

else
MsgBox e.LocalizedDescription
end if

```

Notes: For TextArea you can query the underlying NSTextViewMBS object via TextArea.NSTextViewMBS method.

7.0.191 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.

7.0.192 How to scale a picture proportionally with mask?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: For a proportional scaling, we calculate the new picture size relative to the target maximum size.

Example:

```

Function ProportionalScaledWithMask(extends pic as Picture, Width as Integer, Height as Integer) As Pic-
ture
// Calculate scale factor

dim faktor as Double = min( Height / Pic.Height, Width / Pic.Width)

// Calculate new size
dim w as Integer = Pic.Width * faktor
dim h as Integer = Pic.Height * faktor

// create new picture
dim NewPic as new Picture(w,h,32)

// check if we have a mask and clear it
dim m as picture = pic.mask(False)
pic.mask = nil

// draw picture in the new size
NewPic.Graphics.DrawPicture Pic, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height

if m <>nil then
// restore mask and scale it
pic.mask = m
NewPic.mask.Graphics.DrawPicture m, 0, 0, w, h, 0, 0, Pic.Width, Pic.Height
end if

// return result
Return NewPic
End Function

```

Notes: This version handles mask. As you see we actually have to remove mask in order to copy the picture part correctly.

7.0.193 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)

7.0.194 How to scale/resize a CIIImageMBS?

Plugin Version: all, Platform: Windows.

Answer: Use the CIFilterLanczosScaleTransform filter to scale down a picture to a specific size.

Example:

```

Dim pic As Picture = LogoMBS(500)
Dim image As CIIImageMBS = CIIImageMBS.imageWithPicture(pic)

Dim filter As New CIFilterLanczosScaleTransformMBS

Const targetWidth = 600.0
Const targetHeight = 400.0

Dim scale As Double = targetHeight / image.Extent.Height
Dim aspect As Double = targetWidth / (image.Extent.Width * scale)

filter.inputImage = image
filter.inputScale = scale
filter.inputAspectRatio = aspect

Dim result As Picture = filter.outputImage.RenderPicture

Backdrop = result

```

Notes: This is same code as our scaleTo convenience method.

7.0.195 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.

7.0.196 How to search with regex and use unicode codepoints?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: You can specify unicode characters in search string with backslash x and digits.

Example:

```
dim r as RegExMbs
dim s as string
dim c as Integer
```

```

s="123 √$√√° ABC 456"

r=new RegExMBS
if r.Compile("√") then
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if

r=new RegExMBS
if r.Compile("\xF6") then // finds √ using Unicode codepoint
c=r.Execute(s,0)
MsgBox str(c)+" "+str(r.Offset(0))+" "+str(r.Offset(1))
// shows: 1 4 10
// 1 for ubound of the offset array
// 4 for 4 bytes before the matched pattern
// 10 for the 10 bytes before the end of the matched pattern
end if

```

7.0.197 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

```

7.0.198 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.

7.0.199 How to set the modified dot in the window?

Plugin Version: all, Platform: macOS.

Answer: Try this declares:

Example:

```

window1.ModifiedMBS=true

```

7.0.200 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.

7.0.201 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
```

7.0.202 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.

7.0.203 How to shutdown a Mac?

Plugin Version: all, Platform: macOS.

Answer: Ask the Finder via Apple Events:

Example:

```
dim ae as appleevent
ae=newappleEvent("FNDR","shut","MACS")
if not ae.send then
msgBox "The computer couldn't be shutdown."
end if
```

Notes: Or toolbox call (Attention: This method will stop the computer immediatly: No document asked to be saved, all applications quitting without knowing).

```
Declare Sub ShutDwnPower Lib "Carbon" ()
ShutDwnPower
```

7.0.204 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
```

7.0.205 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.

7.0.206 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.

7.0.207 How to use quotes in a string?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Just double them.

Example:

```
msgbox "This String contains ""quotes"""
```

7.0.208 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
```

7.0.209 How to use the Application Support folder?

Plugin Version: all, Platform: macOS.

Answer:

I was saving a registration code for an app to the Preference folder. People on the list have suggested that it would be better in the ApplicationSupportFolder. How do I save the file called CWWPrefs into that folder using MBS?

I have checked for examples and the docs but can't see how to apply it

```
//f = SpecialFolder.Preferences.child("CWWPrefs")
f = ApplicationSupportFolderMBS(-32768)
```

Example:

```

dim folder,file as FolderItem

folder = createApplicationSupportFolderMBS(-32763)

if folder=nil then
// Some very old Mac OS Versions may not support it
// or the plugin may fail for any reason
folder=SpecialFolder.Preferences
end if

file=folder.Child("CWWPrefs")

MsgBox file.NativePath

```

Notes:

You may not be able to write there with a normal user account!

7.0.210 How to use the IOPMCopyScheduledPowerEvents function in Xojo?

Plugin Version: all, Platform: macOS.

Answer: You can use the following code which does this using the SoftDeclareMBS class.

Example:

```

Sub Open()
dim c as CFDateMBS
dim t as CFAbsoluteTimeMBS

// get current date
c=NewCFDateMBS

// in absolute time (seconds since x)
t=c.AbsoluteTime

// add 600 seconds (= 10 Minutes)
t.Value=t.Value+600

// Make a Date from it
c=t.Date

// Schedule the event
// 0 on success
// E00002C1 for missing root rights

```

```

Title=hex(schedulePowerEvent(c, "wake"))

// Just for information, display the scheduled stuff
CFShowMBS CopyScheduledPowerEvents
End Sub

Function CopyScheduledPowerEvents() As carrayMBS
dim s as SoftDeclareMBS
dim m as MemoryBlock

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMCopyScheduledPowerEvents") then
if s.CallFunction(0,nil) then
Return NewCFArrayMBSHandle(s.Result,true)
else
MsgBox "Failed to Call IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOPMCopyScheduledPowerEvents."
end if
else
MsgBox "Failed to load IOKit."
end if

Return nil
End Function

Function SchedulePowerEvent(time_to_wake as CFDateMBS, Type as CFStringMBS) as Integer
dim s as SoftDeclareMBS
dim m as MemoryBlock

'/*
'* Types of power event
'* These are potential arguments to IOPMSchedulePowerEvent().
'* These are all potential values of the kIOPMPowerEventTypeKey in the CFDictionaryes
'* returned by IOPMCopyScheduledPowerEvents().
'*/
'/*!
'@define kIOPMAutoWake
'@abstract Value for scheduled wake from sleep.
'*/
'#define kIOPMAutoWake "wake"
,
'/*!
'@define kIOPMAutoPowerOn
'@abstract Value for scheduled power on from off state.

```

```

*/
`#define kIOPMAutoPowerOn "poweron"
,
`/*!
`@define kIOPMAutoWakeOrPowerOn
`@abstract Value for scheduled wake from sleep, or power on. The system will either wake OR
`power on, whichever is necessary.
*/
,
`#define kIOPMAutoWakeOrPowerOn "wakepoweron"
`/*!
`@define kIOPMAutoSleep
`@abstract Value for scheduled sleep.
*/
,
`#define kIOPMAutoSleep "sleep"
`/*!
`@define kIOPMAutoShutdown
`@abstract Value for scheduled shutdown.
*/
,
`#define kIOPMAutoShutdown "shutdown"

s=new SoftDeclareMBS

if s.LoadLibrary("IOKit.framework") then
if s.LoadFunction("IOPMSchedulePowerEvent") then

m=NewMemoryBlock(12)
m.Long(0)=time_to_wake.handle
m.Long(4)=0 // nil
m.Long(8)=type.Handle

if s.CallFunction(3,m) then
Return s.Result
end if
end if
end if

End Function

```

Notes: Requires Mac OS X and to execute root rights.

7.0.211 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".

7.0.212 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.

7.0.213 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.

7.0.214 I registered the MBS Plugins in my application, but later the registration dialog is shown.

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: There are two main reasons.

Notes: 1. you may use the plugin before registering them. This is often the case if you register in a window open event and use the plugin in a control open event.

On the console on Mac OS X or Windows, you may see a message like this "MBS Plugins were used by the application before the RegisterMBSPlugin function was called. Please fix this in your code!".

2. you may have mixed different plugin versions which are not compatible.

In this case you can see a message "Internal plugin registration error." on the console on Mac OS X. Newer plugins may show a message dialog reporting this. Older version simply think they are not registered.

If the installer just merges old and new applications, users may have libraries of older and newer plugin versions in the libs folder. If your application loads the wrong version, the registration fails.

If you use remote debugging, make sure you clear the temporary files there, too. Otherwise you may have old DLLs on your hard disc which may disturb your application.

You can run into issues if you use your registration code on different places of your app. Please register only once in app.open (or app Constructor). If you have several codes, simply call them one after the other.

Also check that you only call RegisterMBSPlugin with valid serial number. If you later call RegisterMBSPlugin with Demo like in example code above, you remove the license.

Next check if you can clear the Xojo caches and that helps. This includes the Xojo Scratch folder and the Plugins & Project caches. Simply locate those folders and delete them. For Windows look in hidden AppData folder in your user folder. For Mac, please check textasciitilde /Library/Caches and your temp folders.

Finally make sure you use the right serial number. Not an older one or a misspelled one.

7.0.215 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(NewCFBinaryDataMBS(s))

// Make dictionary
if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

// get Tracks Dictionary
key=NewCFStringMBS("Tracks")
o=d.Value(key)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)
dl=d.List

// Walk over all entries in the Tracks dictionary
c=dl.Count-1
for i=0 to c
o=dl.Value(i)

if o isa CFDictionaryMBS then
d=CFDictionaryMBS(o)

key=NewCFStringMBS("Location")
o=d.Value(key)
if o isa CFStringMBS then
u=NewCFURLMBS(CFStringMBS(o),nil)

file=u.file
if file<>nil then
MsgBox file.NativePath
end if
end if
end if
next
end if
end if
end if
End Sub
```

Notes: The code above inside a window on Xojo 5.5 with MBS Plugin 5.3 will do it nice and show the paths.

7.0.216 I'm drawing into a listbox but don't see something.

Plugin Version: all.

Answer: If you draw this in a listbox cellbackground, you need to draw on the correct position

Example:

```
Function CellBackgroundPaint(g As Graphics, row as Integer, column as Integer) As Boolean
dim f as FolderItem
f=SpecialFolder.Desktop
f.DrawWideIconMBS(g,listbox1.left,listbox1.top+row*20,16)
Return true
End Function
```

Notes: Try this in a listbox. The Graphics object there has a clipping and an offset which the plugin doesn't know about.

7.0.217 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.

7.0.218 If I use one of your plug-ins under windows, would this then impose the use of dll after compilation or my would my compiled soft still be a stand-alone single file software?

Platforms: macOS, Linux, Windows.

Answer: Stand alone.

Notes: Xojo compiles all used plugins into the application binary.

Some plugin parts need external dlls but you will find that in the documentation. (e.g. pdfib for some classes)

7.0.219 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.

7.0.220 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
```

7.0.221 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.

7.0.222 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
```

7.0.223 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>

7.0.224 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)

7.0.225 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?

7.0.226 SQLiteDatabase not initialized error?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Before you can use SQLiteDatabaseMBS, it must be initialized.

Example:

```
dim d as new SQLiteDatabaseMBS
```

Notes: This happens normally when you use "new SQLiteDatabaseMBS".

But if you just have a SQLConnectionMBS and get a recordset there, the initialization may not have happened, yet.

So please simply add a line "dim d as new SQLiteDatabaseMBS" to your app.open code after registration, so the plugin part can initialize and late provide recordsets.

7.0.227 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.

7.0.228 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 QTime ->QTimeMBS
NSValue with QTimeRange ->QTimeRangeMBS
NSArray ->Array of Variant
QuartzFilter ->QuartzFilterMBS

```

- ->*MBS

Variant to Cocoa NSObject:

```

nil ->nil
Dictionary ->NSDictionary
Boolean ->NSNumber
Integer ->NSNumber
Color ->NSColor
Int64 ->NSNumber
Single ->NSNumber
Double ->NSNumber
Date ->NSDate
MemoryBlock ->NSData
String ->NSString
NSImageMBS ->NSImage
NSAttributedStringMBS ->NSAttributedString
NSColorMBS ->NSColor
NSRectMBS ->NSValue with NSRect
NSSizeMBS ->NSValue with NSSize

```

NSPointMBS ->NSValue with NSPoint
 NSRangeMBS ->NSValue with NSRange
 NSBurnMBS ->NSBurn
 NSViewMBS ->NSView
 NSFontMBS ->NSFont
 NSParagraphStyleMBS ->NSParagraphStyle
 NSAttributedStringMBS ->NSAttributedString
 WebPolicyDelegateMBS ->WebPolicyDelegate
 WebUIDelegateMBS ->WebUIDelegate
 WebFrameLoadDelegateMBS ->WebFrameLoadDelegate
 WebResourceLoadDelegateMBS ->WebResourceLoadDelegate
 NSIndexSetMBS ->NSIndexSet
 QTTimeMBS ->QTTime
 QTTimeRangeMBS ->QTTimeRange
 Array of Variant ->NSArray
 Array of String ->NSArray
 CFStringMBS ->NSString
 CFNumberMBS ->NSNumber
 CFDataMBS ->NSData
 CFURLMBS ->NSURL
 CFArrayMBS ->NSArray
 CFDictionaryMBS ->NSDictionary
 CFBinaryDataMBS ->NSData

Carbon CTypeRef to Variant:

CFDictionaryRef ->Dictionary
 CFStringRef ->String
 CFDataRef ->String
 CFURL ->String
 CFNumber ->Integer/Double/Int64
 CFArray ->Array
 CFDate ->date
 nil ->nil
 CGColorSpace ->CGColorSpaceMBS
 CGColor ->CGColorMBS
 CGImage ->CGImageMBS
 CF* ->CF*MBS

Variant to Carbon CTypeRef:

Dictionary ->CFDictionaryRef
 Boolean ->CFBooleanRef
 Color ->CFNumberRef
 Integer ->CFNumberRef

Int64 ->CFNumberRef
 Single ->CFNumberRef
 Double ->CFNumberRef
 String ->CFStringRef
 Color ->CGColorRef
 Date ->CFDateRef
 nil ->nil
 Memoryblock ->CFDataRef
 FolderItem ->CFURLRef
 Dictionary ->CFDictionaryRef
 Array of Variant/String/Date/Double/Single/Int64/Integer ->CFArray
 CGRectMBS ->CGRect as CFDataRef
 CGSizeMBS ->CGSize as CFDataRef
 CGPointMBS ->CGPoint as CFDataRef
 CGColorMBS ->CGColor
 CGColorSpaceMBS ->CGColorSpace
 CGImageMBS ->CGImage
 CGDataConsumerMBS ->CGDataConsumer
 CGDataProviderMBS ->CGDataProvider
 CF*MBS ->CF*

Strings without encodings should be put into dictionaries as memoryblocks.

7.0.229 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.

7.0.230 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.

7.0.231 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.

7.0.232 What does the NAN code mean?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

7.0.233 What font is used as a 'small font' in typical Mac OS X apps?

Plugin Version: all, Platform: macOS.

Answer:

Xojo 4.5 has a constant "SmallSystem" to use for a font name.

For older versions try this code:

Example:

```

Sub GetThemeFont(fontType as Integer, ByRef fontName as String, ByRef fontSize as Integer, ByRef
fontName as Integer)
dim err as Integer
dim theFont, theFontSize, theFontStyle as MemoryBlock

const smSystemScript = -1

Declare Function GetThemeFont Lib "Carbon" (inFontID as Integer, inScript as Integer, outFontName
as Ptr, outFontSize as Ptr, outStyle as Ptr) as Integer

theFont = NewMemoryBlock(256) //Str255
theFontSize = NewMemoryBlock(2) //SInt16
theFontStyle = NewMemoryBlock(1) //Style

err = GetThemeFont(fontType, smSystemScript, theFont, theFontSize, theFontStyle)

if err = 0 then
fontName = theFont.PString(0)
fontSize = theFontSize.UShort(0)
fontStyle = theFontStyle.Byte(0)
else
fontName = ""
fontSize = 0
fontStyle = 0
end if
End Sub

```

7.0.234 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.

7.0.235 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.

7.0.236 What is last version of the plugins for macOS 32-bit?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Please use version 23.0 or older.

Notes: We stopped including 32-bit code for macOS in version 23.1. Please use older versions if you use an old Xojo.

Xojo 2017r3 and newer load our 64-bit plugins.

7.0.237 What is the difference between Timer and WebTimer?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Timer is server side and WebTimer client side.

Notes: Timer is the normal timer class in Xojo. It runs on the server. On the client 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.

7.0.238 What is the list of Excel functions?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: Below is a list of function names known by LibXL.

Notes: LibXL parses the functions and writes tokens to the excel file. So even if Excel can do more functions, we can only accept the ones known by LibXL.

ABS, ABSREF, ACOS, ACOSH, ACTIVE.CELL, ADD.BAR, ADD.COMMAND, ADD.MENU, ADD.TOOLBAR, ADDRESS, AND, APP.TITLE, AREAS, ARGUMENT, ASC, ASIN, ASINH, ATAN, ATAN2, ATANH, AVEDEV, AVERAGE, AVERAGEA, BAHTTEXT, BETADIST, BETAINV, BINOMDIST, BREAK, CALL, CALLER, CANCEL.KEY, CEILING, CELL, CHAR, CHECK.COMMAND, CHIDIST, CHIINV, CHITEST, CHOOSE, CLEAN, CODE, COLUMN, COLUMNS, COMBIN, CONCATENATE, CONFIDENCE, CORREL, COS, COSH, COUNT, COUNTA, COUNTBLANK, COUNTIF, COVAR, CREATE.OBJECT, CRITBINOM, CUSTOM.REPEAT, CUSTOM.UNDO, DATE, DATEDIF, DATESTRING, DATEVALUE, DAVERAGE, DAY, DAYS360, DB, DBCS, DCOUNT, DCOUNTA, DDB, DEGREES, DELETE.BAR, DELETE.COMMAND, DELETE.MENU, DELETE.TOOLBAR, DEREf, DEVSQ, DGET, DIALOG.BOX, DIRECTORY, DMAX, DMIN, DOCUMENTS, DOLLAR, DPRODUCT, DSTDEV, DSTDEVP, DSUM, DVAR, DVARP, ECHO, ELSE, ELSE.IF, ENABLE.COMMAND, ENABLE.TOOL, END.IF, ERROR, ERROR.TYPE, EVALUATE, EVEN, EXACT, EXEC, EXECUTE, EXP, EXPONDIST, FACT, FALSE, FCLOSE, FDIST, FILES, FIND, FINDB, FINV, FISHER, FISHERINV, FIXED, FLOOR, FOPEN, FOR, FOR.CELL, FORECAST,

FORMULA.CONVERT, FPOS, FREAD, FREADLN, FREQUENCY, FSIZE, FTEST, FV, FWRITE, FWRITELN, GAMMADIST, GAMMAINV, GAMMALN, GEOMEAN, GET.BAR, GET.CELL, GET.CHART.ITEM, GET.DEF, GET.DOCUMENT, GET.FORMULA, GET.LINK.INFO, GET.MOVIE, GET.NAME, GET.NOTE, GET.OBJECT, GET.PIVOT.FIELD, GET.PIVOT.ITEM, GET.PIVOT.TABLE, GET.TOOL, GET.TOOLBAR, GET.WINDOW, GET.WORKBOOK, GET.WORKSPACE, GETPIVOTDATA, GOTO, GROUP, GROWTH, HALT, HARMEAN, HELP, HLOOKUP, HOUR, HYPERLINK, HYPGEOMDIST, IF, INDEX, INDIRECT, INFO, INITIATE, INPUT, INT, INTERCEPT, IPMT, IRR, ISBLANK, ISERR, ISERROR, ISLOGICAL, ISNA, ISNONTEXT, ISNUMBER, ISPMT, ISREF, ISTEXT, ISTHAIDIGIT, KURT, LARGE, LAST.ERROR, LEFT, LEFTB, LEN, LENB, LINEST, LINKS, LN, LOG, LOG10, LOGEST, LOGINV, LOGNORMDIST, LOOKUP, LOWER, MATCH, MAX, MAXA, MDETERM, MEDIAN, MID, MIDB, MIN, MINA, MINUTE, MINVERSE, MIRR, MMULT, MOD, MODE, MONTH, MOVIE.COMMAND, N, NA, NAMES, NEGBINOMDIST, NEXT, NORMDIST, NORMINV, NORMSDIST, NORMSINV, NOT, NOTE, NOW, NPER, NPV, NUMBERSTRING, ODD, OFFSET, OPEN.DIALOG, OPTIONS.LISTS.GET, OR, PAUSE, PEARSON, PERCENTILE, PERCENTRANK, PERMUT, PHONETIC, PI, PIVOT.ADD.DATA, PMT, POISSON, POKE, POWER, PPMT, PRESS.TOOL, PROB, PRODUCT, PROPER, PV, QUARTILE, RADIANS, RAND, RANK, RATE, REFTTEXT, REGISTER, REGISTER.ID, RELREF, RENAME.COMMAND, REPLACE, REPLACEB, REPT, REQUEST, RESET.TOOLBAR, RESTART, RESULT, RESUME, RETURN, RIGHT, RIGHTB, ROMAN, ROUND, ROUNDBAHTDOWN, ROUNDBAHTUP, ROUNDDOWN, ROUNDUP, ROW, ROWS, RSQ, RTD, SAVE.DIALOG, SAVE.TOOLBAR, SCENARIO.GET, SEARCH, SEARCHB, SECOND, SELECTION, SERIES, SET.NAME, SET.VALUE, SHOW.BAR, SIGN, SIN, SINH, SKEW, SLN, SLOPE, SMALL, SPELLING.CHECK, SQRT, STANDARDIZE, STDEV, STDEVA, STDEVP, STDEVPA, STEP, STEYX, SUBSTITUTE, SUBTOTAL, SUM, SUMIF, SUMPRODUCT, SUMSQ, SUMX2MY2, SUMX2PY2, SUMXMY2, SYD, T, TAN, TANH, TDIST, TERMINATE, TEXT, TEXT.BOX, TEXTREF, THAIDAYOFWEEK, THAIDIGIT, THAIMONTHOFYEAR, THAINUMSOUND, THAINUMSTRING, THAISTRINGLENGTH, THAIYEAR, TIME, TIMEVALUE, TINV, TODAY, TRANSPOSE, TREND, TRIM, TRIMMEAN, TRUE, TRUNC, TTEST, TYPE, UNREGISTER, UPPER, USDOLLAR, USERDEFINED, VALUE, VAR, VARA, VARP, VARPA, VDB, VIEW.GET, VLOOKUP, VOLATILE, WEEKDAY, WEIBULL, WHILE, WINDOW.TITLE, WINDOWS, YEAR and ZTEST.

7.0.239 What is the replacement for PluginMBS?

Plugin Version: all, Platform: macOS.

Answer: Use the SoftDeclareMBS class to load libraries dynamically.

7.0.240 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.

7.0.241 What to do with a NSImageCacheException?

Plugin Version: all, Platforms: macOS, Windows.

Answer: You need to add exception handlers for NSExcptionMBS in order to catch this exception.

Notes: You may also add code to write the stack of the exception into a log file for later locating the error source.

A NSImage has several image representations in memory. So basically 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.

7.0.242 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.

7.0.243 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.

7.0.244 Where is CGGetActiveDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetActiveDisplayList.

7.0.245 Where is CGGetDisplaysWithPointMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithPoint.

7.0.246 Where is CGGetDisplaysWithRectMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetDisplaysWithRect.

7.0.247 Where is CGGetOnlineDisplayListMBS?

Plugin Version: all, Platform: Windows.

Answer: This is now CGDisplayMBS.GetOnlineDisplayList.

7.0.248 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.

7.0.249 Where is NetworkAvailableMBS?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer: We removed NetworkAvailableMBS some versions ago. It was not working right and basically it's not useful. If you want to check whether you have a network, than do a DNS resolve:

Example:

```

// two independent domain names
const domain1 = "www.google.com"
const domain2 = "www.macs.w.de"

// resolve IPs
dim ip1 as string = DNSNameToAddressMBS(Domain1)
dim ip2 as string = DNSNameToAddressMBS(Domain2)

// if we got IPs and not the same IPs (error/login pages)
if len(ip1)=0 or len(ip2)=0 or ip1=ip2 then
MsgBox "no connection"
else
MsgBox "have connection"
end if

```

Notes: This way you can detect whether you got something from DNS. And you can make sure that a DNS redirection to a login page won't catch you.

7.0.250 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.

7.0.251 Where is XLSDocumentMBS class?

Plugin Version: all, Platform: macOS.

Answer: This class has been removed in favor of XLBookMBS class.

Notes: These classes have been removed: XLSCellMBS, XLSDocumentMBS, XLSFormatRecordMBS, XLSMergedCellsMBS, XLSRowMBS and XLSSheetMBS.

7.0.252 Where to get information about file formats?

Plugin Version: all, Platforms: macOS, Linux, Windows.

Answer:

Please visit this web page:

<http://www.wotsit.org>

7.0.253 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>

7.0.254 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.

7.0.255 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.

7.0.256 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.

7.0.257 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.

7.0.258 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.

7.0.259 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.

7.0.260 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.

7.0.261 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.

7.0.262 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.

7.0.263 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.

7.0.264 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

7.0.265 Xojo doesn't work with your plugins on Windows 98.

Plugin Version: all, Platform: Windows.

Answer: Please upgrade your Windows version.

7.0.266 Xojo or my RB application itself crashes on launch on Mac OS Classic. Why?

Plugin Version: all.

Answer:

You may check if the application has enough memory to be loaded.

RB should have on Mac OS Classic more than 20 MB of RAM.

I preferred to use 50 MB and for an application a 10 MB partition is a good way to start.

Parameter	Description
x	The x value of the data point. For an enumerated x-axis (see <code>Axis.setLabels</code> on what is an enumerated axis), the first data point is 0, and the nth data point is (n-1).
xLabel	The bottom x-axis label of the data point.
x2Label	The top x-axis label of the data point.
value	The value of the data point.
accValue	The sum of values of all data points that are in the same x position and same data group as the current data point, and with data set number less than or equal to the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
totalValue	The sum of values of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
percent	The percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
accPercent	The accumulated percentage of the data point based on the total value of all data points that are in the same x position and same data group as the current data point. This is useful for stacked charts, such as stacked bar chart and stacked area chart.
gpercent	The percentage of the data point based on the total value of all data points in a layer.
dataSet	The data set number to which the data point belongs. The first data set is 0. The nth data set is (n-1).
dataSetName	The name of the data set to which the data point belongs.
dataItem	The data point number within the data set. The first data point is 0. The nth data point is (n-1).
dataGroup	The data group number to which the data point belongs. The first data group is 0. The nth data group is (n-1).
dataGroupName	The name of the data group to which the data point belongs.
layerId	The layer number to which the data point belongs. The first layer is 0. The nth layer is (n-1).
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using <code>Layer.addExtraField</code> , <code>Layer.addExtraField2</code> , <code>BaseChart.addExtraField</code> or <code>BaseChart.addExtraField2</code> .

diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by data set number. The Pth data set corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth data set corresponds to the Pth element of the (N + Q)th extra field.

Parameter	Description
zx	The symbol scale in the x dimension. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .
zy	The symbol scale in the y dimension. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .
z	The symbol scale without distinguishing the dimension to use. Applicable for layers with symbol scales set by <code>LineStyle.setSymbolScale</code> .

Parameter	Description
slope	The slope of the trend line.
intercept	The y-intercept of the trend line.
corr	The correlation coefficient in linear regression analysis.
stderr	The standard error in linear regression analysis.

Parameter	Description
top	The value of the top edge of the box-whisker symbol.
bottom	The value of the bottom edge of the box-whisker symbol.
max	The value of the maximum mark of the box-whisker symbol.
min	The value of the minimum mark of the box-whisker symbol.
med	The value of the median mark of the box-whisker symbol.

Parameter	Description
high	The high value.
low	The low value.
open	The open value.
close	The close value.

Parameter	Description
dir	The direction of the vector.
len	The length of the vector.

Parameter	Description
radius	The radial value of the data point.
value	Same as { radius } . See above.
angle	The angular value of the data point.
x	Same as { angle } . See above.
label	The angular label of the data point.
xLabel	Same as { label } . See above.
name	The name of the layer to which the data point belongs.
dataSetName	Same as { name } . See above.
i	The data point number. The first data point is 0. The nth data point is (n-1).
dataItem	Same as { i } . See above.
z	The symbol scale. Applicable for layers with symbol scales set by Polar-Layer.setSymbolScale.
fieldN	The (N + 1)th extra field. For example, { field0 } means the first extra field. An extra field is an array of custom elements added using Layer.addExtraField, Layer.addExtraField2, BaseChart.addExtraField or BaseChart.addExtraField2.
diFieldN	Same as fieldN. See above.
dsFieldN	Similar to fieldN, except that dsFieldN means the extra field is indexed by layer index. The Pth layer corresponds to the Pth element of the extra field.
dsdiFieldN	Similar to fieldN, except that dsdiFieldN means the extra fields are indexed by both the data set number and data point number. The Pth data item of the Qth layer corresponds to the Pth element of the (N + Q)th extra field.
Parameter	Description
dir	The direction of the vector.
len	The length of the vector.
Parameter	Description
value	The axis value at the tick position.
label	The axis label at the tick position.
Parameter	Description
[param]	The name of the parameter
[a]	If this field a number, it specifies the number of decimal places (digits to the right of the decimal point).

[b]	The thousand separator. Should be a non-alphanumeric character (not 0-9, A-Z, a-z). Use '.
textasciitilde ' for no thousand separator. The default is 'textasciitilde ', which can be modified using BaseChart.setNumberFormat.	
[c]	The decimal point character. The default is '.', which can be modified using BaseChart.setNumberFormat.
[d]	The negative sign character. Use '-'
textasciitilde ' for no negative sign character. The default is '-', which can be modified using BaseChart.setNumberFormat.	

Parameter	Description
yyyy	The year in 4 digits (e.g. 2002)
yyy	The year showing only the least significant 3 digits (e.g. 002 for the year 2002)
yy	The year showing only the least significant 2 digits (e.g. 02 for the year 2002)
y	The year showing only the least significant 1 digits (e.g. 2 for the year 2002)
mmm	The month formatted as its name. The default is to use the first 3 characters of the english month name (Jan, Feb, Mar ...). The names can be configured using BaseChart.setMonthNames.
mm	The month formatted as 2 digits from 01 - 12, adding leading zero if necessary.
m	The month formatted using the minimum number of digits from 1 - 12.
MMM	The first 3 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
MM	The first 2 characters of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
M	The first character of the month name converted to upper case. The names can be configured using BaseChart.setMonthNames.
dd	The day of month formatted as 2 digits from 01 - 31, adding leading zero if necessary.
d	The day of month formatted using the minimum number of digits from 1 - 31.
w	The name of the day of week. The default is to use the first 3 characters of the english day of week name (Sun, Mon, Tue ...). The names can be configured using BaseChart.setWeekDayNames.
hh	The hour of day formatted as 2 digits, adding leading zero if necessary. The 2 digits will be 00 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
h	The hour of day formatted using the minimum number of digits. The digits will be 0 - 23 if the 'a' option (see below) is not specified, otherwise it will be 01 - 12.
nn	The minute formatted as 2 digits from 00 - 59, adding leading zero if necessary.
n	The minute formatted using the minimum number of digits from 00 - 59.
ss	The second formatted as 2 digits from 00 - 59, adding leading zero if necessary.
s	The second formatted using the minimum number of digits from 00 - 59.
a	Display either 'am' or 'pm', depending on whether the time is in the morning or afternoon. The text 'am' and 'pm' can be modified using BaseChart.setAMPM.

Shape Id	Value	Description
SquareShape	1	Square shape. See (1, 1) above.
DiamondShape	2	Diamond shape. See (2, 1) above.
TriangleShape	3	Triangle shape pointing upwards. See (3, 1) above.
RightTriangleShape	4	Triangle shape pointing rightwards. See (4, 1) above.
LeftTriangleShape	5	Triangle shape pointing leftwards. See (5, 1) above.
InvertedTriangleShape	6	Triangle shape pointing downwards. See (1, 2) above.
CircleShape	7	Circle shape. See (2, 2) above.
StarShape	[Method]	Star shapes of various points. See (2, 3), (2, 4), (2, 5), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5) above for stars with 3 to 10 points.
PolygonShape	[Method]	Polygon shapes symmetrical about a vertical axis with a vertex at the top center position. See (4, 1), (4, 3), (4, 5), (5, 1) for polygons of 5 to 8 sides.
Polygon2Shape	[Method]	Polygon shapes symmetrical about a vertical axis but without any vertex at the top center position. See (4, 2), (4, 4) for polygons of 5 and 6 sides.
CrossShape	[Method]	'+' shapes. See (5, 2), (5, 3), (5, 4), (5, 5), (6, 1), (6, 2), (6, 3) for '+' shape with arm width of 0.1 - 0.7.
Cross2Shape	[Method]	'X' shapes. See (6, 4), (6, 5), (7, 1), (7, 2), (7, 3), (7, 4), (7, 5) for 'X' shapes with arm width of 0.1 - 0.7.

langEnglish	0	Roman script
langFrench	1	Roman script
langGerman	2	Roman script
langItalian	3	Roman script
langDutch	4	Roman script
langSwedish	5	Roman script
langSpanish	6	Roman script
langDanish	7	Roman script
langPortuguese	8	Roman script
langNorwegian	9	Roman script
langHebrew	10	Hebrew script
langJapanese	11	Japanese script
langArabic	12	Arabic script
langFinnish	13	Roman script
langGreek	14	Greek script using smRoman script code
langIcelandic	15	modified smRoman/Icelandic script
langMaltese	16	Roman script
langTurkish	17	modified smRoman/Turkish script
langCroatian	18	modified smRoman/Croatian script
langTradChinese	19	Chinese (Mandarin) in traditional characters
langUrdu	20	Arabic script
langHindi	21	Devanagari script
langThai	22	Thai script
langKorean	23	Korean script

Nan	Meaning
1	Invalid square root (negative number, usually)
2	Invalid addition (indeterminate such as infinity + (-infinity))
4	Invalid division (indeterminate such as 0/0)
8	Invalid multiplication (indeterminate such as 0*infinity)
9	Invalid modulo such as (a mod 0)
17	Try to convert invalid string to a number like val("x7")
33	Invalid argument in a trig function
34	Invalid argument in an inverse trig function
36	Invalid argument in a log function
37	Invalid argument in Pow function
38	Invalid argument in toolbox financial function
40	Invalid argument in hyperbolic function
42	Invalid argument in a gamma function

Symbol	Description and result
0	Digit placeholder. For example, if the value 8.9 is to be displayed as 8.90, use the format #.00
#	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall not display extra zeros when the number typed has fewer digits on either side of the decimal than there are # symbols in the format. For example, if the custom format is #.##, and 8.9 is in the cell, the number 8.9 is displayed.
?	Digit placeholder. This symbol follows the same rules as the 0 symbol. However, the application shall put a space for insignificant zeros on either side of the decimal point so that decimal points are aligned in the column. For example, the custom format 0.0? aligns the decimal points for the numbers 8.9 and 88.99 in a column.
. (period)	Decimal point.
%	Percentage. If the cell contains a number between 0 and 1, and the custom format 0% is used, the application shall multiply the number by 100 and add the percentage symbol in the cell.
, (comma)	Thousands separator. The application shall separate thousands by commas if the format contains a comma that is enclosed by number signs (#) or by zeros. A comma that follows a placeholder scales the number by one thousand. For example, if the format is #.0,, and the cell value is 12,200,000 then the number 12.2 is displayed.
E- E+ e- e+	Scientific format. The application shall display a number to the right of the "E" symbol that corresponds to the number of places that the decimal point was moved. For example, if the format is 0.00E+00, and the value 12,200,000 is in the cell, the number 1.22E+07 is displayed. If the number format is #0.0E+0, then the number 12.2E+6 is displayed.
\$ -+/():space	Displays the symbol. If it is desired to display a character that differs from one of these symbols, precede the character with a backslash (\). Alternatively, enclose the character in quotation marks. For example, if the number format is (000), and the value 12 is in the cell, the number (012) is displayed.
\	Display the next character in the format. The application shall not display the backslash. For example, if the number format is 0\!, and the value 3 is in the cell, the value 3! is displayed.
*	Repeat the next character in the format enough times to fill the column to its current width. There shall not be more than one asterisk in one section of the format. If more than one asterisk appears in one section of the format, all but the last asterisk shall be ignored. For example, if the number format is 0*x, and the value 3 is in the cell, the value 3xxxxxx is displayed. The number of x characters that are displayed in the cell varies based on the width of the column.
_ (underline)	Skip the width of the next character. This is useful for lining up negative and positive values in different cells of the same column. For example, the number format _(0.0_);(0.0) aligns the numbers 2.3 and -4.5 in the column even though the negative number is enclosed by parentheses.
"text"	Display whatever text is inside the quotation marks. For example, the format 0.00 "dollars" displays 1.23 dollars when the value 1.23 is in the cell.
@	Text placeholder. If text is typed in the cell, the text from the cell is placed in the format where the at symbol (@) appears. For example, if the number format is "Bob "@ Smith" (including quotation marks), and the value "John" is in the cell, the value Bob John Smith is displayed.

[Black] [Green] [White] [Blue] [Magenta] [Yellow] [Cyan] [Red]

To display	As	Use this code
Months	1-12	m
Months	01-12	mm
Months	Jan-Dec	mmm
Months	January-December	mmmm
Months	J-D	mmmmm
Days	1-31	d
Days	01-31	dd
Days	Sun-Sat	ddd
Days	Sunday-Saturday	dddd
Years	00-99	yy
Years	1900-9999	yyyy
Hours	0-23	h
Hours	00-23	hh
Minutes	0-59	m
Minutes	00-59	mm
Seconds	0-59	s
Seconds	00-59	ss
Time	4 AM	h AM/PM
Time	4:36 PM	h:mm AM/PM
Time	4:36:03 P	h:mm:ss A/P
Time	4:36:03.75	h:mm:ss.00
Elapsed time	1:02	[h] :mm
Elapsed time	62:16	[mm] :ss
Elapsed time	3735.80	[ss] .00

To display	As	Use this code
1234.59	1234.6	#####.#
8.9	8.900	#.000
.631	0.6	0.#
12	12.0	#.0#
1234.568	1234.57	#.0#
44.398	44.398	???.???
102.65	102.65	???.???
2.8	2.8	???.???
5.25	5 1/4	# ??/??
5.3	5 3/10	# ??/??
12000	12,000	#,###
12000	12	#,
12400000	12.4	0.0,,