

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, Outlook and Internet Explorer, MathWorks Matlab and Google Earth are available.

Note: Only Microsoft Office packages Excel, Word and PowerPoint 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 <http://www.poSoft.de/html/extCawt.html>

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.
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.
CawtOutlook	Automation functionality for Microsoft Outlook.
CawtPpt	Automation functionality for Microsoft PowerPoint.
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.

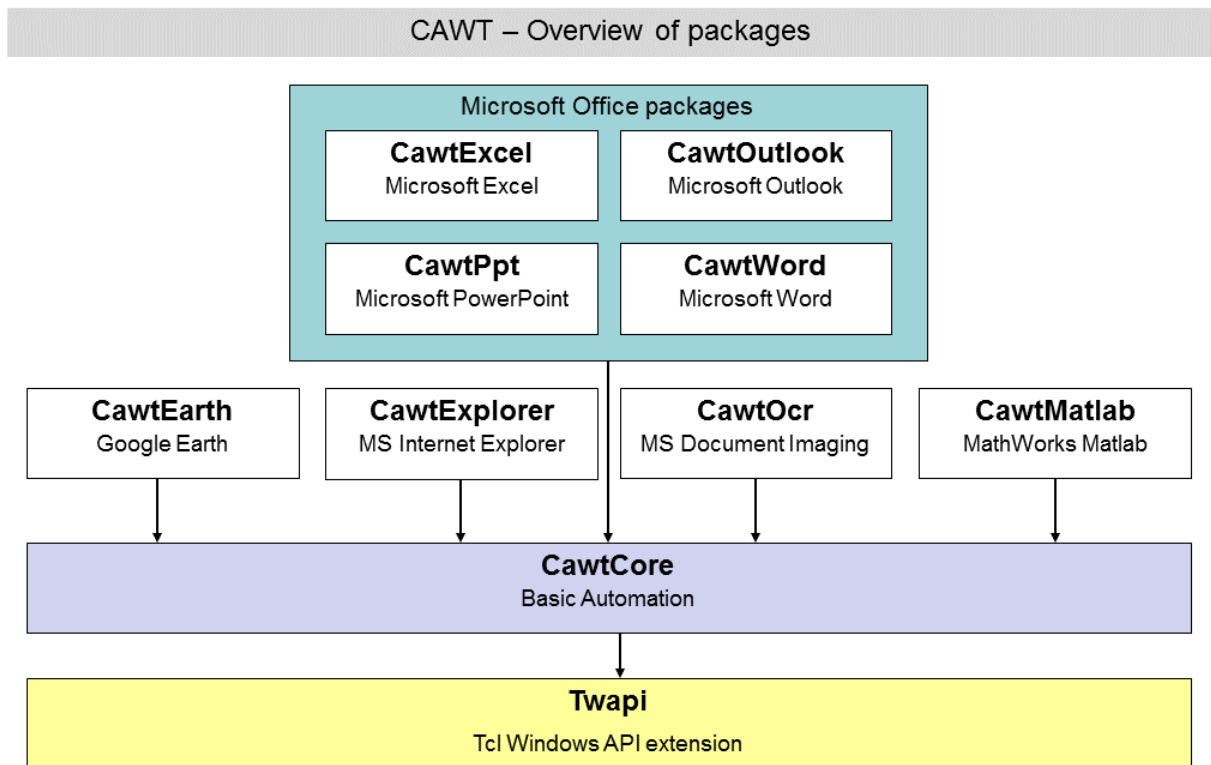


Figure 1: Overview of CAWT packages

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	>= 4.2	Mandatory: Included in CAWT user distribution.	http://twapi.magicsplat.com/
Tkimg	>= 1.4.1	Optional: Included in CAWT user distribution.	http://sourceforge.net/projects/tkimg/ http://www.poSoft.de/html/extTkimg.html
Base64		Optional: Included in CAWT user distribution.	http://sourceforge.net/projects/tcllib/
Tablelist	>= 4	Optional: Included in CAWT user distribution.	http://www.nemethi.de
Libraries needed for generating the CAWT documentation			
Ruff!	0.4	Included in CAWT developer distribution.	http://woof.magicsplat.com/ruff_home
Tcllib		Ruff! needs the textutil module from Tcllib. (textutil included in CAWT developer distribution)	http://sourceforge.net/projects/tcllib/

Note:

Tkimg: Needed only 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**, **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.

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>RgbToColor</code> , <code>TclBool</code>
COM access via Twapi	<code>GetOrCreateApp</code> , <code>IsValidId</code> , <code>Destroy</code>
Common Office functionality	<code>GetApplicationName</code> , <code>GetDocumentProperties</code>
Testing utilities	<code>CheckString</code> , <code>CheckNumber</code> , <code>CheckMatrix</code>
Image utilities	<code>ClipboardToImg</code> , <code>ImgToClipboard</code>

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

Procedure	Short description
CentiMetersToPoints	Convert centimeter value into points.
CheckComObjects	Check, if the number of COM objects fits expected value.
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.
ColorToRgb	Return an Office color number as a RGB color list.
Destroy	Destroy one or all COM objects.
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.
GetComObjects	Return the COM objects currently in use as a list.
GetDocumentProperties	Get document property names as a list.
GetDocumentProperty	Get the value of a document property.
GetDotsPerInch	Return the dots-per-inch value used for conversions.
GetInstallationPath	Get the Office installation pathname.
GetNumComObjects	Return 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.
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.
HavePkg	Check, if a Cawt sub-package is available.
ImgToClipboard	Copy a photo image into the clipboard.
InchesToPoints	Convert inch value into points.
IsApplicationId	Check, if Office object is an application identifier.

IsComObject	Check, if a COM object is valid.
IsValidId	Obsolete: Replaced with IsComObject in version 2.0.0
KillApp	Kill all running instances of an application.
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.
RgbToColor	Return a RGB color as an Office color number.
SetDocumentProperty	Set the value of a document property.
SetDotsPerInch	Set the dots-per-inch value used for conversions.
ShowAlerts	Toggle the display of Office alerts.
TclBool	Cast a value to a boolean.
TclInt	Cast a value to an integer with boolean range.
TclString	Cast a value to a string.

Table 1: CawtCore Reference

2.2 CawtEarth: Automation for Google Earth

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

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

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`.

Procedure	Short description
IsInitialized	Check, if a GoogleEarth instance is initialized.
Open	Open a GoogleEarth instance. Use an already running instance, if available.
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 2: CawtEarth Reference

2.3 CawtExcel: Automation for Microsoft Excel

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

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

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>

Chart handling	ChartObjToClipboard, CreateChart, AddLineChart
Insert values	SetCellValue, SetRowValues, SetMatrixValues
Retrieve values	GetCellValue, GetRowValues, GetMatrixValues
Formatting functionality	SetColumnWidth, SetHyperlink, SetRangeTextColor
Clipboard functionality	ClipboardToMatrix, ClipboardToWorksheet
External file handling	Csv, Raw Images, MediaWiki, Wikit, Matlab files
External table tools handling	Tablelist, Word tables

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: http://www.mathworks.com/help/pdf_doc/matlab/matfile_format.pdf

Raw images: <http://docs.activestate.com/activetcl/8.5/img/doc/img-raw.html>

MediaWiki: <https://meta.wikimedia.org/wiki/Help:Table>

Wikit: <http://wiki.tcl.tk/14>

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.

2.3.1 Module excelCsv

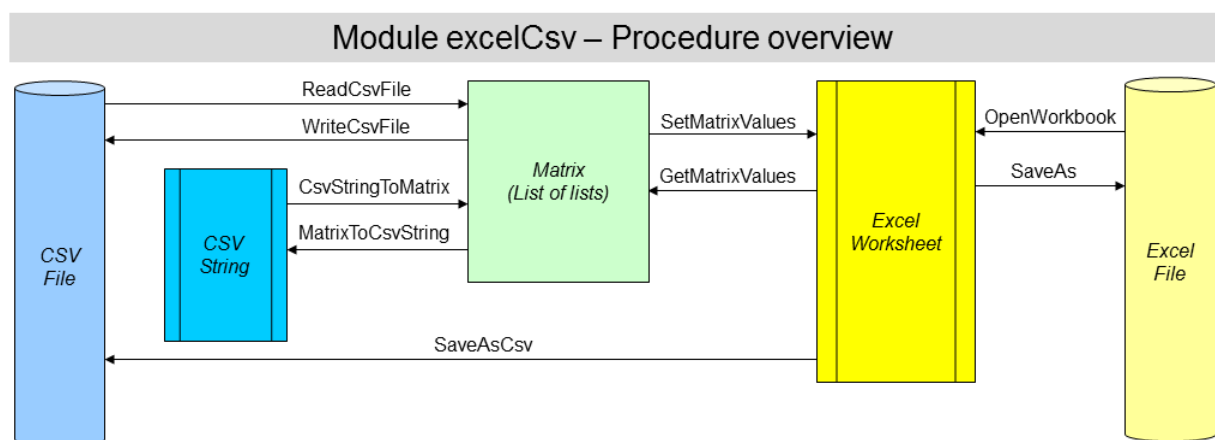


Figure 2: Module excelCsv

2.3.2 Module excelTablelist

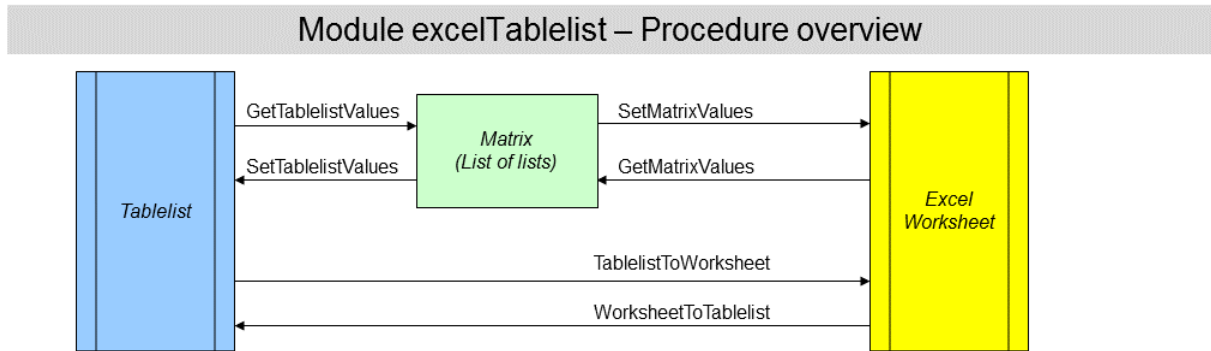


Figure 3: Module excelTablelist

2.3.3 Module excelMatlabFile

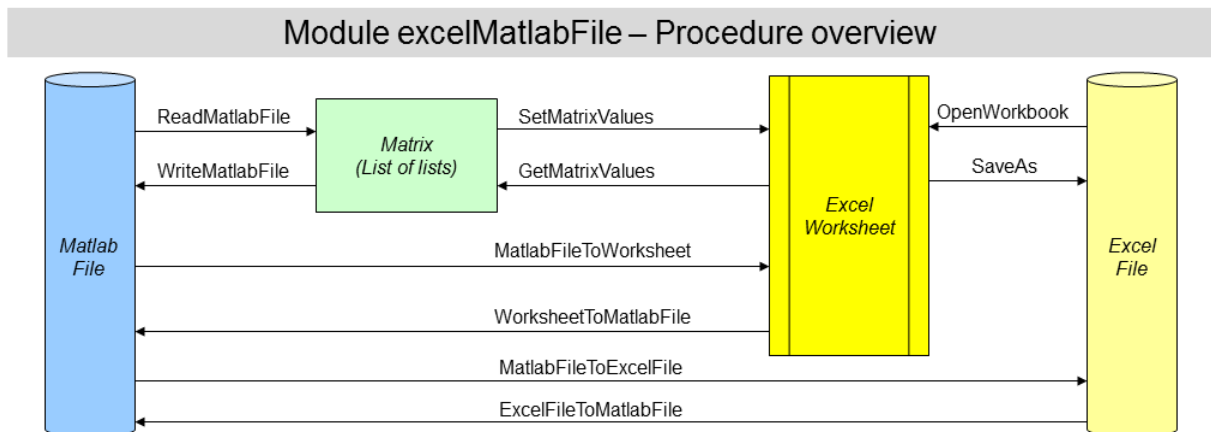


Figure 4: Module excelMatlabFile

2.3.4 Module excelWord

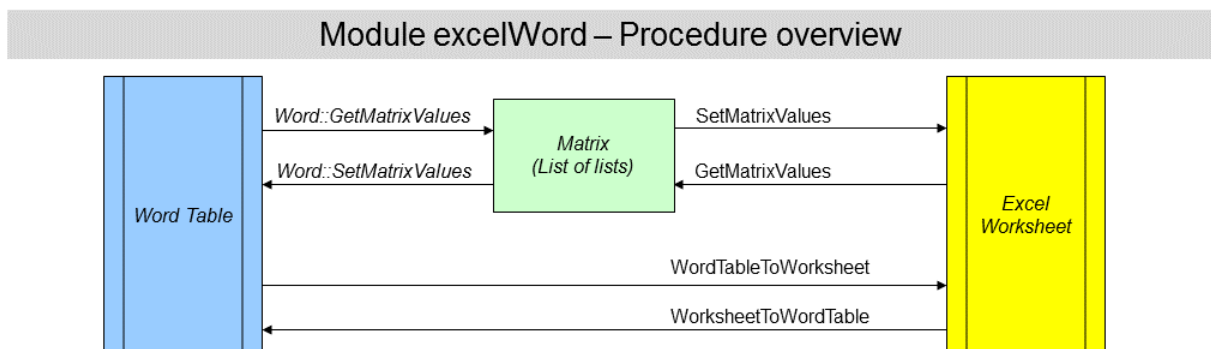


Figure 5: Module excelWord

2.3.5 Module excellmgRaw

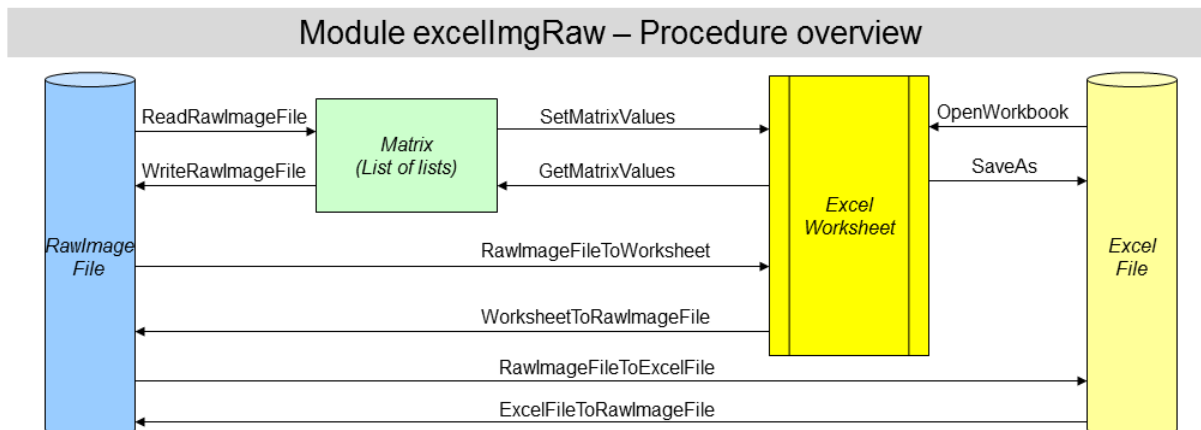


Figure 6: Module excellmgRaw

2.3.6 Module excelMediaWiki

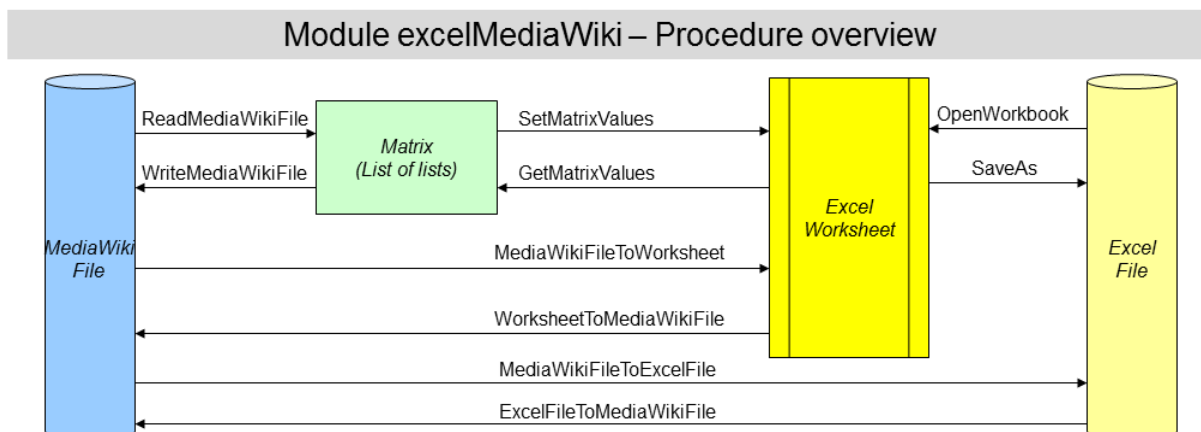


Figure 7: Module excelMediaWiki

2.3.7 Module excelWikiti

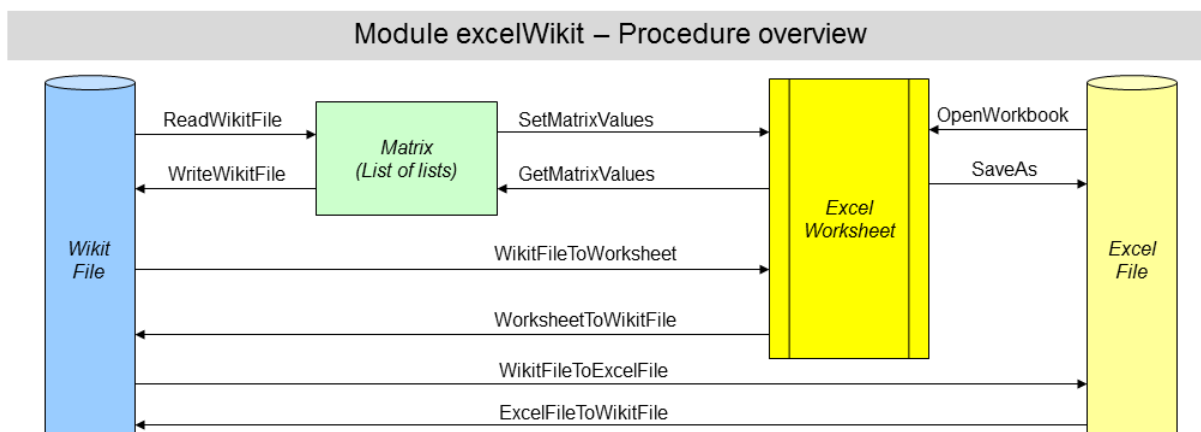


Figure 8: Module excelWikiti

2.3.8 Module excelHtml

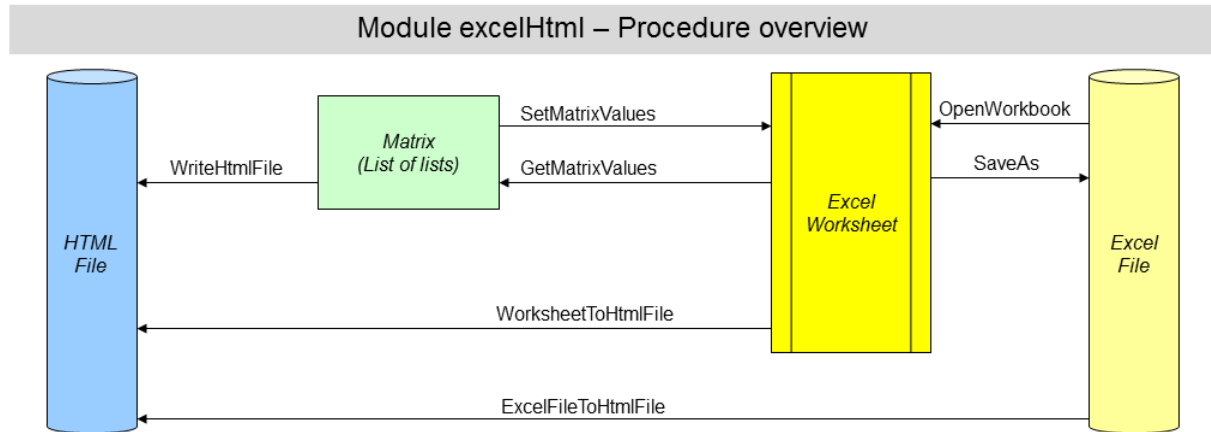


Figure 9: Module excelHtml

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

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.
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 ChartObjToClipboard 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.
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.
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.
DiffExcelFiles	Compare two Excel files visually.
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.
FreezePanes	Freeze a range in a worksheet identified by its row/column index.
GetActiveWorkbook	Return the active workbook of an application.
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.
GetColumnRange	Return a numeric column range as an Excel range string.
GetColumnValues	Return column values as a Tcl list.
GetCsvSeparatorChar	Return the column separator character.
GetDecimalSeparator	Return the decimal separator used by Excel.
GetEnum	Return the numeric value of an enumeration.
GetEnumNames	Return a list of names of a given enumeration type.
GetEnumTypes	Return a list of available enumeration types.
GetEnumVal	Return the 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.
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.
GetNumberFormat	Return an Excel number format string.
GetNumColumns	Return the number of columns of a cell range.
GetNumRows	Return the number of rows of a cell range.
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.
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.
GetRangeHorizontalAlignment	Get the horizontal alignment of a cell range.
GetRangeTextColor	Get the text color of a cell range.
GetRangeVerticalAlignment	Get the vrtical alignment of a cell range.
GetRowValues	Return row values as a Tcl list.
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.
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.
ImgToWorksheet	Put a photo image into a worksheet.
InsertImage	Insert an image into a worksheet.
IsWorkbookProtected	Check, if a workbook is protected.
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.
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
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.
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.
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.
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 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.
SetRangeVerticalAlignment	Set the vertical alignment 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.
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.
SetWorksheetName	Set the name of a worksheet.
SetWorksheetOrientation	Set the orientation of a worksheet.
SetWorksheetTabColor	Set the color of the tab of a worksheet.
SetWorksheetZoom	Set the zoom factor for printing of a worksheet.
ShowCellByIndex	Show a cell identified by its row/column index.
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.
UseImgTransparency	Toggle usage of transparency channel of an image.
Visible	Toggle 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 3: CawtExcel Reference

2.4 CawtExplorer: Automation for Internet Explorer

The procedures of package **CawtExplorer** are implemented in namespace `Explorer`. The name of the controlled application is `InternetExplorer.Application`.

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`.

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. Use an already running instance, if available.
OpenNew	Open a new Internet Explorer instance.
Quit	Quit an Internet Explorer instance.
Visible	Toggle the visibility of an Internet Explorer application window.

Table 4: CawtExplorer Reference

2.5 CawtMatlab: Automation for MathWorks Matlab

The procedures of package **CawtMatlab** are implemented in namespace `Matlab`.
The name of the controlled application is `Matlab.Application`.

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`.

Procedure	Short description
ExecCmd	Execute a Matlab command.
Open	Open a Matlab instance. Use an already running instance, if available.
OpenNew	Open a new Matlab instance.
Quit	Quit a Matlab instance.
Visible	Toggle the visibility of a Matlab application window.

Table 5: CawtMatlab Reference

2.6 CawtOcr: Automation for Microsoft Document Imaging

The procedures of package **CawtOcr** are implemented in namespace `Ocr`.
The name of the controlled application is `MODI.Document`.

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`.

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.
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 6: CawtOcr Reference

2.7 CawtOutlook: Automation for Microsoft Outlook

The procedures of package **CawtOutlook** are implemented in namespace `Outlook`.
The name of the controlled application is `Outlook.Application`.

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>SendMail</code>

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

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

Procedure	Short description
CreateMail	Create a new Outlook mail.
GetEnum	Return the numeric value of an enumeration.
GetEnumNames	Return a list of names of a given enumeration type.
GetEnumTypes	Return a list of available enumeration types.
GetEnumVal	Return the numeric value of an enumeration name.
GetVersion	Return the version of an Outlook application.
Open	Open an Outlook instance. Use an already running instance, if available.
OpenNew	Open a new Outlook instance.
Quit	Quit an Outlook instance.
SendMail	Send an Outlook mail.

Table 7: CawtOutlook Reference

2.8 CawtPpt: Automation for Microsoft PowerPoint

The procedures of package **CawtPpt** are implemented in namespace `Ppt`.
The name of the controlled application is `PowerPoint.Application`.

They provide functionality for the following domains:

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

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`.

Procedure	Short description
AddPres	Add a new empty presentation.
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.
Close	Close a presentation without saving changes.
CloseAll	Close all presentations of a PowerPoint instance.
CopySlide	Copy the contents of a slide into another slide.
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.
GetCommentKeyValue	Return the value of a key stored in a comment.
GetComments	Get the comment texts of a slide as a Tcl list.
GetCustomLayoutId	Get a custom layout by its index or name.
GetCustomLayoutName	Return the name of a custom layout.
GetEnum	Return the numeric value of an enumeration.
GetEnumNames	Return a list of names of a given enumeration type.
GetEnumTypes	Return a list of available enumeration types.
GetEnumVal	Return the 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.
GetNumSlides	Return the number of slides of a presentation.
GetNumSlideShows	Return the number of slide shows of a presentation.
GetSlideId	Get slide identifier from slide index.
GetSlideIndex	Return the index of a slide.
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.
MoveSlide	Move a slide to another position.
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.
SetTextboxFontSize	Set the font size of the text in a text box.
SetViewType	Set the view type of a presentation.
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 8: CawtPpt Reference

2.9 CawtWord: Automation for Microsoft Word

The procedures of package **CawtWord** are implemented in namespace `Word`.

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

They provide functionality for the following domains:

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

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`.

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.
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.
ConfigureCaption	Configure style of a caption type identified by its label identifier.
CreateRange	Create a new text range.
CreateRangeAfter	Create a new text range after specified range.
CropImage	Crop an image at the four borders.
DiffWordFiles	Compare two Word files visually.
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.
GetCellRange	Return a cell 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.
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	Return the numeric value of an enumeration.
GetEnumNames	Return a list of names of a given enumeration type.
GetEnumTypes	Return a list of available enumeration types.
GetEnumVal	Return the numeric value of an enumeration name.
GetExtString	Return the default extension of a Word file.
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.
GetNumRows	Return the number of rows of a Word table.
GetNumTables	Return the number of tables of a Word document.
GetRangeEndIndex	Return the end index of a text range.
GetRangeInformation	Get information about a text range.
GetRangeStartIndex	Return the start index of a text range.
GetRowRange	Return a row 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.
GetTableIdByIndex	Find a table by its index.
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.
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.
PrintRange	Print the indices of a text range.
Quit	Quit a Word instance.
ReplaceByProc	Replace a string in a text range. Generic case.
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.
SelectRange	Select a text range.
SetCellValue	Set the value 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	N/A
SetContentControlText	N/A
SetHeaderRow	Insert row values into a Word table and format as a header row.
SetHyperlink	Insert an external hyperlink into a Word document.
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.
SetRangeBackgroundColor	Set the background color of a text range.
SetRangeBackgroundColorByEnum	Set the background color of a text range.
SetRangeEndIndex	Set the end index of a text range.
SetRangeFontBold	Toggle the bold font style 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.
SetRangeStartIndex	Set the start index of a text range.
SetRangeStyle	Set the style of a text range.
SetRowValues	Insert row values from a Tcl list.
SetTableBorderLineStyle	Set the border line styles of a Word table.
SetTableBorderLineWidth	Set the border line widths of a Word table.
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 9: 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 BSD license. 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:

- Word2Pdf.tcl
- EnumExplorer.tcl

4.1 Application Word2Pdf.tcl

The application `Word2Pdf.tcl` can be used to convert a Word file to a PDF file. Note, that PDF export is support 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.
```

4.2 Application EnumExplorer.tcl

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

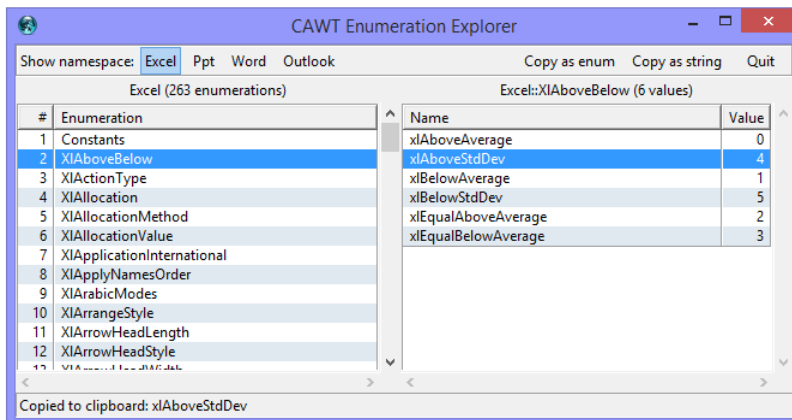


Figure 10: Screenshot of EnumExplorer.tcl

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:

```
Excel Ppt Word Outlook
```

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

Example: `$Excel::xlAboveStdDev`

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

Example: xlAboveStdDev

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
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. Clicking onto one of these buttons triggers Google Earth to fly to that position.
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, searching and page setup.
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-08_Tablelist.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.tcl	Test CawtExcel procedures to exchange data between Excel and RAW photo 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-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-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.tcl	Test CawtExcel procedures related to font handling.
Excel-24_Format.tcl	Test CawtExcel procedures related to specifying number formats. If called without options, the system separators are used. If "--English" is specified, a dot is used as floating point separator and a comma as thousands separator. If "--German" is specified, a comma is used as floating point separator and a dot as thousands separator.
Excel-25_Properties.tcl	Test CawtExcel procedures related to property handling.
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 fullscreen mode.
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.
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 a test mail to info@poSoft.de.
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.
Word-01_Basic.tcl	Test basic functionality of the CawtWord package.
Word-02_Table.tcl	Test CawtWord procedures related to Word table management.
Word-03_Text.tcl	Test CawtWord procedures for handling text.
Word-04_Find.tcl	Test CawtWord procedures related to search and replace functionality.
Word-05_Report.tcl	Test CawtWord procedures needed for generating a test report. It is assumed that the test data is read from an external data sink (ex. file), there are images to be inserted that are in a format Word does not know about, and a summary should be printed at the first page.
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.

Table 10: 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 XP, Windows 7, Windows 8	6.2, 7.1.2
CawtExcel	Windows XP, Windows 7, Windows 8	2003, 2007, 2010, 2013

CawtExplorer	Windows XP, Windows 7, Windows 8 (*)	IE 8, IE 9, IE 11
CawtMatlab	Windows XP	R2007b
CawtOcr	Windows XP, Windows 7, Windows 8	2003, 2007, 2010, 2013
CawtOutlook	Windows 7, Windows 8	2010, 2013
CawtPpt	Windows XP, Windows 7, Windows 8	2003, 2007, 2010, 2013
CawtWord	Windows XP, Windows 7, Windows 8	2003, 2007, 2010, 2013

(*) See chapter 2.4 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: Excel Ppt Word Outlook Ocr Earth Matlab Explorer.
Use "all" as namespace name to run tests and checks for all namespaces.
```

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 the enumeration values of the Office applications Excel (*excelConst.tcl*), PowerPoint (*pptConst.tcl*), Word (*wordConst.tcl*) and Outlook (*outlookConst.tcl*) are automatically generated with script *createConstFile.tcl*.

The enumeration values of the current CAWT distribution are based on Microsoft Office 2013. 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. Note also, that the enumeration files are created in the CAWT root directory, so you have to copy them into the appropriate sub-folders by hand (but check and compare the differences to the existing files first).

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*.

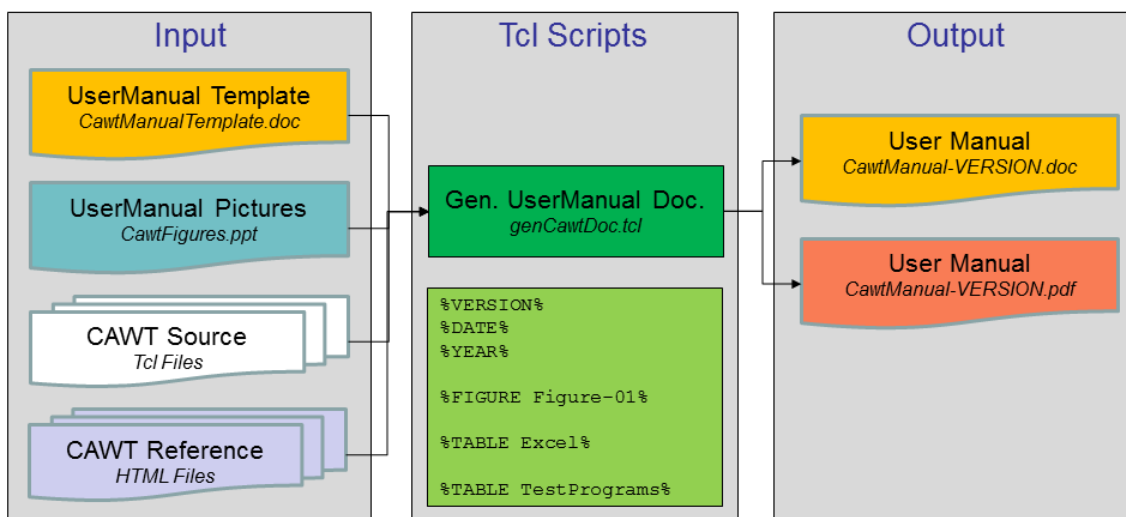


Figure 11: Documentation generation workflow

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 it's 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 SetRangeFontName, SetRangeStyle, SetRangeFontSize InsertText, AddText, GetNumCharacters

		<ul style="list-style-type: none"> • 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 rangeId 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

		<p>TclString procedure.</p> <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.
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