

CAWT - COM Automation With Tcl

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1 Introduction

CAWT is a high-level Tcl interface for scripting Microsoft Windows® applications having a COM interface. It uses **Twapi** for automation via the COM interface.

Currently packages for Microsoft Excel, Word, PowerPoint, OneNote, Outlook, SAPI, Internet Explorer, MathWorks Matlab, Adobe Acrobat Reader and Google Earth are available.

Note: Only Microsoft Office packages Excel, Word, PowerPoint and Outlook are in active development. The other packages are proof-of-concept examples only.

CAWT sources are available at <https://sourceforge.net/projects/cawt/>.

The CAWT homepage is at <https://www.tcl3d.org/cawt/>

The CAWT user distribution contains the Tcl sources, documentation (this document and a reference manual), several test programs showing the use of the CAWT functionality and the needed external libraries Twapi, Tkimg, Base64 and Tablelist (see chapter 1.2 for details).

The CAWT developer distribution additionally contains scripts for generating the documentation, the distribution packages and the CAWT Starkit and Starpack. It also includes the external packages Ruff! and textutil (see chapter 1.2 for details). The developer distribution is intended for programmers who want to extend the CAWT package.

1.1 Architecture overview

The **CAWT** package currently consists of the following sub-packages:

CawtCore	Basic automation functionality.
CawtOffice	Basic Microsoft Office automation functionality.
CawtEarth	Automation functionality for Google Earth.
CawtExcel	Automation functionality for Microsoft Excel.
CawtExplorer	Automation functionality for Microsoft Internet Explorer.
CawtMatlab	Automation functionality for MathWorks Matlab.
CawtOcr	Automation functionality for Microsoft Document Imaging.
CawtOneNote	Automation functionality for Microsoft OneNote
CawtOutlook	Automation functionality for Microsoft Outlook.
CawtPpt	Automation functionality for Microsoft PowerPoint.
CawtReader	Automation functionality for Adobe Acrobat Reader.
CawtSapi	Automation functionality for Microsoft Speech API.
CawtWord	Automation functionality for Microsoft Word.

Each sub-package is implemented as a separate Tcl package and can be loaded explicitly with the Tcl package command, ex. `package require cawtexcel`. All available CAWT sub-packages can be loaded with a single command: `package require cawt`.

Note: Package names are all lower case.

The next figure shows the architecture of the CAWT package.

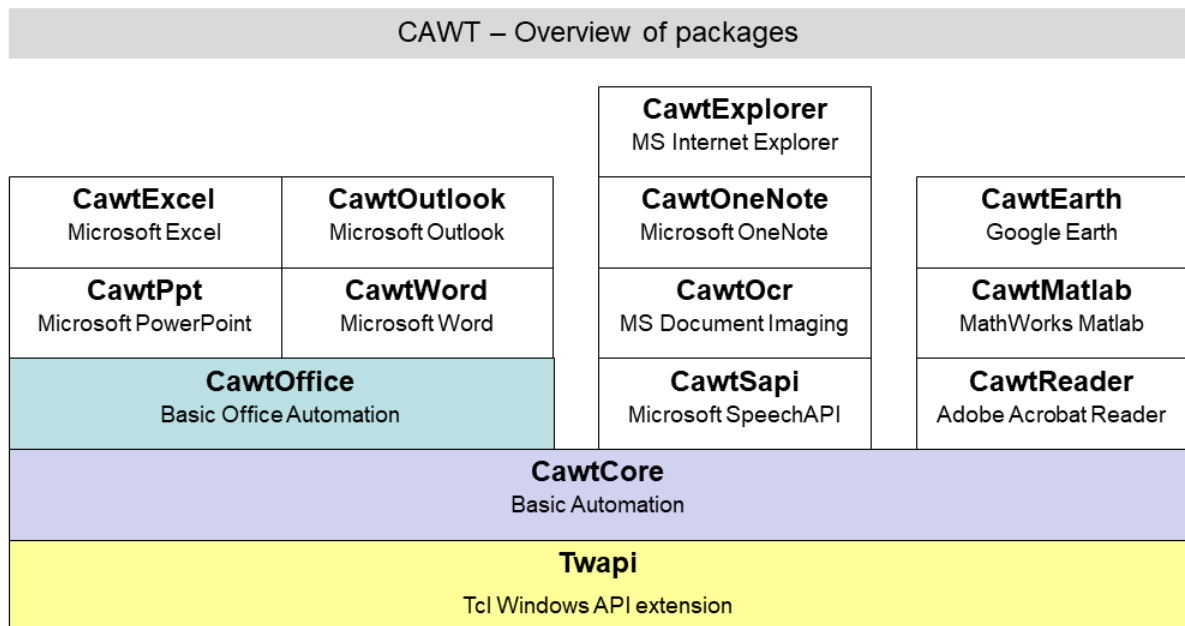


Figure 1: Overview of CAWT packages

1.2 Dependencies

The following table shows a list of the external Tcl packages used in the CAWT infrastructure.

Lib	Version	Comment	URL
Libraries needed for the CAWT package			
Twapi	>= 4.4	Mandatory: Included in CAWT user distribution.	https://twapi.magicplat.com/
tDOM	>= 0.9	Optional: Included in CAWT user distribution.	http://tdom.org/
Tklmg	>= 1.4.1	Optional: Included in CAWT user distribution.	https://sourceforge.net/projects/tklmg/
Base64		Optional: Included in CAWT user distribution.	https://sourceforge.net/projects/tcllib/
Tablelist	>= 6	Optional: Included in CAWT user distribution.	https://www.nemethi.de
Libraries needed for generating the CAWT documentation			
Ruff!	>= 1.0	Included in CAWT developer distribution.	https://ruff.magicplat.com/
Tcllib		Ruff! needs the textutil module from Tcllib. (textutil included in CAWT developer distribution)	https://sourceforge.net/projects/tcllib/

Note:

- tDOM** Mandatory for the CawtOneNote package.
- Tklmg**: Needed for some functionalities (see the CawtExcel package for further details).
- Base64**: Needed for photo image to clipboard functionality.
- Tablelist**: Needed only for the excelTablelist module.

1.3 Installation and Usage

Installation of **CAWT** is simple and fast.

If you just want to play with the test programs to get an impression on how CAWT works, unzip the user distribution file in a folder of your choice. Then open a shell window, go to folder *TestPrograms* of the CAWT distribution and execute a test program with a line as follows:

```
> tclsh Excel-01_Basic.tcl
```

See also chapter 5 for scripts to run all or groups of test programs in batch mode.

If you want to use CAWT as a package for your own applications, the *Cawt* folder should be copied into the library section of your Tcl installation (ex. *C:\Tcl\Lib*). If write access to this Tcl directory is not permitted, you can copy the *Cawt* directory somewhere else, eg. *C:\myCawt*. To have Tcl look for packages in this location, you must set the `TCLLIBPATH` environment variable with the above specified directory name as value. Note that on Windows the path must be written with slashes (not backslashes):

```
> set TCLLIBPATH = C:/myCawt.
```

If suitable versions of *Twapi*, *tDOM*, *Tkimg*, *Base64* or *Tablelist* are already available on your machine, you may remove the appropriate folders from the *Externals* subfolder. Otherwise you should move these packages into the same folder, where you have copied *Cawt* to.

Note:

CAWT is also available via **BAWT** (Build Automation With Tcl) at <https://www.tcl3d.org/bawt/>

2 Packages in Detail

This chapter explains the different packages of CAWT.

For a detailed description of the available procedures in the different sub-packages see the CAWT reference manual available at the CAWT homepage or in the distribution.

2.1 CawtCore: Basic automation functionality

The procedures of package **CawtCore** are implemented in namespace `Cawt`.

They provide functionality for the following domains:

Domain	Examples
Package information	<code>HavePkg</code> , <code>GetPkgVersion</code>
Conversion functionality	<code>CentiMetersToPoints</code> , <code>TclBool</code>
COM access via Twapi	<code>GetOrCreateApp</code> , <code>IsValidId</code> , <code>Destroy</code>
Application embedding	<code>EmbedApp</code> , <code>SetEmbedTimeout</code>
Event handling	<code>SetEventCallback</code>
Color handling	<code>GetColor</code> , <code>GetColorNames</code> , <code>RgbToOfficeColor</code>
Interpolation handling	<code>oo::class Interpolate</code>
Image utilities	<code>ClipboardToImg</code> , <code>ImgToClipboard</code>
Date utilities	<code>XmlDateToIsoDate</code> , <code>OutlookDateToSeconds</code>
String utilities	<code>CountWords</code>
Testing utilities	<code>CheckString</code> , <code>CheckNumber</code> , <code>CheckMatrix</code>

The following table lists all procedures available in namespace `Cawt`.

CawtCore Procedure	Short description
CentiMetersToPoints	Convert centimeter value into points.
CheckBoolean	Check, if two boolean values are identical.
CheckComObjects	Check, if the number of COM objects fits expected value.
CheckFile	Check, if two files are identical.
CheckList	Check, if two lists are identical.
CheckMatrix	Check, if two matrices are identical.
CheckNumber	Check, if two numerical values are identical.
CheckString	Check, if two string values are identical.
ClipboardToImg	Copy the clipboard content into a photo image.
ConcatFiles	Concatenates files into one file.
CountWords	Count words contained in a string.
Destroy	Destroy one or all COM objects.
EmbedApp	Embed an application into a Tk frame.
GetColor	Convert a color representation into an Office color number.
GetColorNames	Get all supported Tcl color names.
GetComObjects	Get the COM objects currently in use as a list.
GetDotsPerInch	Get the dots-per-inch value used for conversions.
GetNumComObjects	Get the number of COM objects currently in use.
GetOrCreateApp	Use or create an instance of an application.
GetPkgVersion	Get the version of a CAWT sub-package.
GetProgramByExtension	Get path to program for a given file extension.
GetTmpDir	Try different environment variables.
HavePkg	Check, if a CAWT sub-package is available.
ImgToClipboard	Copy a photo image into the clipboard.
InchesToPoints	Convert inch value into points.
IsAppIdValid	Check, if an application identifier is valid.

CawtCore Procedure	Short description
IsComObject	Check, if parameter is a COM object.
IsHexColor	Check, if specified color is a valid Tcl hexadecimal color string.
IsNameColor	Check, if specified color is a valid Tcl color name.
IsoDateToOfficeDate	Return ISO date string as Office date.
IsoDateToOutlookDate	Obsolete: Replaced with IsoDateToOfficeDate in version 2.4.4
IsoDateToSeconds	Return ISO date string as seconds.
IsoDateToXmlDate	Return ISO date string as XML date string.
IsOfficeColor	Check, if specified color is a valid Office color number.
IsRgbColor	Check, if specified color is a valid RGB representation.
IsUnicodeFile	Check, if a file is encoded in Unicode.
IsValidId	Obsolete: Replaced with IsComObject in version 2.0.0
IsValidUrlAddress	Check, if supplied address is a valid URL.
KillApp	Kill all running instances of an application.
OfficeColorToRgb	Convert an Office color number into a RGB color list.
OfficeDateToIsoDate	Return Office date as ISO date string.
OfficeDateToSeconds	Return Office date as seconds.
OutlookDateToIsoDate	Obsolete: Replaced with OfficeDateToIsoDate in version 2.4.4
OutlookDateToSeconds	Obsolete: Replaced with OfficeDateToSeconds in version 2.4.4
PointsToCentiMeters	Convert value in points into centimeters.
PointsToInches	Convert value in points into inches.
PopComObjects	Pop last entry from COM objects stack.
PrintNumComObjects	Print the number of currently available COM objects to stdout.
PushComObjects	Push current list of COM objects onto a stack.
RgbToOfficeColor	Convert a RGB color into an Office color number.
SecondsToIsoDate	Return date in seconds as ISO date string.
SecondsToOfficeDate	Return date in seconds as Office date.
SecondsToOutlookDate	Obsolete: Replaced with SecondsToOfficeDate in version 2.4.4
SecondsToXmlDate	Return date in seconds as XML date string.
SetClipboardWaitTime	Set the time to wait until clipboard content is ready.
SetDotsPerInch	Set the dots-per-inch value used for conversions.
SetEmbedTimeout	Set the timeout to wait for the embedded application to start.
SetEventCallback	Set an event callback procedure.
SplitFile	Split a file into several output files.
TclBool	Cast a value to a boolean.
TclInt	Cast a value to an integer with boolean range.
TclString	Cast a value to a string.
ValueToPoints	Convert a value into points.
WaitClipboardReady	Wait until clipboard content is ready.
XmlDateToIsoDate	Return XML date string as ISO date string.
XmlDateToSeconds	Return XML date string as seconds.

Table 1: CawtCore Reference

2.2 CawtOffice: Basic Microsoft Office automation functionality

The procedures of package **CawtOffice** are implemented in namespace `Office`. They provide functionality for the following domains:

Domain	Examples
Office application functionality	GetApplicationName, GetApplicationId
Office document properties	SetDocumentProperty, GetDocumentProperty
Office environment	GetUserName, GetUserPath, GetActivePrinter
Office macros	AddMacro, RunMacro

Namespace `Office` has an internal namespace `Enum` with procedures for all enumeration types of this package. The procedure names correspond to the name of the enumeration type and return a list of enumeration names and values. See the reference manual for a list of all enumeration types.

Example:

```
proc MsoBarRow {} {
    # msoBarRowFirst - 0
    # msoBarRowLast - -1
    return { msoBarRowFirst 0 msoBarRowLast -1 }
}
```

The following table lists all procedures available in namespace `Office`.

CawtOffice Procedure	Short description
AddMacro	Add macros or functions to an Office document.
AddProperty	Add a custom document property.
ColorToRgb	Obsolete: Replaced with <code>::Cawt::OfficeColorToRgb</code> in version 2.2.0
DeleteProperty	Delete a document property.
GetActivePrinter	Get the name of the active printer.
GetApplicationId	Get the application identifier of an Office object.
GetApplicationName	Get the name of an Office application.
GetApplicationVersion	Get the version number of an Office application.
GetDocumentProperties	Get document property names as a list.
GetDocumentProperty	Get the value of a document property.
GetEnum	Get numeric value of an enumeration.
GetEnumName	Get name of a given enumeration type and numeric value.
GetEnumNames	Get names of a given enumeration type.
GetEnumTypes	Get available enumeration types.
GetEnumVal	Get numeric value of an enumeration name.
GetInstallationPath	Get the Office installation pathname.
GetOfficeType	Get the Office type of a file.
GetProperty	Get a document property.
GetPropertyName	Get the name of a document property.
GetPropertyType	Get the type of a document property.
GetPropertyValue	Get the value of a document property.
GetStartupPath	Get the Office startup pathname.
GetTemplatesPath	Get the Office templates pathname.
GetUserLibraryPath	Get the Office user library pathname.
GetUserName	Get the name of the Office application user.
GetUserPath	Get the Office user folder's pathname.
IsApplicationId	Check, if Office object is an application identifier.
RgbToColor	Obsolete: Replaced with <code>::Cawt::RgbToOfficeColor</code> in version 2.2.0
RunMacro	Run a macro or function contained in an Office document.
SetDocumentProperty	Set the value of a document property.
SetPrinterCommunication	Enable or disable printer communication.
SetPropertyValue	Set the value of a document property.

CawtOffice Procedure	Short description
ShowAlerts	Obsolete: Replaced with module specific procedures in version 2.4.3

Table 2: CawtOffice Reference

2.3 CawtEarth: Automation for Google Earth

The name of the controlled application is `GoogleEarth.ApplicationGE`.

The procedures of package **CawtEarth** are implemented in namespace `Earth`.

They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open</code> , <code>Quit</code>
Camera positioning	<code>SetCamera</code>

See the test programs `Earth-*.tcl` for examples on how to use the procedures of this package.

The following table lists all procedures available in namespace `Earth`.

CawtEarth Procedure	Short description
IsInitialized	Check, if a GoogleEarth instance is initialized.
Open	Open a GoogleEarth instance.
OpenNew	Open a new GoogleEarth instance.
Quit	Quit a GoogleEarth instance.
SaveImage	Save a grey-scale image of the current view.
SetCamera	Set camera position and orientation.

Table 3: CawtEarth Reference

2.4 CawtExcel: Automation for Microsoft Excel

The name of the controlled application is `Excel.Application`.

The procedures of package **CawtExcel** are implemented in namespace `Excel`.

They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open</code> , <code>Quit</code> , <code>GetVersion</code>
Workbook handling	<code>OpenWorkbook</code> , <code>AddWorkbook</code> , <code>SaveAs</code> , <code>Close</code>
Worksheet handling	<code>AddWorksheet</code> , <code>DeleteWorksheet</code> , <code>CopyWorksheet</code>
Row handling	<code>InsertRow</code> , <code>DeleteRow</code> , <code>HideRow</code>
Column handling	<code>InsertColumn</code> , <code>DeleteColumn</code> , <code>HideColumn</code>
Chart handling	<code>ChartObjToClipboard</code> , <code>CreateChart</code> , <code>AddLineChart</code>
Insert values	<code>SetCellValue</code> , <code>SetRowValues</code> , <code>SetMatrixValues</code>
Retrieve values	<code>GetCellValue</code> , <code>GetRowValues</code> , <code>GetMatrixValues</code>
Formatting functionality	<code>SetColumnWidth</code> , <code>SetHyperlink</code> , <code>SetRangeTextColor</code>
Clipboard functionality	<code>ClipboardToMatrix</code> , <code>ClipboardToWorksheet</code>
External file handling	<code>Csv</code> , <code>Raw Images</code> , <code>MediaWiki</code> , <code>Wikit</code> , <code>Matlab files</code>
External table tools handling	<code>Tablelist</code> , <code>Word tables</code>

Namespace `Excel` has an internal namespace `Enum` with procedures for all enumeration types

of this package. The procedure names correspond to the name of the enumeration type and return a list of enumeration names and values. See the reference manual for a list of all enumeration types.

Example:

```
proc xlAxisGroup {} {
    # xlPrimary - 1
    # xlSecondary - 2
    return { xlPrimary 1 xlSecondary 2 }
}
```

The commands are grouped and implemented in the following modules:

Implementation file	Description
excelConst.tcl	All Excel enumeration types.
excelBasic.tcl	Basic Excel commands.
excelUtil.tcl	Higher-level utility commands.
excelChart.tcl	Higher-level commands for chart creation.
excelCsv.tcl	Commands for reading/writing CSV files.
excelTablelist.tcl	Exchange Excel data with Tablelist.
excelMatlabFile.tcl	Exchange Excel data with Matlab MAT-Files. Level 4 files only.
excelWord.tcl	Exchange Excel data with Word tables.
excelImgRaw.tcl	Exchange Excel data with Tk photo images. 1-channel floating-point RAW files only.
excelMediaWiki.tcl	Exchange Excel data with MediaWiki tables.
excelWikit.tcl	Exchange Excel data with Wikit tables.
excelHtml.tcl	Export Excel data to HTML files.

See the following URL's for details on table file formats:

Matlab: https://www.mathworks.com/help/pdf_doc/matlab/matfile_format.pdf

Raw images: <https://docs.activestate.com/activetcl/8.6/tcl/img/doc/img-raw.html>

MediaWiki: <https://www.mediawiki.org/wiki/Help:Tables>

Wikit: <https://wiki.tcl-lang.org/page/Formatting+Rules>

See the test programs *Excel-*.tcl* for examples on how to use the procedures of this package.

The next chapters explain the Excel modules dealing with data exchange.

2.4.1 Module excelCsv

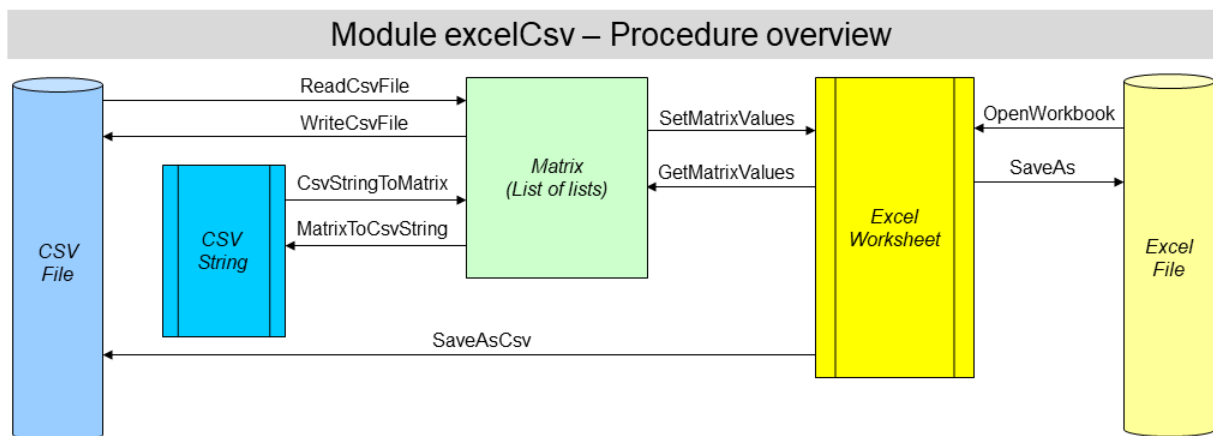


Figure 2: Module excelCsv

2.4.2 Module excelTablelist

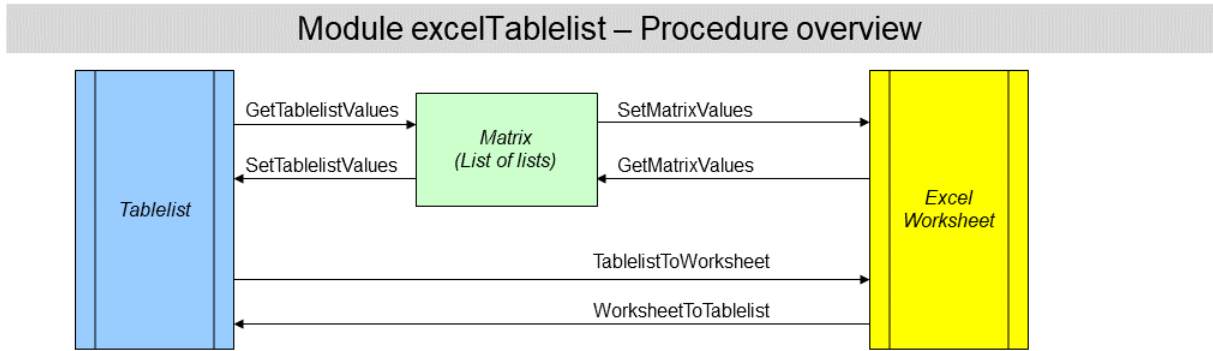


Figure 3: Module excelTablelist

2.4.3 Module excelMatlabFile

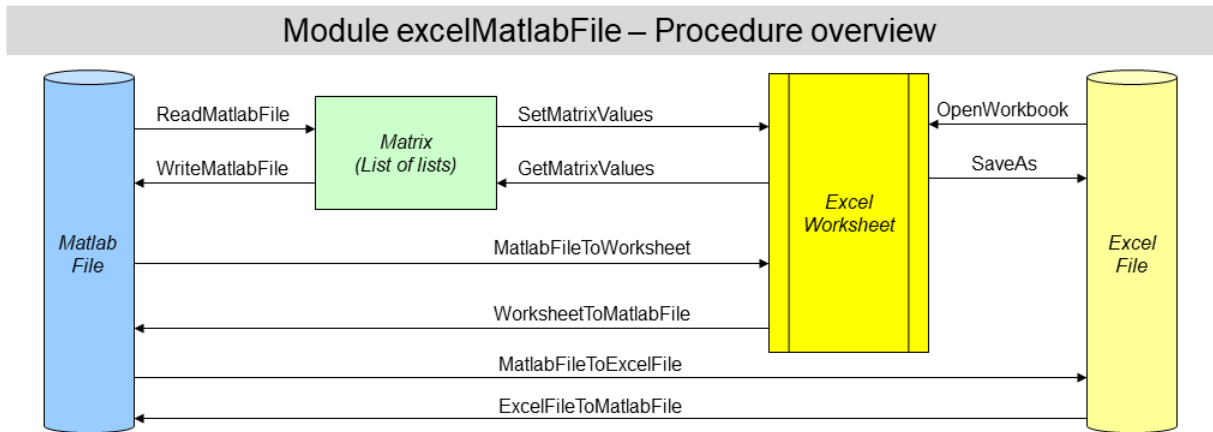


Figure 4: Module excelMatlabFile

2.4.4 Module excelWord

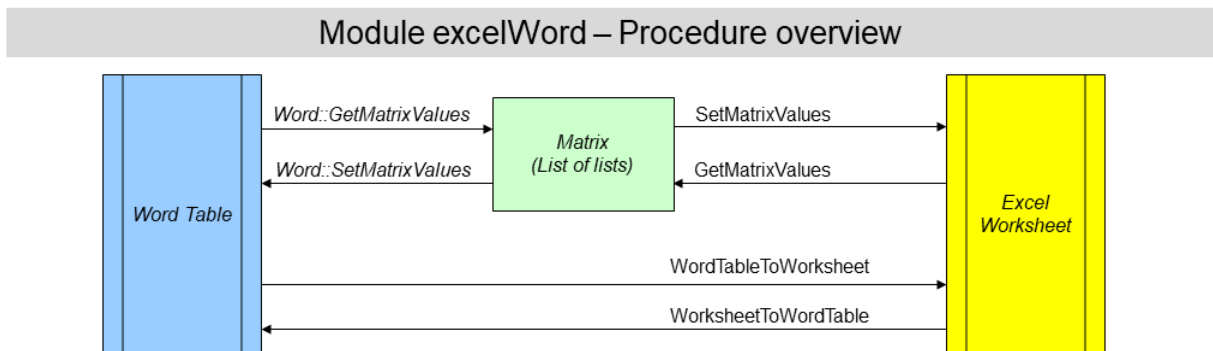


Figure 5: Module excelWord

2.4.5 Module excellmgRaw

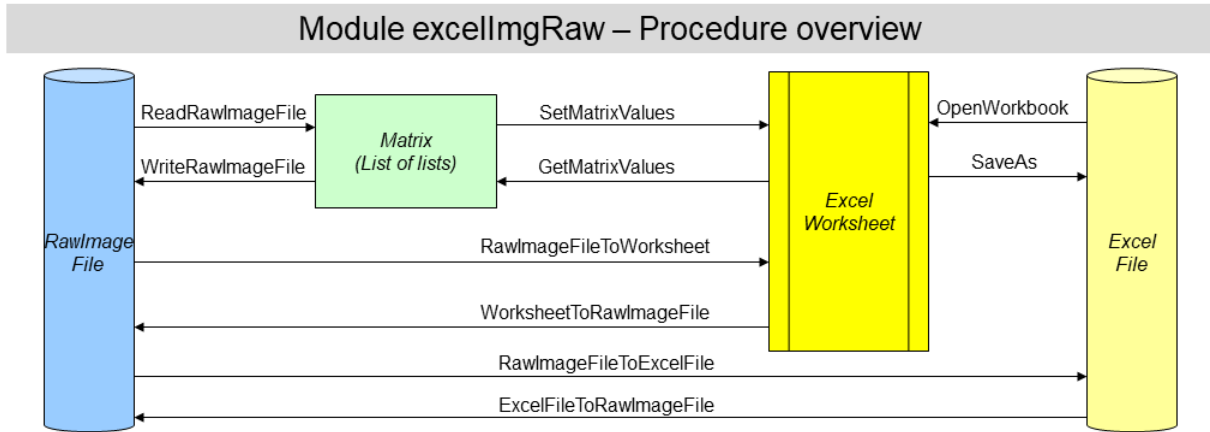


Figure 6: Module excellmgRaw

2.4.6 Module excelMediaWiki

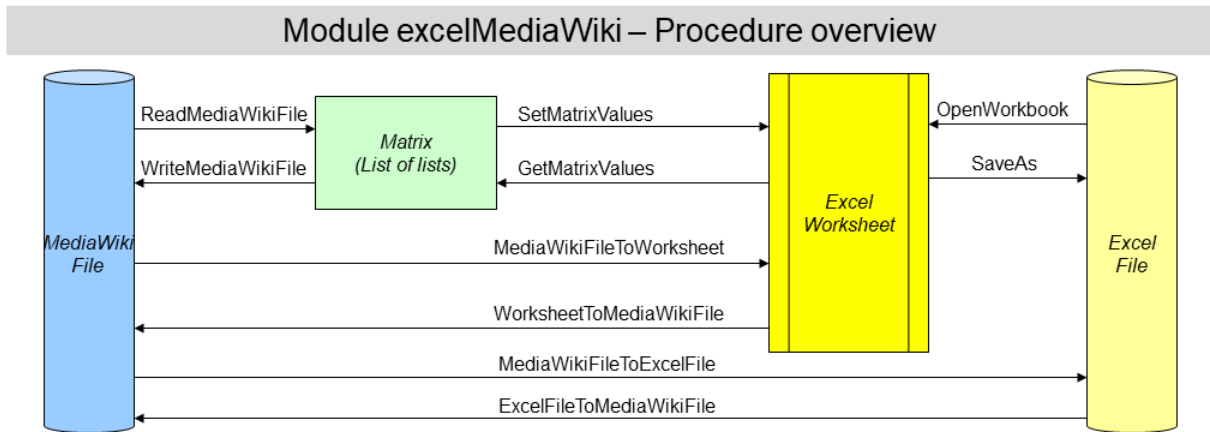


Figure 7: Module excelMediaWiki

2.4.7 Module excelWikikit

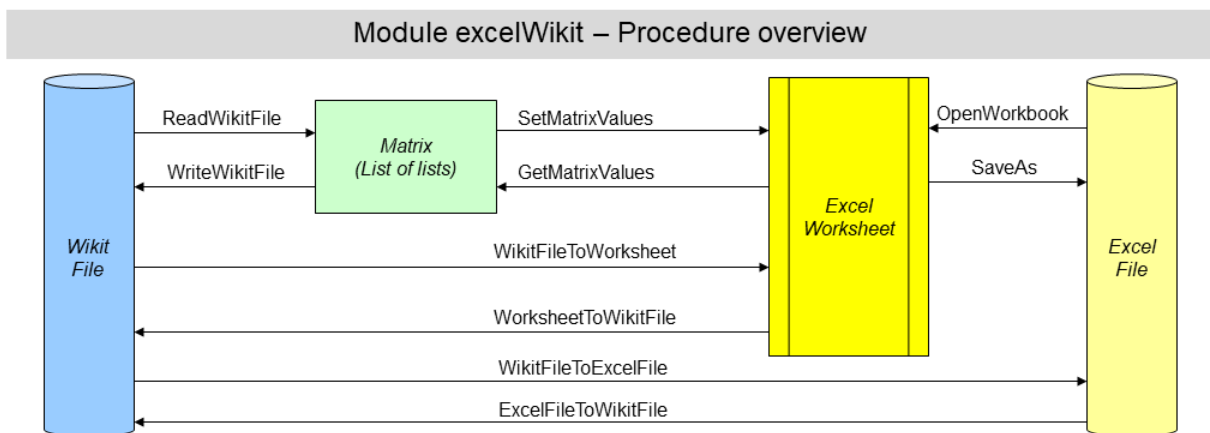


Figure 8: Module excelWikikit

2.4.8 Module excelHtml

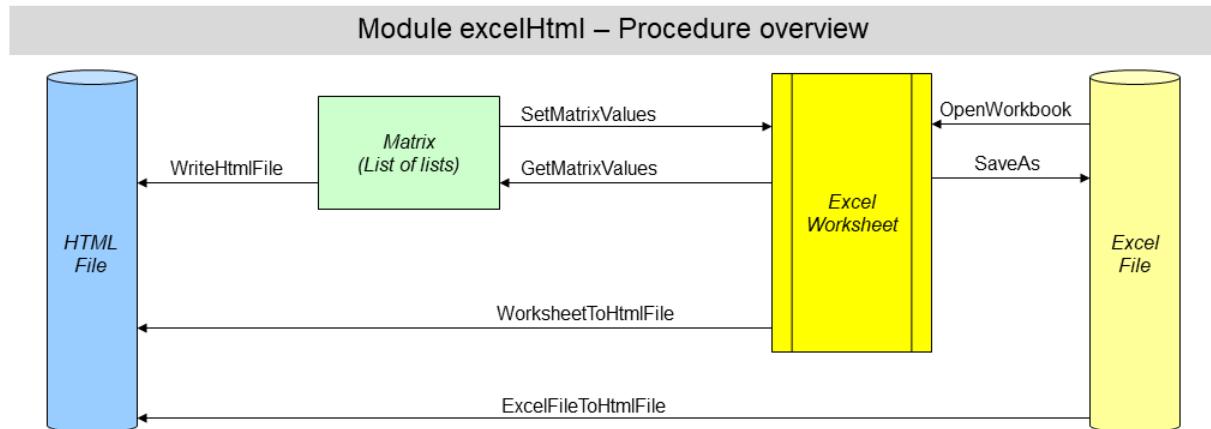


Figure 9: Module excelHtml

The following table lists all procedures available in namespace `Excel`.

CawtExcel Procedure	Short description
AddColumnChartSimple	Add a clustered column chart to a worksheet. Simple case.
AddLineChart	Add a line chart to a worksheet. Generic case.
AddLineChartSimple	Add a line chart to a worksheet. Simple case.
AddPointChartSimple	Add a point chart to a worksheet. Simple case.
AddRadarChartSimple	Add a radar chart to a worksheet. Simple case.
AddSeriesTrendLine	Add a trend line to a series.
AddWorkbook	Add a new workbook with one worksheet.
AddWorksheet	Add a new worksheet to the end of a workbook.
ArrangeWindows	Arrange the windows of an Excel application.
ChartObjToClipboard	Copy a chart object to the clipboard.
ChartToClipboard	Obsolete: Replaced with <code>ChartObjToClipboard</code> in version 1.0.1
ClipboardToMatrix	Return the matrix values contained in the clipboard.
ClipboardToWorksheet	Insert the matrix values contained in the clipboard into a worksheet.
Close	Close a workbook without saving changes.
ColumnCharToInt	Return an Excel column string as a column number.
ColumnIntToChar	Return a column number as an Excel column string.
CopyColumn	Copy the contents of a column into another column.
CopyRange	Copy the contents of a cell range into another cell range.
CopyWorksheet	Copy the contents of a worksheet into another worksheet.
CopyWorksheetAfter	Copy the contents of a worksheet after another worksheet.
CopyWorksheetBefore	Copy the contents of a worksheet before another worksheet.
CreateChart	Create a new empty chart in a worksheet.
CreateRangeString	Create a range string in A1 notation.
CsvRowToList	Return a CSV encoded row as a list of column values.
CsvStringToMatrix	Return a matrix from a CSV encoded table string.
DeleteColumn	Delete a column.
DeleteRow	Delete a row.
DeleteWorksheet	Delete a worksheet.
DeleteWorksheetByIndex	Delete a worksheet identified by its index.

CawtExcel Procedure	Short description
DiffExcelFiles	Compare two Excel files visually.
DuplicateColumn	Duplicate a column.
DuplicateRow	Duplicate a row.
ExcelFileToHtmlFile	Convert an Excel file to a HTML table file.
ExcelFileToMatlabFile	Convert an Excel file to a Matlab table file.
ExcelFileToMediaWikiFile	Convert an Excel file to a MediaWiki table file.
ExcelFileToRawImageFile	Convert an Excel file to a raw photo image file.
ExcelFileToWikitFile	Convert an Excel file to a Wikit table file.
FormatHeaderRow	Format a row as a header row.
FreezePanels	Freeze a range in a worksheet identified by its row/column index.
GetActiveWorkbook	Return the active workbook of an application.
GetCellComment	Return the comment text of a cell.
GetCellIdByIndex	Return a cell of a worksheet.
GetCellRange	Return a numeric cell range as an Excel range string in A1 notation.
GetCellsId	Return the cells identifier of a worksheet.
GetCellValue	Return the value of a cell.
GetCellValueA1	Return the value of a cell.
GetChartNumSeries	Return the number of series of a chart.
GetChartSeries	Get a specific series of a chart.
GetColumnNumber	Return an Excel column string or number as a column number.
GetColumnRange	Return a numeric column range as an Excel range string.
GetColumnValues	Return column values as a Tcl list.
GetCsvSeparatorChar	Returns the column separator character.
GetCurrencyFormat	Return an Excel number format string for currencies.
GetDecimalSeparator	Return the decimal separator used by Excel.
GetEnum	Get numeric value of an enumeration.
GetEnumName	Get name of a given enumeration type and numeric value.
GetEnumNames	Get names of a given enumeration type.
GetEnumTypes	Get available enumeration types.
GetEnumVal	Get numeric value of an enumeration name.
GetExtString	Return the default extension of an Excel file.
GetFirstUsedColumn	Return the index of the first used column of a worksheet.
GetFirstUsedRow	Return the index of the first used row of a worksheet.
GetFloatSeparator	Obsolete: Replaced with GetDecimalSeparator in version 2.1.0
GetHiddenColumns	Return the hidden columns of a worksheet.
GetHiddenRows	Return the hidden rows of a worksheet.
GetLangNumberFormat	Obsolete: Replaced with GetNumberFormat in version 2.1.0
GetLastUsedColumn	Return the index of the last used column of a worksheet.
GetLastUsedRow	Return the index of the last used row of a worksheet.
GetMatrixValues	Return worksheet table values as a matrix.
GetMaxColumns	Return the maximum number of columns of an Excel table.
GetMaxRows	Return the maximum number of rows of an Excel table.
GetNamedRange	Get the identifier of a named range.
GetNamedRangeNames	Get the names of named ranges.
GetNumberFormat	Return an Excel number format string.
GetNumColumns	Return the number of columns of a cell range.

CawtExcel Procedure	Short description
GetNumRows	Return the number of rows of a cell range.
GetNumStyles	Return the number of styles in a workbook.
GetNumUsedColumns	Return the number of used columns of a worksheet.
GetNumUsedRows	Return the number of used rows of a worksheet.
GetNumWorksheets	Return the number of worksheets in a workbook.
GetRangeAsIndex	Get address of a cell range as list of row/column indices.
GetRangeAsString	Get address of a cell range as Excel range string in A1 notation.
GetRangeCharacters	Return characters of a cell range.
GetRangeFillColor	Get the fill color of a cell range.
GetRangeFontAttributes	Get the font attributes of a cell or character range.
GetRangeFontBold	Get the bold font style of a cell range.
GetRangeFontItalic	Get the italic font style of a cell range.
GetRangeFontName	Get the font name of a cell or character range.
GetRangeFontSize	Get the font size of a cell range.
GetRangeFontSubscript	Get the subscript font style of a cell or character range.
GetRangeFontSuperscript	Get the superscript font style of a cell or character range.
GetRangeFontUnderline	Get the underline font style of a cell range.
GetRangeFormat	Get the number format of a cell range.
GetRangeHorizontalAlignment	Get the horizontal alignment of a cell range.
GetRangeTextColor	Get the text color of a cell range.
GetRangeValues	Return range values as a matrix.
GetRangeVerticalAlignment	Get the vertical alignment of a cell range.
GetRangeWrapText	Get the wrap text mode of a cell range.
GetRowValues	Return row values as a Tcl list.
GetStyleId	Find a style by its index or name.
GetTablelistHeader	Return the header line of a tablelist as a list.
GetTablelistValues	Return the values of a tablelist as a matrix.
GetThousandsSeparator	Return the thousands separator used by Excel.
GetVersion	Return the version of an Excel application.
GetWorkbookIdByName	Find an open workbook by its name.
GetWorkbookName	Return the name of a workbook.
GetWorksheetAsMatrix	Return worksheet table as a matrix.
GetWorksheetIdByIndex	Find a worksheet by its index.
GetWorksheetIdByName	Find a worksheet by its name.
GetWorksheetIndexByName	Find a worksheet index by its name.
GetWorksheetName	Return the name of a worksheet.
HideColumn	Hide or unhide a column.
HideRow	Hide or unhide a row.
ImgToWorksheet	Put a photo image into a worksheet.
Import	Import data from an external data source.
InsertColumn	Insert a new empty column.
InsertImage	Insert an image into a worksheet.
InsertRow	Insert a new empty row.
IsWorkbookId	Check, if Excel object is a workbook identifier.
IsWorkbookOpen	Check, if a workbook is open.
IsWorkbookProtected	Check, if a workbook is protected.
IsWorksheetEmpty	Check, if a worksheet is empty.
IsWorksheetProtected	Check, if a worksheet is content protected.
IsWorksheetVisible	Check, if a worksheet is visible.
ListToCsvRow	Return a list of column values as a CSV encoded row string.
MapWorksheetName	Map the name of a worksheet to conform to Excel constraints.

CawtExcel Procedure	Short description
MatlabFileToExcelFile	Convert a Matlab table file to an Excel file.
MatlabFileToWorksheet	Insert the data values of a Matlab file into a worksheet.
MatrixToClipboard	Copy a matrix into the clipboard.
MatrixToCsvString	Return a CSV encoded table string from a matrix list.
MediaWikiFileToExcelFile	Convert a MediaWiki table file to an Excel file.
MediaWikiFileToWorksheet	Insert the values of a MediaWiki table file into a worksheet.
Open	Open an Excel instance. Use an already running instance, if available.
OpenNew	Open a new Excel instance.
OpenWorkbook	Open a workbook, i.e. load an Excel file.
PlaceChart	Place an existing chart into a worksheet.
Quit	Quit an Excel instance.
RawImageFileToExcelFile	Convert a raw photo image file to an Excel file.
RawImageFileToWorksheet	Insert the pixel values of a raw photo image into a worksheet.
ReadCsvFile	Read a CSV table file into a matrix.
ReadMatlabFile	Read a Matlab file into a matrix.
ReadMatlabHeader	Read the header of a Matlab file.
ReadMediaWikiFile	Read a MediaWiki table file into a matrix.
ReadRawImageFile	Read a raw photo image into a matrix.
ReadRawImageHeader	Read the header of a raw photo image.
ReadWikitFile	Read a Wikit table file into a matrix.
ResizeChartObj	Set the position and size of a chart object.
SaveAs	Save a workbook to an Excel file.
SaveAsCsv	Save a worksheet to file in CSV format.
SaveChartAsImage	Obsolete: Replaced with SaveChartObjAsImage in version 1.0.1
SaveChartObjAsImage	Save a chart as an image in a file.
ScaleImage	Scale an image.
ScreenUpdate	Toggle the screen updating of an Excel application window.
Search	Find a string in a worksheet cell range.
SelectAll	Select all cells of a worksheet.
SelectCellByIndex	Select a cell by its row/column index.
SelectRangeByIndex	Select a range by specifying a numeric cell range.
SelectRangeByString	Select a range by specifying an Excel range string in A1 notation.
SetCellValue	Set the value of a cell.
SetChartMaxScale	Set the maximum scale of an axis of a chart.
SetChartMinScale	Set the minimum scale of an axis of a chart.
SetChartObjPosition	Set the position of a chart object.
SetChartObjSize	Set the size of a chart object.
SetChartScale	Set the minimum and maximum scale of both axes of a chart.
SetChartSize	Obsolete: Replaced with SetChartObjSize in version 1.0.1
SetChartSourceByIndex	Set the cell range for the source of a chart.
SetChartTicks	Set the tick spacing of an axis of a chart.
SetChartTitle	Set the title of a chart.
SetColumnsWidth	Set the width of a range of columns.
SetColumnValues	Insert column values from a Tcl list.
SetColumnWidth	Set the width of a column.
SetCommentDisplayMode	Set the global display mode of comments.

CawtExcel Procedure	Short description
SetCommentSize	Set the shape size of a comment.
SetCsvSeparatorChar	Set the column separator character.
SetHeaderRow	Insert row values from a Tcl list and format as a header row.
SetHyperlink	Insert a hyperlink into a cell.
SetHyperlinkToCell	Insert a hyperlink to a cell into another cell.
SetHyperlinkToFile	Insert a hyperlink to a file into a cell.
SetLinkToCell	Insert an internal link to a cell into another cell.
SetMatrixValues	Insert matrix values into a worksheet.
SetNamedRange	Set the name of a cell range.
SetRangeBorder	Set the attributes of one border of a cell range.
SetRangeBorders	Set the attributes of all borders of a cell range.
SetRangeComment	Set the comment text of a cell range.
SetRangeFillColor	Set the fill color of a cell range.
SetRangeFontAttributes	Set the font attributes of a cell or character range.
SetRangeFontBold	Set the bold font style of a cell range.
SetRangeFontItalic	Set the italic font style of a cell range.
SetRangeFontName	Set the font name of a cell or character range.
SetRangeFontSize	Set the font size of a cell range.
SetRangeFontSubscript	Set the subscript font style of a cell or character range.
SetRangeFontSuperscript	Set the superscript font style of a cell or character range.
SetRangeFontUnderline	Set the underline font style of a cell range.
SetRangeFormat	Set the number format of a cell range.
SetRangeHorizontalAlignment	Set the horizontal alignment of a cell range.
SetRangeMergeCells	Merge/Unmerge a range of cells.
SetRangeTextColor	Set the text color of a cell range.
SetRangeTooltip	Set a selection based tooltip for a cell range.
SetRangeValues	Set range values from a matrix.
SetRangeVerticalAlignment	Set the vertical alignment of a cell range.
SetRangeWrapText	Set the text wrapping mode of a cell range.
SetRowHeight	Set the height of a row.
SetRowsHeight	Set the height of a range of rows.
SetRowValues	Insert row values from a Tcl list.
SetSeriesAttributes	Set the attributes of a series.
SetSeriesLineWidth	Set the line width of a series.
SetTablelistHeader	Insert header values into a tablelist.
SetTablelistValues	Insert matrix values into a tablelist.
SetWindowState	Set the window state of an Excel application.
SetWorksheetFitToPages	Adjust a worksheet to fit onto given number of pages.
SetWorksheetFooter	Set the texts of the footer of a worksheet.
SetWorksheetHeader	Set the texts of the header of a worksheet.
SetWorksheetMargins	Set the margins of a worksheet.
SetWorksheetName	Set the name of a worksheet.
SetWorksheetOrientation	Set the orientation of a worksheet.
SetWorksheetPaperSize	Set the paper size of a worksheet.
SetWorksheetPrintOptions	Set printing options of a worksheet.
SetWorksheetTabColor	Set the color of the tab of a worksheet.
SetWorksheetZoom	Set the zoom factor for printing of a worksheet.
ShowAlerts	Toggle the display of Excel application alerts.
ShowCellByIndex	Show a cell identified by its row/column index.
ShowWorksheet	Show a worksheet.
TablelistToWorksheet	Insert the values of a tablelist into a worksheet.
ToggleAutoFilter	Toggle the AutoFilter switch of a cell range.
UnhideWorksheet	Unhide a worksheet, if it is hidden.

CawtExcel Procedure	Short description
UseImgTransparency	Toggle usage of transparency channel of an image.
Visible	Set or query the visibility of an Excel application window.
WikitFileToExcelFile	Convert a Wikit table file to an Excel file.
WikitFileToWorksheet	Insert the values of a Wikit table file into a worksheet.
WordTableToWorksheet	Insert the values of a Word table into a worksheet.
WorksheetToClipboard	Copy worksheet data into the clipboard.
WorksheetToHtmlFile	Write the values of a worksheet into a HTML table file.
WorksheetToImg	Put worksheet background colors into a photo image.
WorksheetToMatlabFile	Insert the values of a worksheet into a Matlab file.
WorksheetToMediaWikiFile	Insert the values of a worksheet into a MediaWiki table file.
WorksheetToRawImageFile	Insert the values of a worksheet into a raw photo image file.
WorksheetToTablelist	Insert the values of a worksheet into a tablelist.
WorksheetToWikitFile	Insert the values of a worksheet into a Wikit table file.
WorksheetToWordTable	Insert the values of a worksheet into a Word table.
WriteCsvFile	Write the values of a matrix into a CSV file.
WriteHtmlFile	Write the values of a matrix into a Html table file.
WriteMatlabFile	Write the values of a matrix into a Matlab file.
WriteMediaWikiFile	Write the values of a matrix into a MediaWiki table file.
WriteRawImageFile	Write the values of a matrix into a raw photo image file.
WriteWikitFile	Write the values of a matrix into a Wikit table file.

Table 4: CawtExcel Reference

2.5 CawtExplorer: Automation for Internet Explorer

The name of the controlled application is `InternetExplorer.Application`.

The procedures of package **CawtExplorer** are implemented in namespace `Explorer`. They provide functionality for the following domains:

Domain	Examples
Application handling	Open, Quit
URL navigation	Navigate, GoBack, GoHome

See the test programs `Explorer-*.tcl` for examples on how to use the procedures of this package.

Note: If running on Windows Vista or 7, you have to lower the security settings like follows:

```
Internet Options -> Security -> Trusted Sites      : Low
Internet Options -> Security -> Internet          : Medium + unchecked Enable Protected Mode
Internet Options -> Security -> Restricted Sites  : unchecked Enable Protected Mode
```

The following table lists all procedures available in namespace `Explorer`.

CawtExplorer Procedure	Short description
FullScreen	Toggle the fullscreen mode of an Internet Explorer application window.
Go	Go to a specific page.
IsBusy	Check, if an Internet Explorer instance is busy.
Navigate	Navigate to a URL or local file.
Open	Open an Internet Explorer instance.

CawtExplorer Procedure	Short description
OpenNew	Open a new Internet Explorer instance.
Quit	Quit an Internet Explorer instance.
Visible	Toggle the visibility of an Internet Explorer application window.

Table 5: CawtExplorer Reference

2.6 CawtMatlab: Automation for MathWorks Matlab

The name of the controlled application is `Matlab.Application`.

The procedures of package **CawtMatlab** are implemented in namespace `Matlab`. They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open</code> , <code>Quit</code>
Command execution	<code>ExecCmd</code>

See the test programs `Matlab-*.tcl` for examples on how to use the procedures of this package.

The following table lists all procedures available in namespace `Matlab`.

CawtMatlab Procedure	Short description
ExecCmd	Execute a Matlab command.
Open	Open a Matlab instance.
OpenNew	Open a new Matlab instance.
Quit	Quit a Matlab instance.
Visible	Toggle the visibility of a Matlab application window.

Table 6: CawtMatlab Reference

2.7 CawtOcr: Automation for Microsoft Document Imaging

The name of the controlled application is `MODI.Document`.

The procedures of package **CawtOcr** are implemented in namespace `Ocr`. They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open</code> , <code>Close</code>
Character recognition	<code>Scan</code> , <code>GetFullText</code> , <code>GetWord</code> , <code>GetWordStatistics</code>

See the test programs `Ocr-*.tcl` for examples on how to use the procedures of this package.

The following table lists all procedures available in namespace `Ocr`.

CawtOcr Procedure	Short description
Close	Close an OCR document instance.
GetFullText	Return the recognized text of an OCR layout.
GetNumImages	Return the number of images of an OCR document.

CawtOcr Procedure	Short description
GetNumWords	Return the number of words identified in an OCR document.
GetWord	Return the text of a recognized word.
GetWordStats	Return statistics of a recognized word.
Open	Open an OCR document instance.
OpenDocument	Open an image file for OCR scanning.
Scan	Scan an image.

Table 7: CawtOcr Reference

2.8 CawtOneNote: Automation for Microsoft OneNote

The name of the controlled application is `OneNote.Application`.

The procedures of package **CawtOneNote** are implemented in namespace `OneNote`. They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open</code> , <code>Quit</code> , <code>GetVersion</code>
Retrieving information	<code>GetNotebooks</code> , <code>GetSections</code> , <code>GetPages</code>

See the test programs `OneNote-*.tcl` for examples on how to use the procedures of this package.

The following table lists all procedures available in namespace `OneNote`.

CawtOneNote Procedure	Short description
FindNodeByName	Get a specific node by name.
FindNotebook	Get a specific notebook by name.
FindPage	Get a specific page by name.
FindSection	Get a specific section by name.
GetApplicationId	Get the application identifier of a OneNote object.
GetDomId	Get the DOM identifier of a OneNote object.
GetDomRoot	Get the DOM root of a OneNote object.
GetEnum	Get numeric value of an enumeration.
GetEnumName	Get name of a given enumeration type and numeric value.
GetEnumNames	Get names of a given enumeration type.
GetEnumTypes	Get available enumeration types.
GetEnumVal	Get numeric value of an enumeration name.
GetExtString	Return the default extension of a OneNote file.
GetLastModified	Get nodes with specific modification date.
GetNodeAttribute	Get attribute value of a DOM node.
GetNodeHyperLink	Get hyperlink to OneNote node.
GetNodeName	Get value of node attribute name.
GetNodesByType	Get nodes of specific type.
GetNodeType	Get type of a DOM node.
GetNotebooks	Get the notebooks of a OneNote object.
GetPageContent	Get page content as XML.
GetPages	Get the pages of a OneNote section.
GetSections	Get the sections of a OneNote notebook.
GetVersion	Return the version of a OneNote application.
IsNodeType	Check, if node is of specific type.
Open	Open a OneNote instance.
PrintPage	Print page content as XML to standard output.

CawtOneNote Procedure	Short description
Quit	Quit a OneNote instance.

Table 8: CawtOneNote Reference

2.9 CawtOutlook: Automation for Microsoft Outlook

The name of the controlled application is `Outlook.Application`.

The procedures of package **CawtOutlook** are implemented in namespace `Outlook`. They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open</code> , <code>Quit</code> , <code>GetVersion</code>
Mail handling	<code>CreateMail</code> , <code>CreateHtmlMail</code> , <code>SendMail</code>
Calendar handling	<code>AddCalendar</code> , <code>DeleteCalendar</code> , <code>GetCalendarId</code>
Category handling	<code>AddCategory</code> , <code>DeleteCategory</code> , <code>GetCategoryId</code>
Contact handling	<code>AddContact</code> , <code>GetContactProperties</code>
Appointment handling	<code>AddAppointment</code> , <code>DeleteAppointment</code>
Holiday filehandling	<code>ReadHolidayFile</code> , <code>ApplyHolidayFile</code>

Namespace `Outlook` has an internal namespace `Enum` with procedures for all enumeration types of this package. The procedure names correspond to the name of the enumeration type and return a list of enumeration names and values. See the reference manual for a list of all enumeration types.

Example:

```
proc OlAlignment {} {
    # olAlignmentLeft - 0
    # olAlignmentRight - 1
    return { olAlignmentLeft 0 olAlignmentRight 1 }
}
```

The commands are grouped and implemented in the following modules:

Implementation file	Description
<code>outlookConst.tcl</code>	All Outlook enumeration types.
<code>outlookBasic.tcl</code>	Basic Outlook commands.
<code>outlookCalendar.tcl</code>	Outlook calendar commands.
<code>outlookColor.tcl</code>	Outlook commands related to color handling.
<code>outlookContact.tcl</code>	Outlook contact commands.
<code>outlookMail.tcl</code>	Outlook mail commands.

See the test programs `Outlook-*.tcl` for examples on how to use the procedures of this package.

Note: The Outlook test programs send test mails and modify the Outlook calendar.

The following table lists all procedures available in namespace `Outlook`.

CawtOutlook Procedure	Short description
AddAppointment	Create a new appointment in an Outlook calendar.
AddCalendar	Add a new Outlook calendar.
AddCategory	Add a new category to the Outlook categories.
AddContact	Create a new contact in an Outlook contact folder.

CawtOutlook Procedure	Short description
AddContactFolder	Add a new Outlook contact folder.
AddHolidayAppointment	Create a new appointment in an Outlook calendar.
ApplyHolidayFile	Read an Outlook holiday file and insert appointments.
CreateHtmlMail	Create a new Outlook HTML mail.
CreateMail	Create a new Outlook text mail.
DeleteAppointmentByIndex	Delete an appointment of an Outlook calendar by its index.
DeleteCalendar	Delete an Outlook calendar.
DeleteCategory	Delete an Outlook category.
DeleteContactByIndex	Delete a contact of an Outlook contact folder by its index.
DeleteContactFolder	Delete an Outlook contact folder.
GetAppointmentByIndex	Get an appointment of an Outlook calendar by its index.
GetAppointmentProperties	Get properties of an Outlook appointment.
GetCalendarId	Get an Outlook calendar by its name.
GetCalendarNames	Get a list of Outlook calendar names.
GetCategoryColor	Convert a category color enumeration or name
GetCategoryColorEnum	Convert a category color enumeration or name into a color enumeration.
GetCategoryColorName	Convert a category color enumeration into a category color name.
GetCategoryColorNames	Get all category color names.
GetCategoryId	Get a category by its index or name.
GetCategoryNames	Get a list of category names.
GetContactByIndex	Get a contact of an Outlook contact folder by its index.
GetContactFolderId	Get an Outlook contact folder by its name.
GetContactFolderNames	Get a list of Outlook contact folder names.
GetContactProperties	Get property values of an Outlook contact.
GetContactReadOnlyPropertyNames	Get a list of Outlook contact read-only property names.
GetContactReadWritePropertyNames	Get a list of Outlook contact read-write property names.
GetEnum	Get numeric value of an enumeration.
GetEnumName	Get name of a given enumeration type and numeric value.
GetEnumNames	Get names of a given enumeration type.
GetEnumTypes	Get available enumeration types.
GetEnumVal	Get numeric value of an enumeration name.
GetFoldersRecursive	Get all Outlook folders of a specific type.
GetMailIds	Get a list of mail identifiers.
GetMailSubjects	Get a list of mail subjects.
GetNumAppointments	Get the number of appointments in an Outlook calendar.
GetNumCalendars	Get the number of Outlook calendars.
GetNumCategories	Get the number of Outlook categories.
GetNumContactFolders	Get the number of Outlook contact folders.
GetNumContacts	Get the number of contacts in an Outlook contact folder.
GetVersion	Get the version of an Outlook application.
HaveCalendar	Check, if an Outlook calendar exists.
HaveCategory	Check, if a category already exists.

CawtOutlook Procedure	Short description
HaveContactFolder	Check, if an Outlook contact folder exists.
Open	Open an Outlook instance.
OpenNew	Obsolete: Replaced with Open in version 2.4.1
Quit	Quit an Outlook instance.
ReadHolidayFile	Read an Outlook holiday file.
SendMail	Send an Outlook mail.
SetContactProperties	Set property values of an Outlook contact.

Table 9: CawtOutlook Reference

2.10 CawtPpt: Automation for Microsoft PowerPoint

The name of the controlled application is `PowerPoint.Application`.

The procedures of package **CawtPpt** are implemented in namespace `Ppt`. They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open, Quit, GetVersion</code>
Presentation handling	<code>OpenPres, AddPres, SaveAs, Close</code>
Slide handling	<code>AddSlide, CopySlide, ShowSlide, ExportSlide</code>
SlideShow handling	<code>UseSlideShow, SlideShowFirst, SlideShowNext</code>
Shape handling	<code>AddShape, ConfigureShape, ConnectShapes</code>
Custom layout handling	<code>GetNumCustomLayouts, GetCustomLayoutName</code>

Namespace `Ppt` has an internal namespace `Enum` with procedures for all enumeration types of this package. The procedure names correspond to the name of the enumeration type and return a list of enumeration names and values. See the reference manual for a list of all enumeration types.

Example:

```
proc PpArrangeStyle {} {
    # ppArrangeCascade - 2
    # ppArrangeTiled - 1
    return { ppArrangeCascade 2 ppArrangeTiled 1 }
}
```

See the test programs `Ppt-*.tcl` for examples on how to use the procedures of this package.

The following table lists all procedures available in namespace `Ppt`.

CawtPpt Procedure	Short description
AddPres	Add a new empty presentation.
AddShape	Add a new shape to a slide.
AddSlide	Add a new slide to a presentation.
AddTextbox	Add a text box into a slide.
AddTextboxText	Add a text string to a text box.
CheckCreateVideoStatus	Check video creation status.
Close	Close a presentation without saving changes.
CloseAll	Close all presentations of a PowerPoint instance.
ConfigureConnector	Configure a connector.
ConfigureShape	Configure a shape.
ConnectShapes	Add a new connector connecting two shapes.
CopySlide	Make a copy of a slide.

CawtPpt Procedure	Short description
CreateVideo	Create a video from a presentation.
ExitSlideShow	Exit specified slide show.
ExportPptFile	Export a PowerPoint file to an image sequence.
ExportSlide	Export a slide as an image.
ExportSlides	Export a range of slides as image files.
GetActivePres	Return the active presentation of an application.
GetCommentKeyLeftPosition	Return the left position of a comment with specific key.
GetCommentKeyPosition	Return the top-left position of a comment with specific key.
GetCommentKeyTopPosition	Return the top position of a comment with specific key.
GetCommentKeyValue	Return the value of a key stored in a comment.
GetComments	Get the comment texts of a slide as a Tcl list.
GetCreateVideoStatus	Get video creation status.
GetCurrentSlideIndex	Return the current slide index of a presentation.
GetCustomLayoutId	Get a custom layout by its index or name.
GetCustomLayoutName	Return the name of a custom layout.
GetEnum	Get numeric value of an enumeration.
GetEnumName	Get name of a given enumeration type and numeric value.
GetEnumNames	Get names of a given enumeration type.
GetEnumTypes	Get available enumeration types.
GetEnumVal	Get numeric value of an enumeration name.
GetExtString	Return the default extension of a PowerPoint file.
GetNumComments	Return the number of comments of a slide.
GetNumCustomLayouts	Return the number of custom layouts of a presentation.
GetNumShapes	Return the number of shapes of a slide.
GetNumSites	Return the number of sites of a shape.
GetNumSlideImages	Return the number of images of a slide.
GetNumSlides	Return the number of slides of a presentation.
GetNumSlideShows	Return the number of slide shows of a presentation.
GetNumSlideVideos	Return the number of videos of a slide.
GetPptImageFormat	Get PowerPoint image format from Img format.
GetPresImages	Get the images of a presentation.
GetPresPageHeight	Get the page height of a presentation.
GetPresPageWidth	Get the page width of a presentation.
GetPresVideos	Get the videos of a presentation.
GetShapeId	Get shape identifier from shape index.
GetShapeMediaType	Return the media type of a shape.
GetShapeName	Return the name of a shape.
GetShapeType	Return the type of a shape.
GetSlideId	Get slide identifier from slide index.
GetSlideIdByName	Find a slide by its name.
GetSlideImages	Get the images of a slide.
GetSlideIndex	Return the index of a slide.
GetSlideName	Return the name of a slide.
GetSlideVideos	Get the videos of a slide.
GetSupportedImageFormats	Get the image formats supported by PowerPoint.
GetTemplateExtString	Return the default extension of a PowerPoint template file.
GetVersion	Return the version of a PowerPoint application.
GetViewType	Return the view type of a presentation.
InsertImage	Insert an image into a slide.
InsertVideo	Insert a video into a slide.
IsImageFormatSupported	Check, if the image format is supported by PowerPoint.
IsValidPresId	Check, if a presentation identifier is valid.
MoveSlide	Move a slide to another position.

CawtPpt Procedure	Short description
Open	Open a PowerPoint instance. Use an already running instance, if available.
OpenNew	Open a new PowerPoint instance.
OpenPres	Open a presentation, i.e. load a PowerPoint file.
Quit	Quit a PowerPoint instance.
SaveAs	Save a presentation to a PowerPoint file.
SetHyperlinkToSlide	Create a hyperlink from a shape to a slide.
SetMediaPlaySettings	Set the play settings of a media (audio or video).
SetPresPageSetup	Set the page size of a presentation.
SetShapeName	Set the name of a shape.
SetSlideName	Set the name of a worksheet.
SetSlideShowTransition	Set transition attributes of a slide.
SetTextboxFontSize	Set the font size of the text in a text box.
SetViewType	Set the view type of a presentation.
ShowAlerts	Toggle the display of PowerPoint application alerts.
ShowSlide	Show a specific slide.
SlideShowFirst	Go to first slide in slide show.
SlideShowLast	Go to last slide in slide show.
SlideShowNext	Go to next slide in slide show.
SlideShowPrev	Go to previous slide in slide show.
UseSlideShow	Use specified slide show.
Visible	Toggle the visibility of a PowerPoint application window.

Table 10: CawtPpt Reference

2.11 CawtReader: Automation for Acrobat Reader

Note: Acrobat Reader is currently not controlled by the COM interface, but uses the program command line options.

The procedures of package **CawtReader** are implemented in namespace `Reader`. They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open</code> , <code>OpenNew</code> , <code>Quit</code> , <code>SetReaderProg</code>

See the test programs `Reader-*.tcl` for examples on how to use the procedures of this package.

The following table lists all procedures available in namespace `Reader`.

CawtReader Procedure	Short description
Open	Open an Acrobat Reader instance.
OpenNew	Open a new Acrobat Reader instance.
Quit	Quit all Acrobat Reader instances.
SetReaderProg	Set the path to Acrobat Reader program.

Table 11: CawtReader Reference

2.12 CawtSapi: Automation for Microsoft Speech API

The name of the controlled application is `sapi.SpVoice`.

The procedures of package **CawtSapi** are implemented in namespace `Sapi`. They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open</code>
Voice handling	<code>GetVoiceByName</code> , <code>GetVoiceNames</code> , <code>SetVoice</code>
Speaking	<code>SetSpeakOptions</code> , <code>Speak</code>

See the test programs `Sapi-*.tcl` for examples on how to use the procedures of this package.

The following table lists all procedures available in namespace `Sapi`.

CawtSapi Procedure	Short description
GetEnum	Get numeric value of an enumeration.
GetEnumName	Get name of a given enumeration type and numeric value.
GetEnumNames	Get names of a given enumeration type.
GetEnumTypes	Get available enumeration types.
GetEnumVal	Get numeric value of an enumeration name.
GetSpeakOptions	Get speak options.
GetVoiceByName	Get a voice identifier by specifying its name.
GetVoiceNames	Get a list of voice names.
Open	Open a SAPI object instance.
SetSpeakOptions	Set speak options.
SetVoice	Set the voice for speaking.
Speak	Speak a sentence.

Table 12: CawtSapi Reference

2.13 CawtWord: Automation for Microsoft Word

The name of the controlled application is `Word.Application`.

The procedures of package **CawtWord** are implemented in namespace `Word`. They provide functionality for the following domains:

Domain	Examples
Application handling	<code>Open</code> , <code>Quit</code> , <code>GetVersion</code>
Document handling	<code>OpenDocument</code> , <code>AddDocument</code> , <code>SaveAs</code> , <code>Close</code>
Table handling	<code>AddTable</code> , <code>GetNumRows</code> , <code>SetCellValue</code> , <code>GetCellValue</code>
Text handling	<code>AddParagraph</code> , <code>AppendText</code> , <code>AddText</code>
Range handling	<code>GetStartRange</code> , <code>GetRangeStartIndex</code> , <code>ExtendRange</code>
Search/Replace functionality	<code>FindString</code> , <code>ReplaceString</code> , <code>ReplaceByProc</code> , <code>Search</code>
Formatting functionality	<code>SetRangeFontBold</code> , <code>SetRangeBackgroundColor</code>
Caption handling	<code>InsertCaption</code> , <code>ConfigureCaption</code>
Bookmark handling	<code>AddBookmark</code> , <code>GetBookmarkName</code> , <code>SetLinkToBookmark</code>
Hyperlink handling	<code>GetHyperlinksAsDict</code> , <code>GetNumHyperlinks</code>
List handling	<code>GetListGalleryId</code> , <code>GetListTemplateId</code> , <code>InsertList</code>

Namespace `Word` has an internal namespace `Enum` with procedures for all enumeration types of this package. The procedure names correspond to the name of the enumeration type and return a list of enumeration names and values. See the reference manual for a list of all enumeration types.

Example:

```

proc WdBookmarkSortBy {} {
    # wdSortByLocation - 1
    # wdSortByName - 0
    return { wdSortByLocation 1 wdSortByName 0 }
}

```

See the test programs *Word-*.tcl* for examples on how to use the procedures of this package.

The following table lists all procedures available in namespace `Word`.

CawtWord Procedure	Short description
AddBookmark	Add a bookmark to a text range.
AddContentControl	Add a content control to a text range.
AddDocument	Add a new empty document to a Word instance.
AddImageTable	Add a new table and fill the cells with images.
AddPageBreak	Add a page break to a text range.
AddParagraph	Add a new paragraph to a document.
AddRow	Add one or more rows to a table.
AddTable	Add a new table in a text range.
AddText	Add text to a Word document.
AppendParagraph	Append a paragraph at the end of the document.
AppendText	Append text to a Word document.
Close	Close a document without saving changes.
CollapseRange	Collapse a text range to the start or end position.
ConfigureCaption	Configure style of a caption type identified by its label identifier.
CopyRange	Copy the contents of a range into another range.
CountWords	Count words contained in a Word document.
CreateRange	Create a new text range.
CreateRangeAfter	Create a new text range after specified range.
CropImage	Crop an image at the four borders.
DeleteRow	Delete a row of a table.
DeleteSubdocumentLinks	Delete all subdocument links from a Word document.
DeleteTable	Delete a table.
DiffWordFiles	Compare two Word files visually.
ExpandSubdocuments	Expand all subdocuments in a Word document.
ExtendRange	Extend the range indices of a text range.
FindString	Find a string in a text range or a document.
FormatHeaderRow	Format a row as a header row.
GetBookmarkName	Get the name of a bookmark.
GetBookmarkNames	Get the names of all bookmarks of a document.
GetCellRange	Return a cell or cells of a Word table as a range.
GetCellValue	Return the value of a Word table cell.
GetColumnRange	Return a column of a Word table as a selection.
GetColumnValues	Return column values of a Word table as a Tcl list.
GetCompatibilityMode	Return the compatibility version of a Word application.
GetCrossReferenceItems	Get all cross reference items of a given type.
GetDocumentId	Get the document identifier of a Word component.
GetDocumentIdByIndex	Find a document by its index.
GetDocumentName	Get the name of a document.
GetEndRange	Return the text range representing the end of the document.
GetEnum	Get numeric value of an enumeration.

CawtWord Procedure	Short description
GetEnumName	Get name of a given enumeration type and numeric value.
GetEnumNames	Get names of a given enumeration type.
GetEnumTypes	Get available enumeration types.
GetEnumVal	Get numeric value of an enumeration name.
GetExtString	Return the default extension of a Word file.
GetFooterText	Get the text of the document footer.
GetHeaderText	Get the text of the document header.
GetHeadingRanges	Get the ranges of a specific heading level.
GetHeadingsAsDict	Get a dictionary with headings of a document.
GetHyperlinksAsDict	Get a dictionary with hyperlinks of a document.
GetImageId	Find an image by its index or name.
GetImageList	Get a list of images of a Word document.
GetImageName	Return the name of an image.
GetListGalleryId	Get one of the 3 predefined list galleries.
GetListTemplateId	Get one of the 7 predefined list templates.
GetMatrixValues	Return table values as a matrix.
GetNumCharacters	Return the number of characters in a Word document.
GetNumColumns	Return the number of columns of a Word table.
GetNumDocuments	Return the number of documents in a Word application.
GetNumHyperlinks	Return the number of hyperlinks of a Word document.
GetNumImages	Return the number of images of a Word document.
GetNumPages	Return the number of pages in a Word document.
GetNumRows	Return the number of rows of a Word table.
GetNumSubdocuments	Return the number of subdocuments in a Word document.
GetNumTables	Return the number of tables of a Word document.
GetPageSetup	Get page setup values.
GetRangeEndIndex	Return the end index of a text range.
GetRangeFont	Get font specific parameters.
GetRangeInformation	Get information about a text range.
GetRangeScreenPos	Return the screen position of a text range.
GetRangeStartIndex	Return the start index of a text range.
GetRangeText	Return the text of a text range.
GetRowId	Return identifier of a Word table row.
GetRowRange	Return rows of a Word table as a range.
GetRowValues	Return row values of a Word table as a Tcl list.
GetSelectionRange	Return the text range representing the current selection.
GetStartRange	Return a text range representing the start of the document.
GetSubdocumentPath	Return the file path of a subdocument.
GetTableIdByIndex	Find a table by its index.
GetTableIdByName	Find table(s) by its name.
GetTableName	Return the name of a table.
GetVersion	Return the version of a Word application.
InsertCaption	Insert a caption into a range of a document.
InsertFile	Insert a file into a Word document.
InsertImage	Insert an image into a range of a document.
InsertList	Insert a Word list.
InsertText	Insert text in a Word document.
IsInlineShape	Check, if a Word object is an InlineShape.
IsValidCell	Check, if a Word table cell is valid.

CawtWord Procedure	Short description
IsVisible	Check the visibility of a Word application window.
MergeCells	Merge a range of cells.
Open	Open a Word instance. Use an already running instance, if available.
OpenDocument	Open a document, i.e. load a Word file.
OpenNew	Open a new Word instance.
PrintHeadingDict	Print the contents of a heading dictionary onto stdout.
PrintHyperlinkDict	Print the contents of a hyperlink dictionary onto stdout.
PrintRange	Print the indices of a text range.
Quit	Quit a Word instance.
ReplaceByProc	Replace a string in a text range. Procedural case.
ReplaceImage	Replace an existing image.
ReplaceString	Replace a string in a text range or a document. Simple case.
SaveAs	Save a document to a Word file.
SaveAsPdf	Save a document to a PDF file.
ScaleImage	Scale an image.
ScreenUpdate	Toggle the screen updating of a Word application window.
Search	Search or replace a string in a text range or a document. Generic case.
SelectRange	Select a text range.
SetCellValue	Set the value of a Word table cell.
SetCellVerticalAlignment	Set the vertical alignment of a Word table cell.
SetColumnsWidth	Set the width of a range of table columns.
SetColumnValues	Insert column values into a Word table.
SetColumnWidth	Set the width of a table column.
SetCompatibilityMode	Set the compatibility mode of a document.
SetContentControlDropdown	Set the values for a content control dropdown list.
SetContentControlText	Set the text of a content control.
SetHeaderRow	Insert row values into a Word table and format as a header row.
SetHeadingFormat	Set the HeadingFormat flag of table rows.
SetHyperlink	Insert an external hyperlink into a Word document.
SetHyperlinkToFile	Insert a hyperlink to a file into a Word document.
SetImageName	Set the name of an image.
SetInternalHyperlink	Insert an internal hyperlink into a Word document.
SetLinkToBookmark	Insert an internal link to a bookmark into a Word document.
SetMatrixValues	Insert matrix values into a Word table.
SetPageSetup	Set page setup values.
SetRangeBackgroundColor	Set the background color of a table cell range.
SetRangeBackgroundColorByEnum	Set the background color of a table cell range.
SetRangeEndIndex	Set the end index of a text range.
SetRangeFont	Set font specific parameters.
SetRangeFontBackgroundColor	Set the background color of a text range.
SetRangeFontBold	Toggle the bold font style of a text range.
SetRangeFontColor	Set the text color of a text range.
SetRangeFontItalic	Toggle the italic font style of a text range.
SetRangeFontName	Set the font name of a text range.
SetRangeFontSize	Set the font size of a text range.
SetRangeFontUnderline	Toggle the underline font style of a text range.
SetRangeHighlightColorByEnum	Set the highlight color of a text range.
SetRangeHorizontalAlignment	Set the horizontal alignment of a text range.

CawtWord Procedure	Short description
SetRangeMergeCells	Merge a range of cells.
SetRangeStartIndex	Set the start index of a text range.
SetRangeStyle	Set the style of a text range.
SetRowHeight	Set the height of a table row.
SetRowValues	Insert row values from a Tcl list.
SetTableAlignment	Set the alignment of a Word table.
SetTableBorderLineStyle	Set the border line styles of a Word table or cell range.
SetTableBorderLineWidth	Set the border line widths of a Word table or cell range.
SetTableName	Set the name of a table.
SetTableOptions	Set miscellaneous table options.
SetTableVerticalAlignment	Set the vertical alignment of all Word table cells.
SetViewParameters	Set view parameters of a document.
ShowAlerts	Toggle the display of Word application alerts.
ToggleSpellCheck	Toggle checking of grammatical and spelling errors.
TrimString	Trim a string.
UpdateFields	Update all fields as well as tables of content and figures of a document.
Visible	Toggle the visibility of a Word application window.

Table 13: CawtWord Reference

3 Miscellaneous CAWT information

This chapter contains miscellaneous information about **CAWT**.

3.1 License information

The CAWT package is copyrighted by Paul Obermeier and distributed under the 3-clause BSD license. See file `CAWT-License.txt` in the CAWT distribution for the license text.

CAWT relies on several other Tcl packages. See the table in chapter 1.2 for links to these packages to get their license information.

4 CAWT applications

CAWT includes the following scripts, which can be used as standalone applications:

- EnumExplorer.tcl
- OneNoteInfo.tcl
- Word2Pdf.tcl
- WordAbbrCheck.tcl

4.1 Application EnumExplorer.tcl

The application `EnumExplorer.tcl` can be used to explore the common Office enumerations as well as the enumerations of the Office applications Excel, OneNote, Outlook, PowerPoint, Sapi and Word.

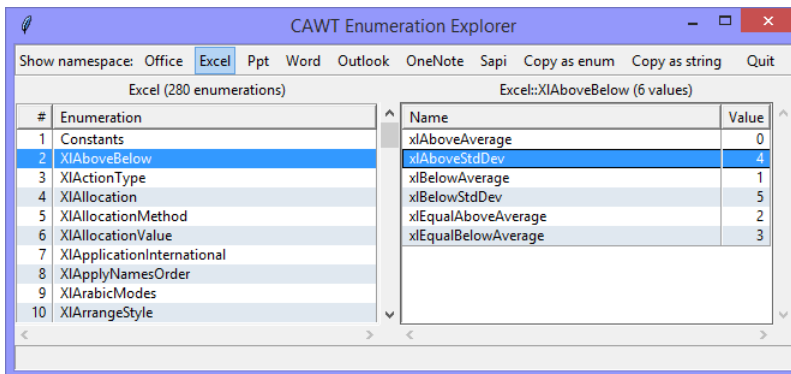


Figure 10: Screenshot of EnumExplorer.tcl

If started with option `--help`, it prints out a usage message:

```
> tclsh EnumExplorer.tcl --help
```

```
Usage: EnumExplorer.tcl [Namespace]
```

Start enumeration explorer and display specified namespace.

If no namespace is given, the first namespace in this list is used:

```
Office Excel Ppt Word Outlook OneNote Sapi
```

Pressing the "Copy as enum" button or the "C" key copies the currently selected enumeration as Tcl variable to the clipboard.

```
Example: $Excel::xIAboveStdDev
```

Pressing the "Copy as string" button or the "c" key copies the currently selected enumeration name to the clipboard.

```
Example: xIAboveStdDev
```

4.2 Application OneNoteInfo.tcl

The application `OneNoteInfo.tcl` can be used to either retrieve information about OneNote notebooks, sections or pages as well as send Outlook mails about changed pages.

If started with option `--help`, it prints out a usage message:

```
> tclsh OneNoteInfo.tcl --help
```

Usage: OneNoteInfo.tcl [Options]

Utility program to retrieve information from OneNote.

Actions:

- help : Print help message and exit.
- print : Print information about notebooks, sections or pages to stdout.
If no other option is given, print a list of all notebook names.
If --notebook is given, print all section names of that notebook.
If --section and --notebook are given, print all page names of that section.
- check : Find recently changed pages.
Use options --days and --mail to change default behaviour.
Default is: Look back 1 days. Print found page names to stdout.

Options:

- notebook <string>: Check or print specified notebook.
- section <string> : Check or print specified section.
- page <string> : Check or print specified page.
- xml <string> : Print information in OneNote XML format.
- days <int> : Specify number of days for recently changed pages.
- mail <string> : Send list of recently changed pages via Outlook mail.
If given string is a valid file name, scan that file for mail addresses. Each line must contain key "always" or "option" followed by a mail address.
Otherwise the string is expected to be a mail address.
- test : Build Outlook mail, but do not send. Use for testing.

Example: Find all pages changed in the last 20 days and send that information via Outlook HTML mail to a list of defined users. The table of changed pages contains links to the corresponding notebooks, sections and pages.

```
> tclsh OneNoteInfo.tcl --check --days 20 --notebook CAWT --mail OneNoteMailList.txt
```

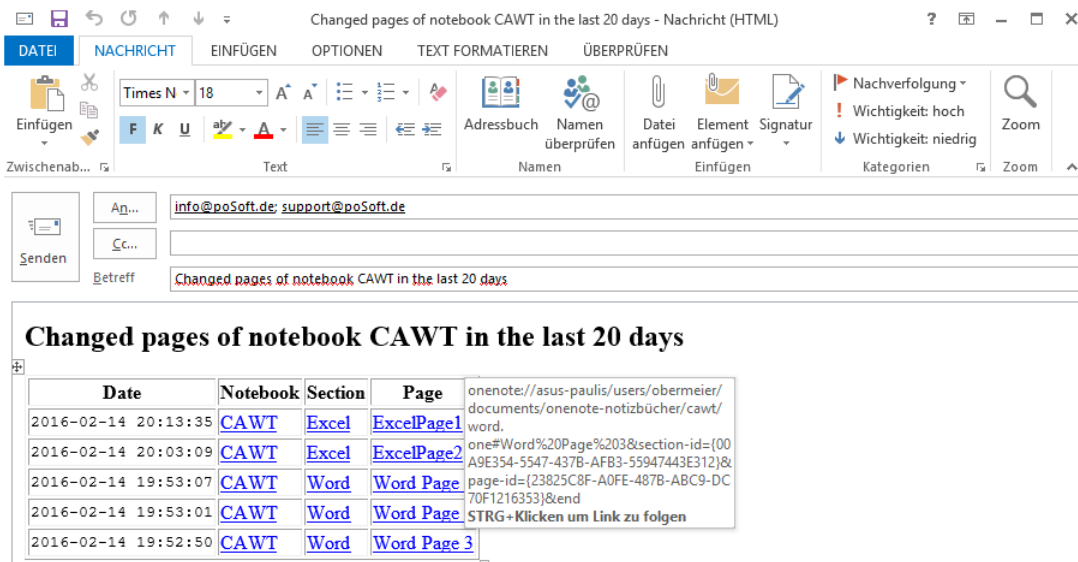


Figure 11: Auto-generated Outlook mail from OneNoteInfo.tcl

4.3 Application Word2Pdf.tcl

The application `Word2Pdf.tcl` can be used to convert a Word file to a PDF file. Note, that PDF export is supported by Word since version 2007.

If started with option `--help`, it prints out a usage message:

```
> tclsh Word2Pdf.tcl --help
```

```
Usage: Word2Pdf.tcl [Options] WordFile PdfFile
```

```
Options: None at the moment.
```

4.4 Application WordAbbrCheck.tcl

The application `WordAbbrCheck.tcl` can be used to list and count the words contained in a Word document. The output may be used to check for used abbreviations in the document, which are not contained in an abbreviation table.

Note: The functionality of this program is available with a graphical user interface in the `poApps Office` module. `poApps` is available at <http://www.poSoft.de>.

If started with option `--help`, it prints out a usage message:

```
> tclsh WordAbbrCheck.tcl --help
```

```
Usage: WordAbbrCheck.tcl [Options] WordFile
```

```
Open a Word document and perform several checks and statistics.
```

```
If no options are specified, the number of words in the document
are counted.
```

```
Options:
```

```
--help           : Print this help message.
--showfiles      : Open log and result files after generation.
--outfile <string> : Store results in given file.
                   Use "stdout" to print to standard output.
                   Default: Results are stored in a file with
                   same root name as input file, but extension ".txt".
--minlength <int> : Only count words having more than minlength
                   characters. Default: 2 characters.
--maxlength <int> : Only count words having less than maxlength
                   characters. Default: Unlimited.
--nonumbers      : Only count words which are no numbers.
--sortmode <string>: Sorting mode of word output.
                   Default: length.
                   Possible values: dictionary, length, increasing,
decreasing.
--csv            : Write result data in CSV format.
                   Default: Space seperated.
--printtables    : Print table names of the Word file and exit.
--abbr <string>  : Title of a table in the Word file containing
                   abbreviations. It is assumed, that the abbreviations
                   start in row 2 and are listed in column 1.
--links          : Check validity of internal and external links.
```

5 Test programs

This chapter gives an overview of the available test programs and describes how to execute the tests.

5.1 Test overview

The following test and demonstration programs are currently available:

Test Program	Description
Cawt-01_Basic.tcl	Test basic functionality of the CawtCore package.
Cawt-02_Color.tcl	Test color functionality of the CawtCore package.
Cawt-03_Date.tcl	Test date conversion functionality of the CawtCore package.
Cawt-04_String.tcl	Test string functionalities of the CawtCore package.
Cawt-05_File.tcl	Test file handling functionality of the CawtCore package.
Cawt-06_Img.tcl	Test image handling functionality of the CawtCore package.
Cawt-07_ComObj.tcl	Test COM object functionality of the CawtCore package.
Cawt-08_TestUtil.tcl	Test Check functionality of the CawtCore package.
Cawt-09_Embed.tcl	Test embedding procedures of the CawtCore package.
Cawt-10_Interpolate.tcl	Test interpolation functionality of the CawtCore package.
Cawt-11_Url.tcl	Test CawtCore procedures for checking URL addresses.
Earth-01_Basic.tcl	Test basic functionality of the CawtEarth package.
Earth-02_MunichTour.tcl	Load position information into an Excel sheet, read back that information and create a Tk GUI with buttons corresponding to these positions.
Excel-01_Basic.tcl	Test basic functionality of the CawtExcel package.
Excel-02_Misc.tcl	Test miscellaneous CawtExcel procedures like setting colors, column width, inserting formulas and searching.
Excel-03_Add.tcl	Test CawtExcel procedures for adding and deleting workbooks and worksheets.
Excel-04_Insert.tcl	Test CawtExcel procedures for inserting data as rows, columns or matrices.
Excel-05_Ranges.tcl	Test CawtExcel procedures for retrieving the number of (used) rows and columns.
Excel-06_Chart.tcl	Test CawtExcel procedures for creating charts and exporting charts as Tk photo images.
Excel-07_Csv.tcl	Test CawtExcel procedures related to CSV files.
Excel-07_CsvUniCode.tcl	Test CawtExcel procedures related to CSV files.
Excel-08_Tablelist.tcl	Test CawtExcel procedures to exchange data between Excel and Tablelist.
Excel-08_TablelistSelection.tcl	Test CawtExcel procedures to exchange data between Excel and Tablelist.
Excel-09_WordTable.tcl	Test CawtExcel procedures to exchange data between Excel and Word tables.
Excel-10_Matrix.tcl	Test CawtExcel procedures to read data into a matrix and write matrix data into Matlab or RAW image files.
Excel-11_RawImage-16bit.tcl	Test CawtExcel procedures to exchange data between Excel and 16-bit integer RAW images.
Excel-11_RawImage.tcl	Test CawtExcel procedures to exchange data between Excel and 32-bit floating point RAW images.
Excel-12_MatlabFile.tcl	Test CawtExcel procedures to exchange data between Excel and Matlab files.

Excel-13_MediaWiki.tcl	Test CawtExcel procedures to exchange data between Excel and MediaWiki tables.
Excel-14_Wikit.tcl	Test CawtExcel procedures to exchange data between Excel and Wikit tables.
Excel-14_WikitWithLinks.tcl	Test CawtExcel procedures to export an Excel workbook as Wikit tables with hyperlinks.
Excel-15_Clipboard.tcl	Test CawtExcel procedures to exchange data between Excel and the Windows clipboard.
Excel-16_SetGet.tcl	Test CawtExcel procedures for setting and getting cell values.
Excel-17_Diff.tcl	Test CawtExcel procedure for diff'ing Excel files.
Excel-17_DiffEqual.tcl	Test CawtExcel procedure for diff'ing Excel files.
Excel-18_SparseMatrix.tcl	Test CawtExcel procedures for handling sparse matrices.
Excel-19_MarkLink.tcl	Test CawtExcel procedures related to marking and linking cells.
Excel-20_ImgUtil.tcl	Test CawtExcel procedures for dealing with images.
Excel-21_ImgCell.tcl	Test CawtExcel procedures for inserting images using cell background colors.
Excel-22_Html.tcl	Test CawtExcel procedures to export Excel data to a HTML file.
Excel-23_Font-Attributes.tcl	Test CawtExcel procedures related to font attribute handling.
Excel-23_Font.tcl	Test CawtExcel procedures related to font handling.
Excel-24_Format.tcl	Test CawtExcel procedures related to specifying number formats.
Excel-25_Properties.tcl	Test CawtExcel procedures related to property handling.
Excel-26_PageSetup.tcl	Test CawtExcel procedures related to page setup and printing.
Excel-27_RowColumn.tcl	Test CawtExcel procedures for row and column handling: Insert, delete, hide, duplicate.
Excel-28_NamedRange.tcl	Test CawtExcel procedures related to named ranges.
Excel-29_EmptySheet.tcl	Test CawtExcel procedures dealing with empty worksheets.
Excel-30_SelectRange.tcl	Test miscellaneous CawtExcel procedures like setting colors, column width, inserting formulas and searching.
Excel-31_Import.tcl	Test CawtExcel procedures related to import functionality.
Excel-32_Quit.tcl	Test quitting Excel without saving modified worksheets.
Excel-33_AddAndRunMacro.tcl	Test CawtOffice procedures to add Excel macros (Sub and Function) from a string and run these macros.
Excel-33_ImportAndRunMacro.tcl	Test CawtOffice procedures to add Excel macros (Sub and Function) from a source file and run these macros.
Excel-33_RunMacro.tcl	Test CawtOffice procedures to run macros (Sub and Function) contained in an Excel file.
Excel-34_Events.tcl	Test event handling functionality of Excel.
Excel-35_Styles.tcl	Test CawtExcel procedures related to Styles handling.
Excel-36_Embed.tcl	Test CawtExcel procedures for embedding an Excel workbook into a Tk frame.
Excel-37_WorksheetName.tcl	Test CawtExcel procedures for mapping worksheet names.
Excel-38_Interpolate.tcl	Test interpolation functionality of the CawtCore package in Excel example.
Explorer-01_Basic.tcl	Test basic functionality of the CawtExplorer package.
Explorer-02_Misc.tcl	Test miscellaneous CawtExplorer functions like navigating to an URL and using fillscreen mode.
Explorer-03_Events.tcl	Test event handling functionality of Internet Explorer.
Matlab-01_Basic.tcl	Test basic functionality of the CawtMatlab package.

Matlab-02_MFile.tcl	Test CawtMatlab procedures for executing Matlab commands.
Ocr-01_Basic.tcl	Test basic functionality of the CawtOcr package.
Ocr-02_Misc.tcl	Test miscellaneous CawtOcr procedures.
OneNote-01_Basic.tcl	Test basic functionality of the CawtOneNote package.
Outlook-01_Basic.tcl	Test basic functionality of the CawtOutlook package.
Outlook-02_Mail.tcl	Test mail functionality of the CawtOutlook package. Note: This script sends two test mails (in text and HTML format) to cawt@tcl3d.org.
Outlook-03_Holiday.tcl	Test holiday appointment functionality of the CawtOutlook package. Note: This script sets appointments in your Outlook calendar.
Outlook-04_Appointment.tcl	Test appointment functionality of the CawtOutlook package. Note: This script sets appointments in your Outlook calendar.
Outlook-05_MailFolders.tcl	Test mail folder functionality of the CawtOutlook package.
Outlook-06_ContactFolders.tcl	Test contact functionality of the CawtOutlook package.
Ppt-01_Basic.tcl	Test basic functionality of the CawtPpt package.
Ppt-02_Misc.tcl	Test miscellaneous CawtPpt procedures like adding slides, inserting images and saving slides as image files.
Ppt-03_Add.tcl	Test CawtPpt procedures for adding and copying slides.
Ppt-04_Present.tcl	Test CawtPpt procedures for presenting a slide show.
Ppt-05_Export.tcl	Test CawtPpt procedures for exporting a PowerPoint presentation as HTML slide show.
Ppt-06_CustomLayout.tcl	Test CawtPpt procedures for using PowerPoint custom layouts.
Ppt-07_Properties.tcl	Test CawtPpt procedures related to property handling.
Ppt-08_Comments.tcl	Test CawtPpt procedures for handling PowerPoint comments.
Ppt-09_Shapes.tcl	Test CawtPpt procedures related to creating, manipulating and connecting shapes.
Ppt-10_AllShapes.tcl	Test CawtPpt procedure for creating all available shapes.
Ppt-11_AllConnectors.tcl	Test CawtPpt procedure for creating all available connectors.
Ppt-12_Quit.tcl	Test quitting PowerPoint without saving modified presentations.
Ppt-13_Media.tcl	Test CawtPpt procedures related to media content, i.e. images and videos.
Ppt-14_CreateVideo.tcl	Test creating videos from PowerPoint slides.
Ppt-15_ButtonEvent.tcl	Test CawtPpt procedures for simulating button events.
Ppt-16_Embed.tcl	Test CawtPpt procedures for embedding a PowerPoint presentation into a Tk frame.
Reader-01_Basic.tcl	Test basic functionality of the CawtReader package.
Reader-02_Embed.tcl	Test CawtExcel procedures for embedding an Acrobat Reader window into a Tk frame.
Sapi-01_Basic.tcl	Test basic functionality of the CawtSapi package.
Sapi-02_Speak.tcl	Test speaking voices of the CawtSapi package.
Sapi-03_SpeakOptions.tcl	Test speaking options of the CawtSapi package.
Sapi-04_SpeakFlags.tcl	Test speaking flags of the CawtSapi package.
Word-01_Basic.tcl	Test basic functionality of the CawtWord package.
Word-02_Table.tcl	Test CawtWord procedures related to Word table management.
Word-02_TableWidth.tcl	Test CawtWord procedures related to Word table width management.

Word-03_Text.tcl	Test CawtWord procedures for handling text.
Word-04_Find.tcl	Test CawtWord procedures related to simple search and replace functionality.
Word-04_FindGeneric.tcl	Test CawtWord procedures related to generic search and replace functionality.
Word-05_Report.tcl	Test CawtWord procedures needed for generating a test report.
Word-06_Diff.tcl	Test CawtWord procedure for diff'ing Word files.
Word-07_Link.tcl	Test CawtWord procedures for handling links and inserting files.
Word-08_ImgUtil.tcl	Test CawtWord procedures for dealing with images.
Word-09_Controls.tcl	Test CawtWord procedures for handling content controls.
Word-10_Properties.tcl	Test CawtWord procedures related to property handling.
Word-11_Tables.tcl	Test CawtWord procedures related to Word table management.
Word-12_LargeTable.tcl	Test CawtWord procedures to insert a large Word table.
Word-13_MultiTables.tcl	Test CawtWord procedures to insert multiple Word tables across multiple pages.
Word-14_Quit.tcl	Test quitting Word without saving modified documents.
Word-15_MergeCells.tcl	Test CawtWord procedures related to Word table cell merging.
Word-16_ReplaceImages.tcl	Test CawtWord procedures for replacing images stored as InlinesShapes and Shapes.
Word-17_Subdocuments.tcl	Test CawtWord procedures related to subdocument handling.
Word-18_PageSetup.tcl	Test Word page setup setter and getter procedures.
Word-19_Heading.tcl	Test CawtWord procedures related to Word headings.
Word-19_HeadingDict.tcl	Test CawtWord procedures related to Word headings.
Word-20_Font.tcl	Test CawtWord procedures for handling fonts.
Word-21_RunMacro.tcl	Test CawtOffice procedures to run a macro contained in a Word file.
Word-22_Events.tcl	Test event handling functionality of Word.
Word-23_Embed.tcl	Test CawtWord procedures for embedding a Word document into a Tk frame.

Table 14: Test Programs

The CAWT sub-packages have been tested successfully with the above-mentioned programs on the following operating systems and COM application versions:

Package	Operating system	Application version
CawtEarth	Windows 7, 8, 10	6.2, 7.1.2
CawtExcel	Windows 7, 8, 10, 11	2013, 2016, 2019 (*)
CawtExplorer	Windows 7, 8 (**)	IE 8, IE 9, IE 11
CawtMatlab	Windows 7	R2007b
CawtOcr	Windows 7, 8	2013
CawtOneNote	Windows 7, 8, 10, 11	2013, 2016
CawtOutlook	Windows 7, 8, 10, 11	2013, 2016, 2019 (*)
CawtPpt	Windows 7, 8, 10, 11	2013, 2016, 2019 (*)
CawtReader	Windows 7, 8, 10	DC
CawtSapi	Windows 8, 10	5.3, 5.4
CawtWord	Windows 7, 8, 10, 11	2013, 2016, 2019 (*)

(*) Older Office versions may work, but are not tested anymore.

(**) See chapter 2.5 for known issues with Internet Explorer on Windows 7 and 8.

5.2 Test execution

To execute a single test program, execute it with the Tcl shell:

```
> tclsh Excel-02_Misc.tcl
```

To execute all test programs of a sub-package, use the utility script `RunTest.tcl`:

```
> tclsh RunTest.tcl Excel
```

To execute all test programs of CAWT, use the batch program `RunTests.bat`:

```
> RunTests.bat
```

Each test program accepts an optional string parameter. If this parameter is set to `auto`, the test program closes and quits the controlled application. If this parameter is not set, the controlled application stays open, so the results can be viewed directly in the application window.

The `RunTest.tcl` utility script, calls all test programs available for a sub-package by specifying the corresponding namespace name. The test programs are called with the above mentioned `auto` parameter. Additionally, the script can be supplied with optional parameters to switch off either the tests or to switch off the code coverage checks.

If called without any parameters, the script issues a help message onto standard output.

```
Usage: RunTest.tcl [Options] Namespace [Namespace]
```

```
Run the test programs and code coverage checks for specified namespace(s).
Namespaces usable: Cawt Excel Ppt Word OneNote Outlook Sapi Ocr Reader Earth Matlab Explorer.
```

Options:

```
--help      : Display this usage message and exit.
--verbose   : Show the detailed results of the tests. (Default: No)
--notests   : Do not run the tests. (Default: Run tests)
--nocover   : Do not run the coverage checks. (Default: Run coverage)
```

6 Inside CAWT

The information in this chapter is for programmers, who want to extend and improve CAWT.

Download the developer distribution from the CAWT homepage or checkout the source code from SourceForge. This distribution contains in addition to the user distribution the documentation source files (a Word and a PowerPoint file), the **Ruff!** and **textutil** packages for generating the reference documentation out of the Tcl sources, as well as some additional utility scripts.

Create or update Office enumeration values

The files containing common Office enumerations (*officeConst.tcl*) as well as the enumeration values of the Office applications Excel (*excelConst.tcl*), PowerPoint (*pptConst.tcl*), Word (*wordConst.tcl*), Outlook (*outlookConst.tcl*) and SAPI (*sapiConst.tcl*) are automatically generated with script *createConstFile.tcl*.

The enumeration values of the current CAWT distribution are based on Microsoft Office 2019. If you have a newer Office version and want to update the enumeration files, execute the batch program *createConstFiles.bat*, which is located at the root directory of CAWT. Before calling the batch program, you should edit it to fit the locations of your Office programs.

Create or update CAWT documentation

The CAWT documentation comes in 2 parts, the user manual (this document) and a reference manual.

The reference manual is created with the help of the **Ruff!** package from inline documentation. So, if adding new procedures to the CAWT packages, be sure to also update the inline documentation.

The sources of the user manual are a Word template document and a PowerPoint presentation located in folder *Documents/UserManual*.

The final documentation is created by Tcl script *genCawtDoc.tcl*, which first creates the reference manual by calling Ruff!, and then the user manual.

The user manual is generated by exporting the slides of the presentation and inserting them into a copy of the Word template document. Additionally, a list of test scripts and tables of all CAWT procedures (containing links to the reference manual) are inserted. Finally, some keywords representing the current date, year and CAWT version are replaced with their corresponding values. The final user manual document is then written in Word and PDF format into folder *Documents/Final*.

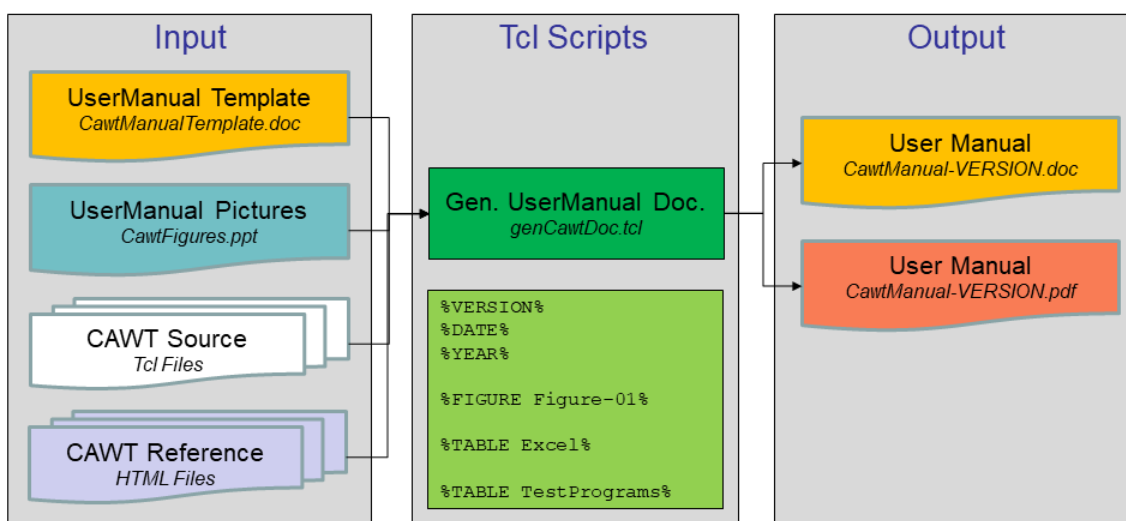


Figure 12: Documentation generation workflow

If specifying the strings `ref` or `user` as command line parameter for script `genCawtDoc.tcl`, only the reference manual resp. the user manual is generated.

Create a CAWT distribution

To create a distribution (both user and developer) call Tcl script `makeDist.tcl`.

Note, that you should have updated the documentation before creating a distribution.

The location of the distribution output files and the program to create ZIP files are listed at the top of file `makeDist.tcl`, and must be adapted to your local situation.

7 Release history

The following table gives an overview of the release history of **CAWT** and its predecessors **TcomOffice** and **TcomExcel**.

Version	Date	Release notes
TcomExcel		
0.1	2008-09-11	Initial release. Support for Excel 2000 and 2003.
0.2	2009-09-19	Extended functionality. Added support for Excel 2007.
0.3	2010-10-29	Bug fixes and extended test programs.
0.3.1	2011-01-13	Extended functionality. Added support for Excel 2010.
0.3.2	2011-04-05	Extended functionality.
TcomOffice		
0.4.0	2011-07-17	New module TcomWord for Word automation.
0.4.1	2011-08-28	Extended functionality.
CAWT		
1.0.0	2012-12-23	Replaced Tcom with Twapi for COM access. Added support for PowerPoint, Internet Explorer, Google Earth and Matlab. Added user and reference manual. Unification of procedure names. Supports Microsoft Office versions 2003, 2007, 2010.
1.0.1	2013-04-28	Extended Excel chart generation. Updated Twapi version to 4.0a16. Added support to generate a CAWT starkit.
1.0.2	2013-07-28	Updated Twapi version to 4.0b22. Updated Img version to 1.4.1. Added new module CawtOcr. New procedures in CawtCore: <ul style="list-style-type: none"> • Clipboard2Img, Img2Clipboard New procedures in CawtExcel: <ul style="list-style-type: none"> • SetRangeBorder
1.0.3	2013-08-30	New procedures in CawtExcel: <ul style="list-style-type: none"> • ExcelFileToMediaWikiFile, ExcelFileToWikiFile • ExcelFileToRawImageFile, RawImageFileToExcelFile • ExcelFileToMatlabFile, MatlabFileToExcelFile • GetTablelistValues, SetTablelistValues
1.0.4	2013-11-23	Improved test suite. Added support for Office 2013. Added support for 64-bit Office. Updated Img extension to version 1.4.2 (32-bit and 64-bit). Update Tablelist to version 5.10. New procedures in CawtWord: <ul style="list-style-type: none"> • SaveAsPdf • UpdateFields • CropImage. New procedures in CawtExcel: <ul style="list-style-type: none"> • CopyWorksheetBefore, CopyWorksheetAfter • GetWorksheetIndexByName • IsWorksheetProtected, IsWorksheetVisible • SetWorksheetTabColor • UnhideWorksheet

		<ul style="list-style-type: none"> • DiffExcelFiles
1.0.5	2014-01-26	<p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> • SetCommentDisplayMode, SetRangeComment • SetRangeMergeCells, GetRangeCharacters • SetRangeFontSubscript, SetRangeFontSuperscript
1.0.6	2014-04-21	<p>Improved and extended test suite. Updated Twapi version to 4.0b53 to fix a bug with sparse matrices as well as core dumps with Word 2013. Improved and corrected handling of sparse matrices in Excel. Bug fix in excelCsv module. Possible incompatibility in GetRowValues and GetColumnValues: Changed startRow resp. startCol to default value 0 instead of 1. New procedures in CawtExcel:</p> <ul style="list-style-type: none"> • GetWorksheetAsMatrix • GetMaxRows, GetMaxColumns • GetFirstUsedRow, GetLastUsedRow • GetFirstUsedColumn, GetLastUsedColumn
1.0.7	2014-06-14	<p>Updated Twapi version to official 4.0.61. CawtExcel:</p> <ul style="list-style-type: none"> • Added support for reading and writing CSV files with multi-line cells. <p>CawtPpt:</p> <ul style="list-style-type: none"> • Extended CopySlide to copy slides between presentations. • Extended AddPres with optional parameter for template file. • Extended AddSlide to supply a custom layout object as type parameter. <p>Extended test suite for changed and new procedures. New procedures in CawtCore:</p> <ul style="list-style-type: none"> • ColorToRgb <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> • UseImgTransparency, WorksheetToImg, ImgToWorksheet • SetRowHeight, SetRowsHeight • GetRangeFillColor • SetHyperlinkToFile, SetHyperlinkToCell, SetLinkToCell • SetRangeTooltip <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> • MoveSlide, • GetTemplateExtString • GetNumCustomLayouts • GetCustomLayoutName, GetCustomLayoutId
1.1.0	2014-08-30	<p>Compatibility issue:</p> <ul style="list-style-type: none"> • Incompatible changes in module CawtWord. • Unified signatures of AddText, AppendText and AddParagraph, AppendParagraph. • Changed handling of text ranges. <p>New module CawtOutlook to control Microsoft Outlook applications:</p> <ul style="list-style-type: none"> • Currently only functionality for creating and sending mails is implemented. <p>Extended test suite for changed and new procedures. New procedures in CawtExcel:</p> <ul style="list-style-type: none"> • FreezePanels, ScreenUpdate <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • SelectRange, GetRangeInformation, CreateRange

		<ul style="list-style-type: none"> • SetRangeFontName, SetRangeStyle, SetRangeFontSize • InsertText, AddText, GetNumCharacters • AddPageBreak, ToggleSpellCheck
1.2.0	2014-12-14	<p>Compatibility issue:</p> <ul style="list-style-type: none"> • Incompatible changes in module CawtWord. Removed parameter docId from all procedures, which had both docId and ranged parameters: • SetRangeStartIndex, SetRangeEndIndex, ExtendRange, • AddText, SetHyperlink, AddTable. <p>CawtExcel:</p> <ul style="list-style-type: none"> • Added optional startRow parameter to TablelistToWorksheet. <p>Extended test suite for changed and new procedures.</p> <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • GetDocumentId • SetRangeFontUnderline, CreateRangeAfter • InsertCaption, ConfigureCaption • AddBookmark, GetBookmarkName, SetLinkToBookmark • GetListGalleryId, GetListTemplateId, InsertList
2.0.0	2015-03-31	<p>Ensembled all CAWT namespaces, ex. write "Excel Open" instead of "::Excel::Open".</p> <p>All Office enumerations are stored in module specific hash tables, ex. write "xlThick" instead of "\$::Excel::xlThick".</p> <p>Updated and extended user manual (automatic insertion of CAWT procedure reference list).</p> <p>Added new application EnumExplorer.tcl to display Office enumerations.</p> <p>New module excelHtml.tcl for HTML export of Excel tables.</p> <p>External packages:</p> <ul style="list-style-type: none"> • Updated Twapi to version 4.1.27. • Updated Img (32 and 64 bit) to version 1.4.3. • Updated Tablelist to version 5.13. <p>CawtExcel:</p> <ul style="list-style-type: none"> • New implementation of InsertImage based on Shapes.AddPicture instead of Pictures.Insert <p>CawtWord:</p> <ul style="list-style-type: none"> • Extended procedure UpdateFields to additionally update TablesOfContents and TablesOfFigures of a document. <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> • GetApplicationVersion, IsApplicationId • PushComObjects, PopComObjects • PrintNumComObjects, CheckComObjects • GetComObjects, GetNumComObjects • Replaced procedure IsValidId with IsComObject <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> • GetRangeAsIndex, GetRangeAsString, GetRangeTextColor <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • ScaleImage, SetInternalHyperlink, InsertFile, DiffWordFile
2.1.0	2015-09-01	<p>Updated Twapi to version 4.2.a1, because of new Twapi functionality "tclcast bstr" and bug fix to retrieve document properties.</p> <p>Added support to generate a CAWT starpack.</p> <p>CawtExcel:</p>

		<ul style="list-style-type: none"> Take hidden flag of both Excel and tablelist columns into account in procedures TablelistToWorksheet and WorksheetToTablelist. Fixed SetCellValue and SetRangeFormat using new TclString procedure. <p>CawtPpt:</p> <ul style="list-style-type: none"> Extended functionality of ExportPptFile and ExportSlides to take into account slide comments regarding export file names. <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> TclString <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> DeleteColumn, DeleteRow HideColumn, GetHiddenColumns GetDecimalSeparator (replacing GetFloatSeparator) GetThousandsSeparator GetNumberFormat (replacing GetLangNumberFormat) <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> AddTextbox, AddTextboxText, SetTextboxFontSize GetNumComments, GetComments, GetCommentKeyValue <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> AddContentControl SetContentControlDropdown, SetContentControlText GetDocumentProperties, GetDocumentProperty SetDocumentProperty.
2.1.1	2015-10-31	<p>Support for Office 2016.</p> <p>External packages:</p> <ul style="list-style-type: none"> Updated Tablelist to version 5.14.
2.1.2	2015-11-10	<p>Extended support for Excel page setup. Changed all Office procedures with size parameters to accept inches, centimeters or points.</p> <p>CawtExcel:</p> <ul style="list-style-type: none"> Corrected SetWorksheetFitToPages to accept zero as values for wide and tall parameters. Zero indicates automatic determination of number of pages. <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> SetPrinterCommunication, ValueToPoints, PointsToCentiMeters, PointsToInches. <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> SetWorksheetPrintOptions, SetWorksheetPaperSize, SetWorksheetMargins, SetWorksheetFooter, SetWorksheetHeader.
2.2.0	2015-12-12	<p>Enhanced functionality in Core and Office modules.</p> <p>Compatibility issue:</p> <ul style="list-style-type: none"> AddWorksheet now adds the new sheet at the end, as was already written in the documentation. Previous behaviour was to insert before active worksheet. <p>New module CawtOffice:</p> <ul style="list-style-type: none"> Moved basic Office procedures into namespace Office. Added aliases in namespace Cawt for backwards compatibility.

		<ul style="list-style-type: none"> Added new enumeration constants file for basic Office types based on type library in mso.dll. <p>CawtCore:</p> <ul style="list-style-type: none"> Colors can now be specified in hex notation, Tcl color names, RGB or as Office color numbers. <p>CawtExcel:</p> <ul style="list-style-type: none"> Extended SetLinkToCell to copy number format when linking. Extended SetRangeFormat to accept Excel style number formats. Extended SetHyperlinkToFile to accept relative path names. Corrected hyperlinking to relative file names. <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> GetColor, GetColorNames, IsHexColor, IsNameColor, IsOfficeColor, IsRgbColor OfficeColorToRgb, RgbToOfficeColor <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> CopyRange, GetCurrencyFormat, GetRangeFormat <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> AddShape, ConfigureShape, ConnectShapes, ConfigureConnector <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> SetHyperlinkToFile
2.3.0	2016-08-16	<p>New module CawtOneNote.</p> <p>Compatibility issue:</p> <ul style="list-style-type: none"> Excel::GetRangeAsIndex now returns a 2-element (cell) or 4-element (range) list. Previous behaviour was to always return a 4 element list. <p>CawtOneNote:</p> <ul style="list-style-type: none"> Added basic functionality for Microsoft OneNote. Added script OneNoteInfo.tcl to retrieve information from OneNote. <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> DuplicateColumn, DuplicateRow GetHiddenRows, HideRow InsertColumn, InsertRow GetColumnNumber, ShowWorksheet GetRangeWrapText, SetRangeWrapText SetRangeValues, GetRangeValues, IsWorkbookId SetNamedRange, GetNamedRange GetNamedRangeNames <p>New procedures in CawtOutlook:</p> <ul style="list-style-type: none"> CreateHtmlMail <p>External packages:</p> <ul style="list-style-type: none"> Updated Tablelist to version 5.15. Updated Twapi to version 4.2a3. New package tDOM 0.8.3 (needed for CawtOneNote).
2.3.1	2016-12-10	Enhanced functionality in Core and Office modules.

		<p>CawtExcel:</p> <ul style="list-style-type: none"> Extended Excel module excellmgRaw to support 16-bit integer images. <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> CheckBoolean <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> GetCellComment <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> Search SetRangeFontBackgroundColor <p>External packages:</p> <ul style="list-style-type: none"> Updated Img (32 and 64 bit) to version 1.4.6. Updated Tablelist to version 5.16.
2.4.0	2017-06-18	<p>New module CawtReader.</p> <p>Compatibility issue:</p> <ul style="list-style-type: none"> Excel::ExcelFileToHtmlFile has changed signature. Now uses parameter args for extended options. <p>CawtReader:</p> <ul style="list-style-type: none"> Added basic functionality for Acrobat Reader (not via COM). <p>CawtExcel:</p> <ul style="list-style-type: none"> Extended module excelHtml to convert Excel hyperlinks. <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> IsValidCell <p>External packages:</p> <ul style="list-style-type: none"> Updated Tablelist to version 5.17. Updated Twapi to version 4.2a5.
2.4.1	2017-12-30	<p>Enhanced functionality in Outlook module.</p> <p>CawtOutlook:</p> <ul style="list-style-type: none"> Added handling of appointments, calendars and categories. Added ability to read and apply Outlook holiday files. <p>CawtExcel:</p> <ul style="list-style-type: none"> Added ability to save CSV files in UTF-8 format. <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> CreateRangeString, SetChartTicks <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> AddImageTable, GetImageId, GetImageName, GetNumImages, ReplaceImage, SetImageName, CountWords <p>External packages:</p> <ul style="list-style-type: none"> Updated Tablelist to version 6.0.

		<ul style="list-style-type: none"> • Updated Twapi to version 4.2.12. • Updated tDOM to version 0.9.0. • Updated lmg to version 1.4.7.
2.4.2	2018-04-26	<p>Enhanced functionality in several modules.</p> <p>CawtPpt:</p> <ul style="list-style-type: none"> • Added new configure options for shapes: -beginsite, -endsite • Added new configure option for connectors: -weight <p>CawtWord:</p> <ul style="list-style-type: none"> • Corrected procedure SetDocumentProperty. <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> • Import, CopyColumn, SetChartSourceByIndex, • SetChartTitle, GetChartNumSeries, GetChartSeries, • SetSeriesLineWidth <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> • SetPresPageSetup, SetHyperlinkToSlide, GetNumSites <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • DeleteRow, SetRangeMergeCells
2.4.3	2018-12-27	<p>Support for Office 2019.</p> <p>CawtOffice:</p> <ul style="list-style-type: none"> • Added script DocumentInfo.tcl to retrieve information about Office documents. <p>CawtWord:</p> <ul style="list-style-type: none"> • Extended procedure GetRowRange to use start and end rows. • Extended procedure GetNumImages to consider both InlineShapes as well as Shapes. <p>New procedure in CawtOffice:</p> <ul style="list-style-type: none"> • GetOfficeType <p>New procedure in CawtExcel:</p> <ul style="list-style-type: none"> • AddSeriesTrendLine <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> • GetCommentKeyTopPosition, GetNumShapes, • GetPresImages, GetPresVideos, GetShapelId, • GetShapeMediaType, GetShapeName, GetShapeType, • InsertVideo, SetShapeName, SetMediaPlaySettings <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • CollapseRange, CopyRange, DeleteTable, GetImageList, • GetPageSetup, GetRowId, GetTableIdByName, • GetTableName, IsVisible, MergeCells, ScreenUpdate, • SetCellVerticalAlignment, SetHeadingFormat, • SetRowHeight, SetTableName <p>External packages:</p>

		<ul style="list-style-type: none"> • Updated Tablelist to version 6.3. • Updated Img to version 1.4.8. • Updated Twapi to version 4.3.5. • Updated tDOM to version 0.9.1.
2.4.4	2019-06-08	<p>Enhanced functionality in several modules.</p> <p>CawtCore:</p> <ul style="list-style-type: none"> • Added new utility procedures *OfficeDate*. Declared old *OutlookDate* procedures as obsolete. <p>CawtExcel:</p> <ul style="list-style-type: none"> • Extended procedure GetCellRange to allow specification of a cell range, not only a single cell. • Extended procedure AddSeriesTrendLine with option keys -linewidth and -linecolor. <p>New procedure in CawtExcel:</p> <ul style="list-style-type: none"> • SetSeriesAttributes <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • SetTableAlignment, SetTableOptions, • SetTableVerticalAlignment <p>External packages:</p> <ul style="list-style-type: none"> • Updated Tablelist to version 6.5. • Updated Img to version 1.4.9.
2.4.5	2019-08-13	<p>Enhanced functionality in Word module.</p> <p>CawtWord:</p> <ul style="list-style-type: none"> • Corrected procedures FindString and Search, when called with a docId. <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • GetFooterText, GetHeaderText, • DeleteSubdocumentLinks, ExpandSubdocuments, • GetNumSubdocuments, GetSubdocumentPath <p>External packages:</p> <ul style="list-style-type: none"> • Updated Tablelist to version 6.6. • Updated Twapi to version 4.3.7.
2.4.6	2019-10-12	<p>Enhanced reference documentation.</p> <p>CawtCore:</p> <ul style="list-style-type: none"> • Extended test suite for complete test coverage. • Fixed bug in procedure GetColorNames. <p>Office modules:</p> <ul style="list-style-type: none"> • Added procedures for each enumeration type. <p>CawtPpt:</p> <ul style="list-style-type: none"> • Added new option "-fit" to proc InsertImage. <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> • CheckCreateVideoStatus, CreateVideo, • SetSlideShowTransition,

		<ul style="list-style-type: none"> • GetPresPageHeight, GetPresPageWidth <p>External packages:</p> <ul style="list-style-type: none"> • Updated Ruff! to version 1.0b3.
2.4.7	2019-11-03	<p>Enhanced functionality in Ppt and Word modules.</p> <p>CawtPpt:</p> <ul style="list-style-type: none"> • Extended InsertImage to support both image file names as well as photo images. • Corrected procedure ExportPptFile. • Added additional "-check" option to proc CreateVideo to specify the check interval. <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> • GetPptImageFormat, GetSupportedImageFormats, • GetCreateVideoStatus, IsImageFormatSupported <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • SetPageSetup, • GetCrossReferenceltems, GetHeadingRanges, • GetRangeText, SetRangeFontColor, • GetRangeFont, SetRangeFont
2.4.8	2020-03-08	<p>Support for Office macro execution.</p> <p>CawtExcel:</p> <ul style="list-style-type: none"> • Fixed bugs in DiffExcelFiles. <p>CawtWord:</p> <ul style="list-style-type: none"> • Fixed COM object leak in IsValidCell. <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> • GetTmpDir <p>New procedures in CawtOffice:</p> <ul style="list-style-type: none"> • AddMacro, RunMacro <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> • GetCellValueA1 <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • GetRangeScreenPos
2.4.9	2020-06-09	<p>Enhanced functionality in Excel module</p> <p>All modules:</p> <ul style="list-style-type: none"> • Compare procedure options with -nocase. <p>CawtExcel:</p> <ul style="list-style-type: none"> • Fixed bug when reading CSV files with Unix line endings. <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> • SetRangeFontAttributes, GetRangeFontAttributes
2.5.0	2020-07-24	<p>Enhanced functionality for handling Office document properties.</p> <p>CawtOffice:</p> <ul style="list-style-type: none"> • Extended to support all types of document properties: bool, int, float, date and string.

		<p>New procedures in CawtOffice:</p> <ul style="list-style-type: none"> • AddProperty, DeleteProperty, GetProperty, • GetPropertyName, GetPropertyType, GetPropertyValue, • SetPropertyValue
2.6.0	2021-01-06	<p>New module CawtSapi adding support for Microsoft Speech API.</p> <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> • SetEventCallback <p>External packages:</p> <ul style="list-style-type: none"> • Updated Twapi to version 4.5.2. • Updated Tablelist to version 6.11. • Updated tDOM to version 0.9.2. • Updated lmg to version 1.4.12.
2.7.0	2021-02-27	<p>Enhanced functionality for handling Outlook contacts.</p> <p>CawtCore:</p> <ul style="list-style-type: none"> • Extended procedure CountWords to additionally sort by increasing or decreasing counts. <p>CawtExcel:</p> <ul style="list-style-type: none"> • Changes in procedure WorksheetToTablelist: Improved speed when handling worksheets with large number of columns. Tablelist column headers are labeled like in Excel: A, B, C. Added options -header, -rownumber, -maxrows, -maxcols. <p>CawtWord:</p> <ul style="list-style-type: none"> • Extended GetHyperlinksAsDict to be used as a coroutine. <p>New procedures in CawtOutlook:</p> <ul style="list-style-type: none"> • AddContact, AddContactFolder, DeleteContactByIndex, • DeleteContactFolder, GetContactByIndex, • GetContactFolderId, GetContactFolderNames, • GetContactProperties, GetNumContactFolders, • GetContactReadOnlyPropertyNames, • GetContactReadWritePropertyNames, • GetNumContacts, HaveContactFolder, • SetContactProperties <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> • GetNumSlidImages, GetNumSlideVideos, • GetSlideIdByName, GetSlidImages, GetSlideName, • GetSlideVideos, SetSlideName <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • GetBookmarkNames, GetHyperlinksAsDict, • PrintHyperlinkDict, GetNumHyperlinks <p>External packages:</p> <ul style="list-style-type: none"> • Updated Tablelist to version 6.12. • Updated Ruff! to version 1.1.
2.8.0	2021-06-27	<p>Added functionality for embedding applications.</p>

		<p>CawtExcel:</p> <ul style="list-style-type: none"> Extended procedure OpenWorkbook to embed the application into a Tk frame. <p>CawtPpt:</p> <ul style="list-style-type: none"> Extended procedure OpenPres to embed the application into a Tk frame. <p>CawtReader:</p> <ul style="list-style-type: none"> Extended procedure Open to embed the application into a Tk frame. <p>CawtWord:</p> <ul style="list-style-type: none"> Extended procedure OpenDocument to embed the application into a Tk frame. <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> EmbedApp <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> GetNumStyles, GetStyleId <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> GetNumPages, SetViewParameters <p>External packages:</p> <ul style="list-style-type: none"> Updated Tablelist to version 6.14. Updated Ruff! to version 1.2.
2.8.1	2021-07-22	<p>Maintenance release.</p> <p>CawtExcel:</p> <ul style="list-style-type: none"> Added automatic mapping of worksheet names to Excel constraints regarding invalid characters and maximum length. <p>CawtWord:</p> <ul style="list-style-type: none"> Corrected behaviour of GetHyperlinksAsDict, if link points to an invalid domain.
2.8.2	2021-08-20	<p>Maintenance release.</p> <p>CawtWord:</p> <ul style="list-style-type: none"> Corrected behaviour of GetHyperlinksAsDict, if link points to an URL with spaces. Extended SetTableOptions with new option -width. Extended SetColumnWidth to specify width in percent.
2.9.0	2021-12-19	<p>Added functionality for interpolation curves.</p> <p>CawtCore:</p> <ul style="list-style-type: none"> Added oo:class to interpolate between control points. <p>CawtWord:</p> <ul style="list-style-type: none"> GetHyperlinksAsDict: <ul style="list-style-type: none"> Improved speed of URL validity check. Added support for URL's with subaddress (ex. www.tcl3d.org/doc.html#Index).

		<p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> • IsValidUrlAddress, SetClipboardWaitTime, • WaitClipboardReady <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> • IsValidPresId, GetCurrentSlideIndex <p>External packages:</p> <ul style="list-style-type: none"> • Updated Ruff! to version 2.0. • Updated Tablelist to version 6.16. • Updated Twapi to version 4.6.0.
2.9.1	2022-04-09	<p>Maintenance release.</p> <p>CawtExcel:</p> <ul style="list-style-type: none"> • Added option "-selection" to procedure WorksheetToTablelist to transfer the selected Excel cell range. • Corrected regexp in procedures GetRangeAsIndex and GetCellValueA1. <p>CawtOutlook:</p> <ul style="list-style-type: none"> • Improved GetFoldersRecursive. <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> • GetHeadingsAsDict, PrintHeadingDict
2.9.2	2022-12-21	<p>Maintenance release.</p> <p>CawtWord:</p> <ul style="list-style-type: none"> • Extended SetTableName and GetTableName to specify or retrieve the descriptive table text. <p>Test programs and documentation:</p> <ul style="list-style-type: none"> • Corrected links due to new Ruff! version.
2.9.3	2023-03-20	<p>Maintenance release.</p> <p>CawtExcel:</p> <ul style="list-style-type: none"> • Corrected default value of parameter worksheetNameOrIndex from 0 to 1 in procedures ExcelFileToWikiFile and ExcelFileToMediaWikiFile. • Added test script showing how to export an Excel workbook as Wikit tables with hyperlinks. <p>CawtWord:</p> <ul style="list-style-type: none"> • Extended validity detection of sub-addresses in procedure GetHyperlinksAsDict to include in addition to addresses. <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> • GetCommentKeyLeftPosition, GetCommentKeyPosition <p>External packages:</p> <ul style="list-style-type: none"> • Updated Img to version 1.4.14. • Updated Ruff! to version 2.3.0. • Updated Tablelist to version 6.20. • Updated tDOM to version 0.9.3. • Updated Twapi to version 4.7.2.

2.9.4	2023-07-17	<p>Maintenance release.</p> <p>CawtWord:</p> <ul style="list-style-type: none"> Extended validity detection of sub-addresses in procedure GetHyperlinksAsDict to include and addresses.
2.9.5	2024-03-12	<p>Maintenance release.</p> <p>CawtCore:</p> <ul style="list-style-type: none"> Take care of changed Img behaviour in procedure ImgToClipboard: Img 2.0 returns image data as binary string. Img 1.4 returns image data as base64 encoded string. <p>CawtOutlook:</p> <ul style="list-style-type: none"> Added new options "-requiredattendees" and "-optionalattendees" to procedures GetAppointmentProperties and AddAppointment.

8 Tables

This chapter contains lists of figures, tables and terms and abbreviations.

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8.3 Table of Terms and Abbreviations

Term / Abbreviation	Meaning
API	Application Program Interface
BAWT	Build Automation With Tcl
BSD	Berkeley Software Distribution
CAWT	COM Automation With Tcl
COM	Component Object Model
CSV	Comma Separated Values
DOM	Document Object Model
GUI	Graphical User Interface
HTML	Hypertext Markup Language

Term / Abbreviation	Meaning
ISO	International Organization for Standardization
OCR	Optical Character Recognition
PDF	Portable Document Format
RGB	Red-Green-Blue
SAPI	Speech Application Programming Interface
Tcl	Tool Command Language
Tk	Toolkit
URL	Uniform Resource Locator
UTF	Unicode Transformation Format
XML	Extensible Markup Language