

# 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, Internet Explorer, MathWorks Matlab, Adobe Acrobat Reader 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:

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

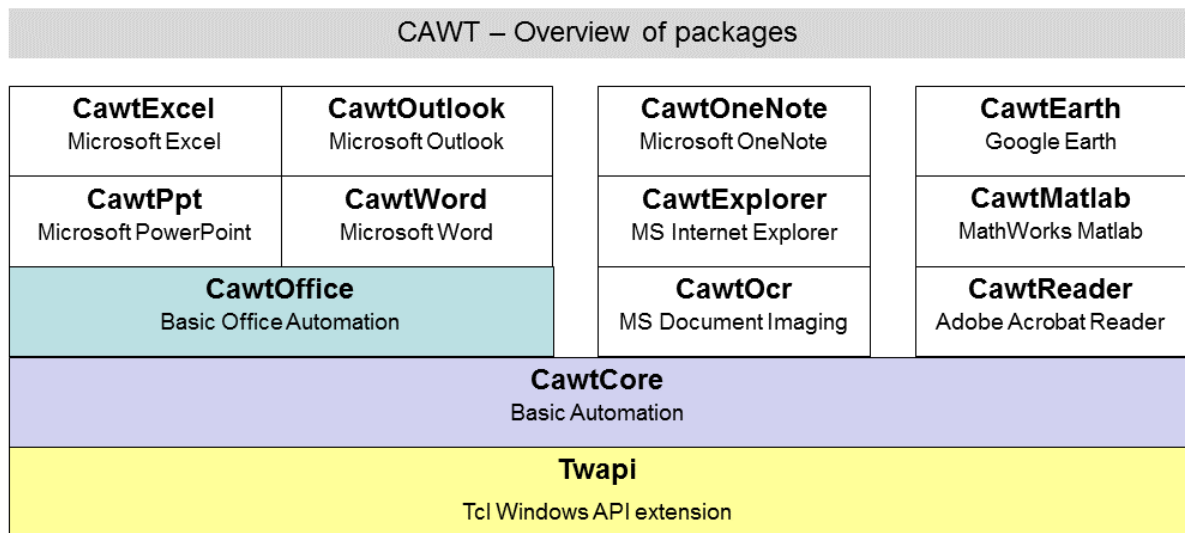


Figure 1: Overview of CAWT packages

## 1.2 Dependencies

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

Lib	Version	Comment	URL
<b>Libraries needed for the CAWT package</b>			
<b>Twapi</b>	>= 4.2	Mandatory: Included in CAWT user distribution.	<a href="http://twapi.magicsplat.com/">http://twapi.magicsplat.com/</a>
<b>tDOM</b>	>= 0.8.3	Optional: Included in CAWT user distribution.	<a href="http://tdom.github.io/">http://tdom.github.io/</a>
<b>Tkimg</b>	>= 1.4.1	Optional: Included in CAWT user distribution.	<a href="http://sourceforge.net/projects/tkimg/">http://sourceforge.net/projects/tkimg/</a> <a href="http://www.poSoft.de/html/extTkimg.html">http://www.poSoft.de/html/extTkimg.html</a>
<b>Base64</b>		Optional: Included in CAWT user distribution.	<a href="http://sourceforge.net/projects/tcllib/">http://sourceforge.net/projects/tcllib/</a>
<b>Tablelist</b>	>= 4	Optional: Included in CAWT user distribution.	<a href="http://www.nemethi.de">http://www.nemethi.de</a>
<b>Libraries needed for generating the CAWT documentation</b>			
<b>Ruff!</b>	0.4	Included in CAWT developer distribution.	<a href="http://woof.magicsplat.com/ruff_home">http://woof.magicsplat.com/ruff_home</a>
<b>Tcllib</b>		Ruff! needs the textutil module from Tcllib. (textutil included in CAWT developer distribution)	<a href="http://sourceforge.net/projects/tcllib/">http://sourceforge.net/projects/tcllib/</a>

### Note:

**tDOM**: Mandatory for the CawtOneNote package.  
**Tkimg**: 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 <http://www.bawt.tcl3d.org/index.html>

## 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>
Color handling	<code>GetColor</code> , <code>GetColorNames</code> , <code>RgbToOfficeColor</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`.

Procedure	Short description
<a href="#">CentiMetersToPoints</a>	Convert centimeter value into points.
<a href="#">CheckBoolean</a>	Check, if two boolean values are identical.
<a href="#">CheckComObjects</a>	Check, if the number of COM objects fits expected value.
<a href="#">CheckList</a>	Check, if two lists are identical.
<a href="#">CheckMatrix</a>	Check, if two matrices are identical.
<a href="#">CheckNumber</a>	Check, if two numerical values are identical.
<a href="#">CheckString</a>	Check, if two string values are identical.
<a href="#">ClipboardToImg</a>	Copy the clipboard content into a photo image.
<a href="#">ConcatFiles</a>	N/A
<a href="#">CountWords</a>	Count words contained in a string.
<a href="#">Destroy</a>	Destroy one or all COM objects.
<a href="#">GetColor</a>	Convert a color representation into an Office color number.
<a href="#">GetColorNames</a>	Get all supported Tcl color names.
<a href="#">GetComObjects</a>	Get the COM objects currently in use as a list.
<a href="#">GetDotsPerInch</a>	Get the dots-per-inch value used for conversions.
<a href="#">GetNumComObjects</a>	Get the number of COM objects currently in use.
<a href="#">GetOrCreateApp</a>	Use or create an instance of an application.
<a href="#">GetPkgVersion</a>	Get the version of a Cawt sub-package.
<a href="#">GetProgramByExtension</a>	Get path to program for a given file extension.
<a href="#">HavePkg</a>	Check, if a Cawt sub-package is available.
<a href="#">ImgToClipboard</a>	Copy a photo image into the clipboard.
<a href="#">InchesToPoints</a>	Convert inch value into points.
<a href="#">IsComObject</a>	Check, if a COM object is valid.
<a href="#">IsHexColor</a>	Check, if specified color is a valid Tcl hexadecimal color string.
<a href="#">IsNameColor</a>	Check, if specified color is a valid Tcl color name.
<a href="#">IsoDateToOutlookDate</a>	Return ISO date string as Outlook date.
<a href="#">IsoDateToSeconds</a>	Return ISO date string as seconds.
<a href="#">IsoDateToXmlDate</a>	Return ISO date string as XML date string.

<a href="#">IsOfficeColor</a>	Check, if specified color is a valid Office color number.
<a href="#">IsRgbColor</a>	Check, if specified color is a valid RGB representation.
<a href="#">IsUnicodeFile</a>	Check, if a file is encode in Unicode.
<a href="#">IsValidId</a>	Obsolete: Replaced with IsComObject in version 2.0.0
<a href="#">KillApp</a>	Kill all running instances of an application.
<a href="#">OfficeColorToRgb</a>	Convert an Office color number into a RGB color list.
<a href="#">OutlookDateToIsoDate</a>	Return Outlook date as ISO date string.
<a href="#">OutlookDateToSeconds</a>	Return Outlook date as seconds.
<a href="#">PointsToCentiMeters</a>	Convert value in points into centimeters.
<a href="#">PointsToInches</a>	Convert value in points into inches.
<a href="#">PopComObjects</a>	Pop last entry from COM objects stack.
<a href="#">PrintNumComObjects</a>	Print the number of currently available COM objects to stdout.
<a href="#">PushComObjects</a>	Push current list of COM objects onto a stack.
<a href="#">RgbToOfficeColor</a>	Convert a RGB color into an Office color number.
<a href="#">SecondsToIsoDate</a>	Return date in seconds as ISO date string.
<a href="#">SecondsToOutlookDate</a>	Return date in seconds as Outlook date.
<a href="#">SecondsToXmlDate</a>	Return date in seconds as XML date string.
<a href="#">SetDotsPerInch</a>	Set the dots-per-inch value used for conversions.
<a href="#">SplitFile</a>	N/A
<a href="#">TclBool</a>	Cast a value to a boolean.
<a href="#">TclInt</a>	Cast a value to an integer with boolean range.
<a href="#">TclString</a>	Cast a value to a string.
<a href="#">ValueToPoints</a>	Convert a value into points.
<a href="#">XmlDateToIsoDate</a>	Return XML date string as ISO date string.
<a href="#">XmlDateToSeconds</a>	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	<code>GetApplicationName</code> , <code>GetApplicationId</code>
Office document properties	<code>SetDocumentProperty</code> , <code>GetDocumentProperty</code>
Office environment	<code>GetUserName</code> , <code>GetUserPath</code> , <code>GetActivePrinter</code>

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

Procedure	Short description
<a href="#">ColorToRgb</a>	Obsolete: Replaced with <code>::Cawt::OfficeColorToRgb</code> in version 2.2.0
<a href="#">GetActivePrinter</a>	Get the name of the active printer.
<a href="#">GetApplicationId</a>	Get the application identifier of an Office object.
<a href="#">GetApplicationName</a>	Get the name of an Office application.
<a href="#">GetApplicationVersion</a>	Get the version number of an Office application.
<a href="#">GetDocumentProperties</a>	Get document property names as a list.
<a href="#">GetDocumentProperty</a>	Get the value of a document property.
<a href="#">GetEnum</a>	Get numeric value of an enumeration.
<a href="#">GetEnumName</a>	Get name of a given enumeration type and numeric value.
<a href="#">GetEnumNames</a>	Get names of a given enumeration type.
<a href="#">GetEnumTypes</a>	Get available enumeration types.
<a href="#">GetEnumVal</a>	Get numeric value of an enumeration name.
<a href="#">GetInstallationPath</a>	Get the Office installation pathname.

<a href="#">GetStartupPath</a>	Get the Office startup pathname.
<a href="#">GetTemplatesPath</a>	Get the Office templates pathname.
<a href="#">GetUserLibraryPath</a>	Get the Office user library pathname.
<a href="#">GetUserName</a>	Get the name of the Office application user.
<a href="#">GetUserPath</a>	Get the Office user folder's pathname.
<a href="#">IsApplicationId</a>	Check, if Office object is an application identifier.
<a href="#">RgbToColor</a>	Obsolete: Replaced with <code>::Cawt::RgbToOfficeColor</code> in version 2.2.0
<a href="#">SetDocumentProperty</a>	Set the value of a document property.
<a href="#">SetPrinterCommunication</a>	Enable or disable printer communication.
<a href="#">ShowAlerts</a>	Toggle the display of Office alerts.

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`.

Procedure	Short description
<a href="#">IsInitialized</a>	Check, if a GoogleEarth instance is initialized.
<a href="#">Open</a>	Open a GoogleEarth instance. Use an already running instance, if available.
<a href="#">OpenNew</a>	Open a new GoogleEarth instance.
<a href="#">Quit</a>	Quit a GoogleEarth instance.
<a href="#">SaveImage</a>	Save a grey-scale image of the current view.
<a href="#">SetCamera</a>	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	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](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.

### 2.4.1 Module excelCsv

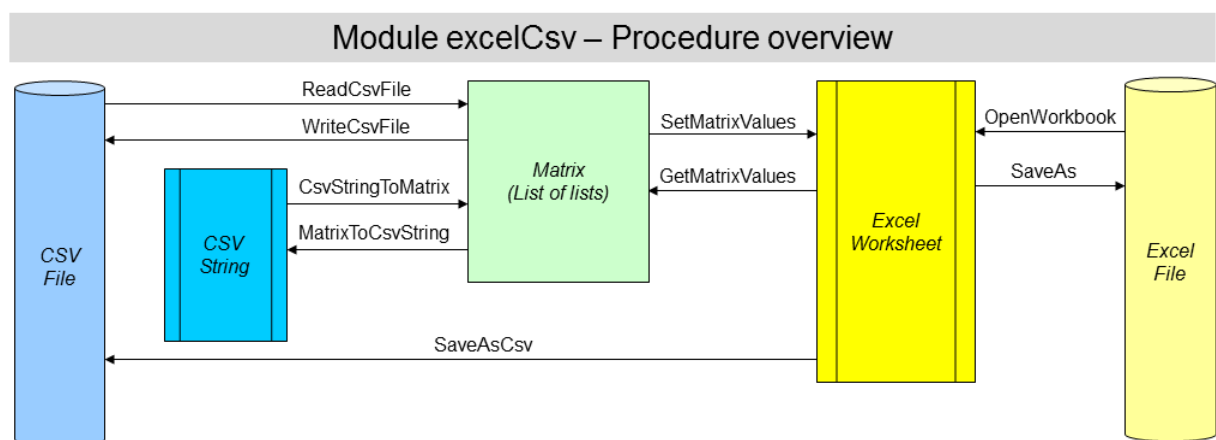
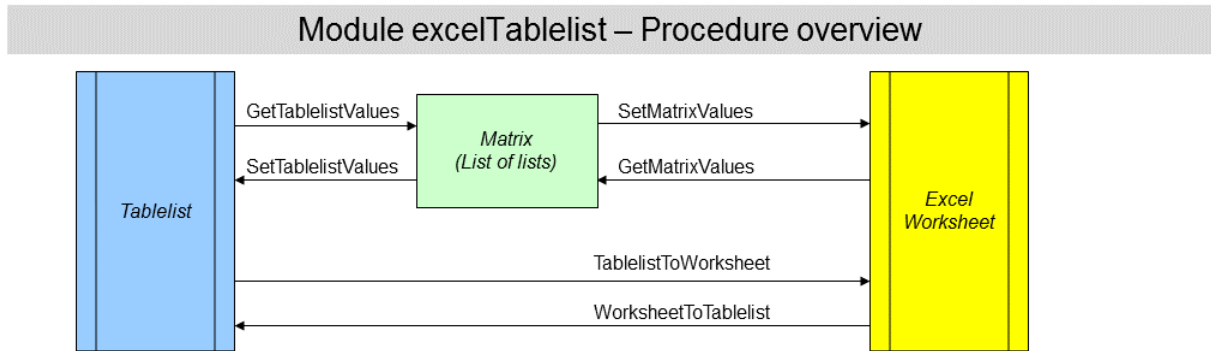


Figure 2: Module excelCsv

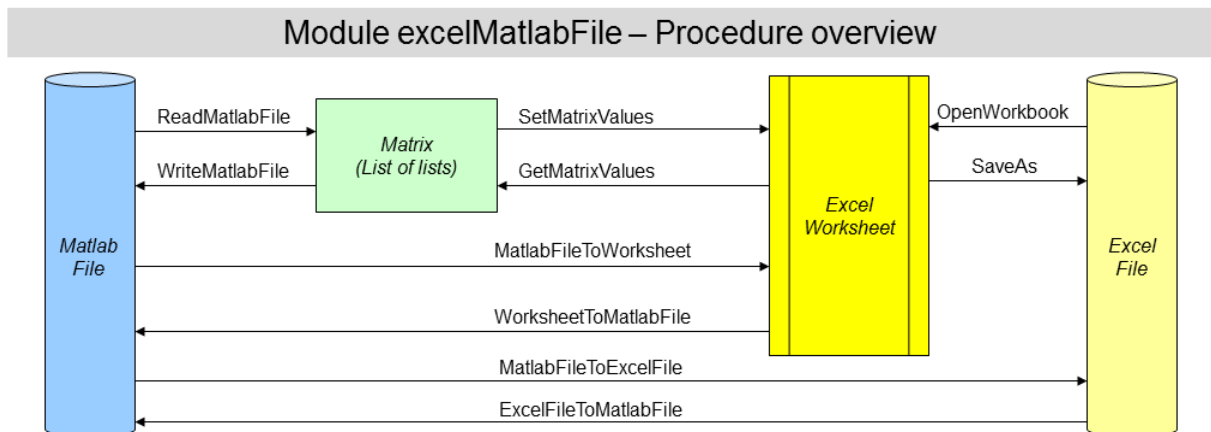


## 2.4.2 Module excelTablelist



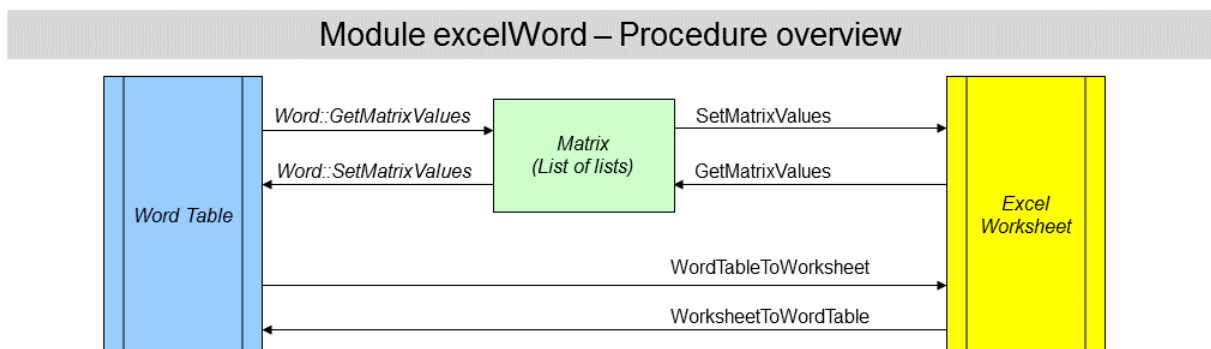
**Figure 3: Module excelTablelist**

## 2.4.3 Module excelMatlabFile



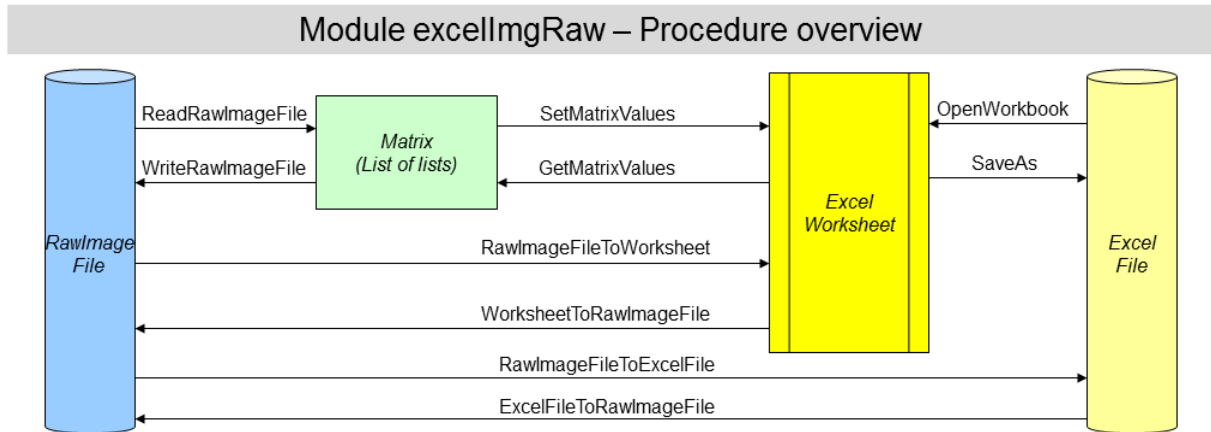
**Figure 4: Module excelMatlabFile**

## 2.4.4 Module excelWord



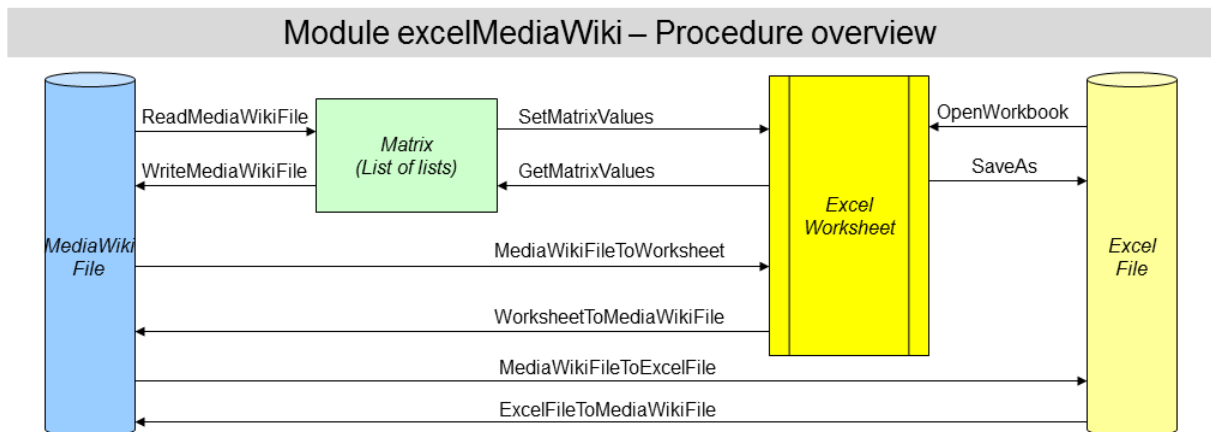
**Figure 5: Module excelWord**

### 2.4.5 Module excellmgRaw



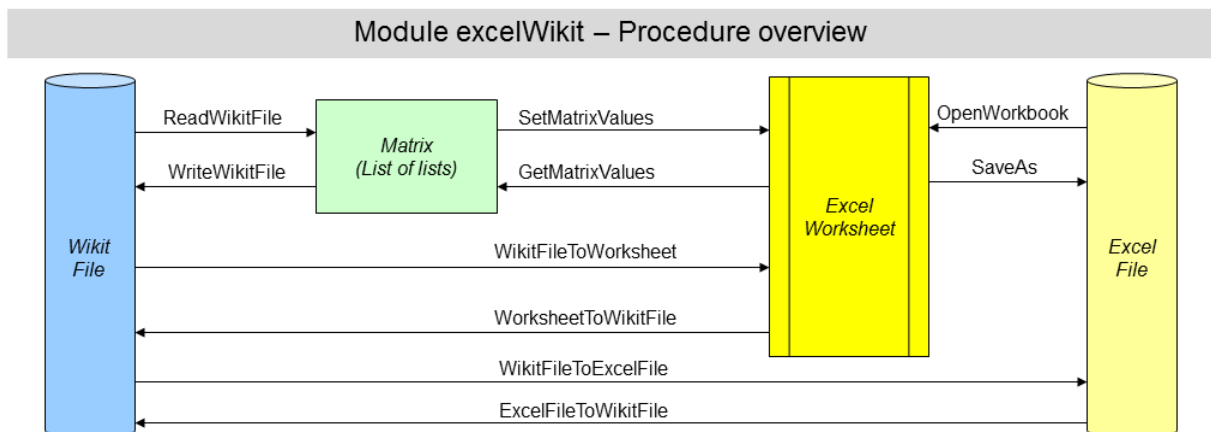
**Figure 6: Module excellmgRaw**

### 2.4.6 Module excelMediaWiki



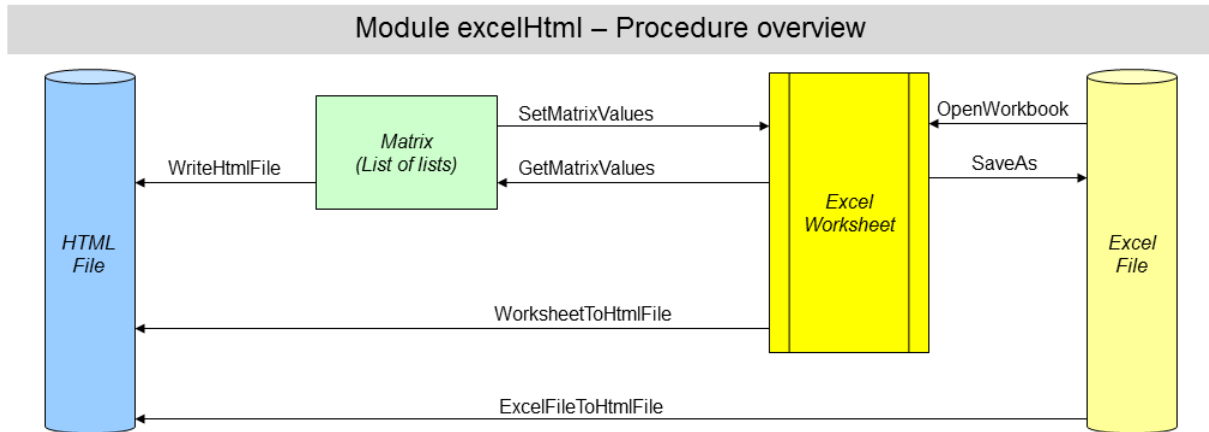
**Figure 7: Module excelMediaWiki**

### 2.4.7 Module excelWikiti



**Figure 8: Module excelWikiti**

## 2.4.8 Module excelHtml



**Figure 9: Module excelHtml**

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

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

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

<a href="#">GetRangeFillColor</a>	Get the fill color of a cell range.
<a href="#">GetRangeFontBold</a>	Get the bold font style of a cell range.
<a href="#">GetRangeFontItalic</a>	Get the italic font style of a cell range.
<a href="#">GetRangeFontName</a>	Get the font name of a cell or character range.
<a href="#">GetRangeFontSize</a>	Get the font size of a cell range.
<a href="#">GetRangeFontSubscript</a>	Get the subscript font style of a cell or character range.
<a href="#">GetRangeFontSuperscript</a>	Get the superscript font style of a cell or character range.
<a href="#">GetRangeFontUnderline</a>	Get the underline font style of a cell range.
<a href="#">GetRangeFormat</a>	Get the number format of a cell range.
<a href="#">GetRangeHorizontalAlignment</a>	Get the horizontal alignment of a cell range.
<a href="#">GetRangeTextColor</a>	Get the text color of a cell range.
<a href="#">GetRangeValues</a>	Return range values as a matrix.
<a href="#">GetRangeVerticalAlignment</a>	Get the vertical alignment of a cell range.
<a href="#">GetRangeWrapText</a>	Get the wrap text mode of a cell range.
<a href="#">GetRowValues</a>	Return row values as a Tcl list.
<a href="#">GetTablelistHeader</a>	Return the header line of a tablelist as a list.
<a href="#">GetTablelistValues</a>	Return the values of a tablelist as a matrix.
<a href="#">GetThousandsSeparator</a>	Return the thousands separator used by Excel.
<a href="#">GetVersion</a>	Return the version of an Excel application.
<a href="#">GetWorkbookIdByName</a>	Find an open workbook by its name.
<a href="#">GetWorkbookName</a>	Return the name of a workbook.
<a href="#">GetWorksheetAsMatrix</a>	Return worksheet table as a matrix.
<a href="#">GetWorksheetIdByIndex</a>	Find a worksheet by its index.
<a href="#">GetWorksheetIdByName</a>	Find a worksheet by its name.
<a href="#">GetWorksheetIndexByName</a>	Find a worksheet index by its name.
<a href="#">GetWorksheetName</a>	Return the name of a worksheet.
<a href="#">HideColumn</a>	Hide or unhide a column.
<a href="#">HideRow</a>	Hide or unhide a row.
<a href="#">ImgToWorksheet</a>	Put a photo image into a worksheet.
<a href="#">Import</a>	Import data from an external data source.
<a href="#">InsertColumn</a>	Insert a new empty column.
<a href="#">InsertImage</a>	Insert an image into a worksheet.
<a href="#">InsertRow</a>	Insert a new empty row.
<a href="#">IsWorkbookId</a>	Check, if Excel object is a workbook identifier.
<a href="#">IsWorkbookOpen</a>	Check, if a workbook is open.
<a href="#">IsWorkbookProtected</a>	Check, if a workbook is protected.
<a href="#">IsWorksheetEmpty</a>	Check, if a worksheet is empty.
<a href="#">IsWorksheetProtected</a>	Check, if a worksheet is content protected.
<a href="#">IsWorksheetVisible</a>	Check, if a worksheet is visible.
<a href="#">ListToCsvRow</a>	Return a list of column values as a CSV encoded row string.
<a href="#">MatlabFileToExcelFile</a>	Convert a Matlab table file to an Excel file.
<a href="#">MatlabFileToWorksheet</a>	Insert the data values of a Matlab file into a worksheet.
<a href="#">MatrixToClipboard</a>	Copy a matrix into the clipboard.
<a href="#">MatrixToCsvString</a>	Return a CSV encoded table string from a matrix list.
<a href="#">MediaWikiFileToExcelFile</a>	Convert a MediaWiki table file to an Excel file.
<a href="#">MediaWikiFileToWorksheet</a>	Insert the values of a MediaWiki table file into a worksheet.
<a href="#">Open</a>	Open an Excel instance. Use an already running instance, if available.
<a href="#">OpenNew</a>	Open a new Excel instance.
<a href="#">OpenWorkbook</a>	Open a workbook, i.e. load an Excel file.
<a href="#">PlaceChart</a>	Place an existing chart into a worksheet.
<a href="#">Quit</a>	Quit an Excel instance.
<a href="#">RawImageFileToExcelFile</a>	Convert a raw photo image file to an Excel file.
<a href="#">RawImageFileToWorksheet</a>	Insert the pixel values of a raw photo image into a

	worksheet.
<a href="#">ReadCsvFile</a>	Read a CSV table file into a matrix.
<a href="#">ReadMatlabFile</a>	Read a Matlab file into a matrix.
<a href="#">ReadMatlabHeader</a>	Read the header of a Matlab file.
<a href="#">ReadMediaWikiFile</a>	Read a MediaWiki table file into a matrix.
<a href="#">ReadRawImageFile</a>	Read a raw photo image into a matrix.
<a href="#">ReadRawImageHeader</a>	Read the header of a raw photo image.
<a href="#">ReadWikifile</a>	Read a Wikit table file into a matrix.
<a href="#">ResizeChartObj</a>	Set the position and size of a chart object.
<a href="#">SaveAs</a>	Save a workbook to an Excel file.
<a href="#">SaveAsCsv</a>	Save a worksheet to file in CSV format.
<a href="#">SaveChartAsImage</a>	Obsolete: Replaced with SaveChartObjAsImage in version 1.0.1
<a href="#">SaveChartObjAsImage</a>	Save a chart as an image in a file.
<a href="#">ScaleImage</a>	Scale an image.
<a href="#">ScreenUpdate</a>	Toggle the screen updating of an Excel application window.
<a href="#">Search</a>	Find a string in a worksheet cell range.
<a href="#">SelectAll</a>	Select all cells of a worksheet.
<a href="#">SelectCellByIndex</a>	Select a cell by its row/column index.
<a href="#">SelectRangeByIndex</a>	Select a range by specifying a numeric cell range.
<a href="#">SelectRangeByString</a>	Select a range by specifying an Excel range string in A1 notation.
<a href="#">SetCellValue</a>	Set the value of a cell.
<a href="#">SetChartMaxScale</a>	Set the maximum scale of an axis of a chart.
<a href="#">SetChartMinScale</a>	Set the minimum scale of an axis of a chart.
<a href="#">SetChartObjPosition</a>	Set the position of a chart object.
<a href="#">SetChartObjSize</a>	Set the size of a chart object.
<a href="#">SetChartScale</a>	Set the minimum and maximum scale of both axes of a chart.
<a href="#">SetChartSize</a>	Obsolete: Replaced with SetChartObjSize in version 1.0.1
<a href="#">SetChartSourceByIndex</a>	Set the cell range for the source of a chart.
<a href="#">SetChartTicks</a>	Set the tick spacing of an axis of a chart.
<a href="#">SetChartTitle</a>	Set the title of a chart.
<a href="#">SetColumnsWidth</a>	Set the width of a range of columns.
<a href="#">SetColumnValues</a>	Insert column values from a Tcl list.
<a href="#">SetColumnWidth</a>	Set the width of a column.
<a href="#">SetCommentDisplayMode</a>	Set the global display mode of comments.
<a href="#">SetCommentSize</a>	Set the shape size of a comment.
<a href="#">SetCsvSeparatorChar</a>	Set the column separator character.
<a href="#">SetHeaderRow</a>	Insert row values from a Tcl list and format as a header row.
<a href="#">SetHyperlink</a>	Insert a hyperlink into a cell.
<a href="#">SetHyperlinkToCell</a>	Insert a hyperlink to a cell into another cell.
<a href="#">SetHyperlinkToFile</a>	Insert a hyperlink to a file into a cell.
<a href="#">SetLinkToCell</a>	Insert an internal link to a cell into another cell.
<a href="#">SetMatrixValues</a>	Insert matrix values into a worksheet.
<a href="#">SetNamedRange</a>	Set the name of a cell range.
<a href="#">SetRangeBorder</a>	Set the attributes of one border of a cell range.
<a href="#">SetRangeBorders</a>	Set the attributes of all borders of a cell range.
<a href="#">SetRangeComment</a>	Set the comment text of a cell range.
<a href="#">SetRangeFillColor</a>	Set the fill color of a cell range.
<a href="#">SetRangeFontBold</a>	Set the bold font style of a cell range.
<a href="#">SetRangeFontItalic</a>	Set the italic font style of a cell range.
<a href="#">SetRangeFontName</a>	Set the font name of a cell or character range.
<a href="#">SetRangeFontSize</a>	Set the font size of a cell range.



<a href="#">SetRangeFontSubscript</a>	Set the subscript font style of a cell or character range.
<a href="#">SetRangeFontSuperscript</a>	Set the superscript font style of a cell or character range.
<a href="#">SetRangeFontUnderline</a>	Set the underline font style of a cell range.
<a href="#">SetRangeFormat</a>	Set the number format of a cell range.
<a href="#">SetRangeHorizontalAlignment</a>	Set the horizontal alignment of a cell range.
<a href="#">SetRangeMergeCells</a>	Merge/Unmerge a range of cells.
<a href="#">SetRangeTextColor</a>	Set the text color of a cell range.
<a href="#">SetRangeTooltip</a>	Set a selection based tooltip for a cell range.
<a href="#">SetRangeValues</a>	Set range values from a matrix.
<a href="#">SetRangeVerticalAlignment</a>	Set the vertical alignment of a cell range.
<a href="#">SetRangeWrapText</a>	Set the text wrapping mode of a cell range.
<a href="#">SetRowHeight</a>	Set the height of a row.
<a href="#">SetRowsHeight</a>	Set the height of a range of rows.
<a href="#">SetRowValues</a>	Insert row values from a Tcl list.
<a href="#">SetSeriesLineWidth</a>	Set the line width of a series.
<a href="#">SetTablelistHeader</a>	Insert header values into a tablelist.
<a href="#">SetTablelistValues</a>	Insert matrix values into a tablelist.
<a href="#">SetWindowState</a>	Set the window state of an Excel application.
<a href="#">SetWorksheetFitToPages</a>	Adjust a worksheet to fit onto given number of pages.
<a href="#">SetWorksheetFooter</a>	Set the texts of the footer of a worksheet.
<a href="#">SetWorksheetHeader</a>	Set the texts of the header of a worksheet.
<a href="#">SetWorksheetMargins</a>	Set the margins of a worksheet.
<a href="#">SetWorksheetName</a>	Set the name of a worksheet.
<a href="#">SetWorksheetOrientation</a>	Set the orientation of a worksheet.
<a href="#">SetWorksheetPaperSize</a>	Set the paper size of a worksheet.
<a href="#">SetWorksheetPrintOptions</a>	Set printing options of a worksheet.
<a href="#">SetWorksheetTabColor</a>	Set the color of the tab of a worksheet.
<a href="#">SetWorksheetZoom</a>	Set the zoom factor for printing of a worksheet.
<a href="#">ShowCellByIndex</a>	Show a cell identified by its row/column index.
<a href="#">ShowWorksheet</a>	Show a worksheet.
<a href="#">TablelistToWorksheet</a>	Insert the values of a tablelist into a worksheet.
<a href="#">ToggleAutoFilter</a>	Toggle the AutoFilter switch of a cell range.
<a href="#">UnhideWorksheet</a>	Unhide a worksheet, if it is hidden.
<a href="#">UseImgTransparency</a>	Toggle usage of transparency channel of an image.
<a href="#">Visible</a>	Set or query the visibility of an Excel application window.
<a href="#">WikitFileToExcelFile</a>	Convert a Wikit table file to an Excel file.
<a href="#">WikitFileToWorksheet</a>	Insert the values of a Wikit table file into a worksheet.
<a href="#">WordTableToWorksheet</a>	Insert the values of a Word table into a worksheet.
<a href="#">WorksheetToClipboard</a>	Copy worksheet data into the clipboard.
<a href="#">WorksheetToHtmlFile</a>	Write the values of a worksheet into a HTML table file.
<a href="#">WorksheetToImg</a>	Put worksheet background colors into a photo image.
<a href="#">WorksheetToMatlabFile</a>	Insert the values of a worksheet into a Matlab file.
<a href="#">WorksheetToMediaWikiFile</a>	Insert the values of a worksheet into a MediaWiki table file.
<a href="#">WorksheetToRawImageFile</a>	Insert the values of a worksheet into a raw photo image file.
<a href="#">WorksheetToTablelist</a>	Insert the values of a worksheet into a tablelist.
<a href="#">WorksheetToWikitFile</a>	Insert the values of a worksheet into a Wikit table file.
<a href="#">WorksheetToWordTable</a>	Insert the values of a worksheet into a Word table.
<a href="#">WriteCsvFile</a>	Write the values of a matrix into a CSV file.
<a href="#">WriteHtmlFile</a>	Write the values of a matrix into a Html table file.
<a href="#">WriteMatlabFile</a>	Write the values of a matrix into a Matlab file.
<a href="#">WriteMediaWikiFile</a>	Write the values of a matrix into a MediaWiki table file.
<a href="#">WriteRawImageFile</a>	Write the values of a matrix into a raw photo image file.
<a href="#">WriteWikitFile</a>	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`.

Procedure	Short description
<a href="#">FullScreen</a>	Toggle the fullscreen mode of an Internet Explorer application window.
<a href="#">Go</a>	Go to a specific page.
<a href="#">IsBusy</a>	Check, if an Internet Explorer instance is busy.
<a href="#">Navigate</a>	Navigate to a URL or local file.
<a href="#">Open</a>	Open an Internet Explorer instance. Use an already running instance, if available.
<a href="#">OpenNew</a>	Open a new Internet Explorer instance.
<a href="#">Quit</a>	Quit an Internet Explorer instance.
<a href="#">Visible</a>	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	Open, Quit
Command execution	ExecCmd

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
<a href="#">ExecCmd</a>	Execute a Matlab command.
<a href="#">Open</a>	Open a Matlab instance. Use an already running instance, if available.
<a href="#">OpenNew</a>	Open a new Matlab instance.
<a href="#">Quit</a>	Quit a Matlab instance.
<a href="#">Visible</a>	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`.

Procedure	Short description
<a href="#">Close</a>	Close an OCR document instance.
<a href="#">GetFullText</a>	Return the recognized text of an OCR layout.
<a href="#">GetNumImages</a>	Return the number of images of an OCR document.
<a href="#">GetNumWords</a>	Return the number of words identified in an OCR document.
<a href="#">GetWord</a>	Return the text of a recognized word.
<a href="#">GetWordStats</a>	Return statistics of a recognized word.
<a href="#">Open</a>	Open an OCR document instance.
<a href="#">OpenDocument</a>	Open an image file for OCR scanning.
<a href="#">Scan</a>	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`.

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

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`.

Procedure	Short description
-----------	-------------------

<a href="#">AddAppointment</a>	Create a new appointment in an Outlook calendar.
<a href="#">AddCalendar</a>	Add a new calendar.
<a href="#">AddCategory</a>	Add a new category to the Outlook categories.
<a href="#">AddHolidayAppointment</a>	Create a new appointment in an Outlook calendar.
<a href="#">ApplyHolidayFile</a>	Read an Outlook holiday file and insert appointments.
<a href="#">CreateHtmlMail</a>	Create a new Outlook HTML mail.
<a href="#">CreateMail</a>	Create a new Outlook text mail.
<a href="#">DeleteAppointmentByIndex</a>	Delete an appointment of an Outlook calendar by its index.
<a href="#">DeleteCalendar</a>	Delete an Outlook calendar.
<a href="#">DeleteCategory</a>	Delete an Outlook category.
<a href="#">GetAppointmentByIndex</a>	Get an appointment of an Outlook calendar by its index.
<a href="#">GetAppointmentProperties</a>	Get properties of an appointment.
<a href="#">GetCalendarId</a>	Get a calendar by its name.
<a href="#">GetCalendarNames</a>	Get a list of calendar names.
<a href="#">GetCategoryColor</a>	Convert a category color enumeration or name
<a href="#">GetCategoryColorEnum</a>	Convert a category color enumeration or name into a color enumeration.
<a href="#">GetCategoryColorName</a>	Convert a category color enumeration into a category color name.
<a href="#">GetCategoryColorNames</a>	Get all category color names.
<a href="#">GetCategoryId</a>	Get a category by its index or name.
<a href="#">GetCategoryNames</a>	Get a list of category names.
<a href="#">GetEnum</a>	Get numeric value of an enumeration.
<a href="#">GetEnumName</a>	Get name of a given enumeration type and numeric value.
<a href="#">GetEnumNames</a>	Get names of a given enumeration type.
<a href="#">GetEnumTypes</a>	Get available enumeration types.
<a href="#">GetEnumVal</a>	Get numeric value of an enumeration name.
<a href="#">GetFoldersRecursive</a>	N/A
<a href="#">GetMailIds</a>	Get a list of mail identifiers.
<a href="#">GetMailSubjects</a>	Get a list of mail subjects.
<a href="#">GetNumAppointments</a>	Get the number of appointments in an Outlook calendar.
<a href="#">GetNumCalendars</a>	Get the number of Outlook calendars.
<a href="#">GetNumCategories</a>	Get the number of Outlook categories.
<a href="#">GetVersion</a>	Get the version of an Outlook application.
<a href="#">HaveCalendar</a>	Check, if a calendar already exists.
<a href="#">HaveCategory</a>	Check, if a category already exists.
<a href="#">Open</a>	Open an Outlook instance.
<a href="#">OpenNew</a>	Obsolete: Replaced with Open in version 2.4.1
<a href="#">Quit</a>	Quit an Outlook instance.
<a href="#">ReadHolidayFile</a>	Read an Outlook holiday file.
<a href="#">SendMail</a>	Send an Outlook mail.

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	Open, Quit, GetVersion
Presentation handling	OpenPres, AddPres, SaveAs, Close

Slide handling	AddSlide, CopySlide, ShowSlide, ExportSlide
SlideShow handling	UseSlideShow, SlideShowFirst, SlideShowNext
Shape handling	AddShape, ConfigureShape, ConnectShapes
Custom layout handling	GetNumCustomLayouts, GetCustomLayoutName

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
<a href="#">AddPres</a>	Add a new empty presentation.
<a href="#">AddShape</a>	Add a new shape to a slide.
<a href="#">AddSlide</a>	Add a new slide to a presentation.
<a href="#">AddTextbox</a>	Add a text box into a slide.
<a href="#">AddTextboxText</a>	Add a text string to a text box.
<a href="#">Close</a>	Close a presentation without saving changes.
<a href="#">CloseAll</a>	Close all presentations of a PowerPoint instance.
<a href="#">ConfigureConnector</a>	Configure a connector.
<a href="#">ConfigureShape</a>	Configure a shape.
<a href="#">ConnectShapes</a>	Add a new connector connecting two shapes.
<a href="#">CopySlide</a>	Copy the contents of a slide into another slide.
<a href="#">ExitSlideShow</a>	Exit specified slide show.
<a href="#">ExportPptFile</a>	Export a PowerPoint file to an image sequence.
<a href="#">ExportSlide</a>	Export a slide as an image.
<a href="#">ExportSlides</a>	Export a range of slides as image files.
<a href="#">GetActivePres</a>	Return the active presentation of an application.
<a href="#">GetCommentKeyValue</a>	Return the value of a key stored in a comment.
<a href="#">GetComments</a>	Get the comment texts of a slide as a Tcl list.
<a href="#">GetCustomLayoutId</a>	Get a custom layout by its index or name.
<a href="#">GetCustomLayoutName</a>	Return the name of a custom layout.
<a href="#">GetEnum</a>	Get numeric value of an enumeration.
<a href="#">GetEnumName</a>	Get name of a given enumeration type and numeric value.
<a href="#">GetEnumNames</a>	Get names of a given enumeration type.
<a href="#">GetEnumTypes</a>	Get available enumeration types.
<a href="#">GetEnumVal</a>	Get numeric value of an enumeration name.
<a href="#">GetExtString</a>	Return the default extension of a PowerPoint file.
<a href="#">GetNumComments</a>	Return the number of comments of a slide.
<a href="#">GetNumCustomLayouts</a>	Return the number of custom layouts of a presentation.
<a href="#">GetNumSites</a>	Return the number of sites of a shape.
<a href="#">GetNumSlides</a>	Return the number of slides of a presentation.
<a href="#">GetNumSlideShows</a>	Return the number of slide shows of a presentation.
<a href="#">GetSlideId</a>	Get slide identifier from slide index.
<a href="#">GetSlideIndex</a>	Return the index of a slide.
<a href="#">GetTemplateExtString</a>	Return the default extension of a PowerPoint template file.
<a href="#">GetVersion</a>	Return the version of a PowerPoint application.
<a href="#">GetViewType</a>	Return the view type of a presentation.
<a href="#">InsertImage</a>	Insert an image into a slide.
<a href="#">MoveSlide</a>	Move a slide to another position.
<a href="#">Open</a>	Open a PowerPoint instance. Use an already running instance, if available.
<a href="#">OpenNew</a>	Open a new PowerPoint instance.
<a href="#">OpenPres</a>	Open a presentation, i.e. load a PowerPoint file.
<a href="#">Quit</a>	Quit a PowerPoint instance.
<a href="#">SaveAs</a>	Save a presentation to a PowerPoint file.
<a href="#">SetHyperlinkToSlide</a>	Create a hyperlink from a shape to a slide.

<a href="#">SetPresPageSetup</a>	Set the page size of a presentation.
<a href="#">SetTextboxFontSize</a>	Set the font size of the text in a text box.
<a href="#">SetViewType</a>	Set the view type of a presentation.
<a href="#">ShowSlide</a>	Show a specific slide.
<a href="#">SlideShowFirst</a>	Go to first slide in slide show.
<a href="#">SlideShowLast</a>	Go to last slide in slide show.
<a href="#">SlideShowNext</a>	Go to next slide in slide show.
<a href="#">SlideShowPrev</a>	Go to previous slide in slide show.
<a href="#">UseSlideShow</a>	Use specified slide show.
<a href="#">Visible</a>	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`.

Procedure	Short description
<a href="#">Open</a>	Open an Acrobat Reader instance. Use an already running instance, if available.
<a href="#">OpenNew</a>	Open a new Acrobat Reader instance.
<a href="#">Quit</a>	Quit all Acrobat Reader instances.
<a href="#">SetReaderProg</a>	Set the path to Acrobat Reader program.

Table 11: CawtReader Reference

## 2.12 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	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
<a href="#">AddBookmark</a>	Add a bookmark to a text range.
<a href="#">AddContentControl</a>	Add a content control to a text range.
<a href="#">AddDocument</a>	Add a new empty document to a Word instance.
<a href="#">AddImageTable</a>	Add a new table and fill the cells with images.
<a href="#">AddPageBreak</a>	Add a page break to a text range.
<a href="#">AddParagraph</a>	Add a new paragraph to a document.
<a href="#">AddRow</a>	Add one or more rows to a table.
<a href="#">AddTable</a>	Add a new table in a text range.
<a href="#">AddText</a>	Add text to a Word document.
<a href="#">AppendParagraph</a>	Append a paragraph at the end of the document.
<a href="#">AppendText</a>	Append text to a Word document.
<a href="#">Close</a>	Close a document without saving changes.
<a href="#">ConfigureCaption</a>	Configure style of a caption type identified by its label identifier.
<a href="#">CountWords</a>	Count words contained in a Word document.
<a href="#">CreateRange</a>	Create a new text range.
<a href="#">CreateRangeAfter</a>	Create a new text range after specified range.
<a href="#">CropImage</a>	Crop an image at the four borders.
<a href="#">DeleteRow</a>	Delete a row of a table.
<a href="#">DiffWordFiles</a>	Compare two Word files visually.
<a href="#">ExtendRange</a>	Extend the range indices of a text range.
<a href="#">FindString</a>	Find a string in a text range or a document.
<a href="#">FormatHeaderRow</a>	Format a row as a header row.
<a href="#">GetBookmarkName</a>	Get the name of a bookmark.
<a href="#">GetCellRange</a>	Return a cell of a Word table as a range.
<a href="#">GetCellValue</a>	Return the value of a Word table cell.
<a href="#">GetColumnRange</a>	Return a column of a Word table as a selection.
<a href="#">GetColumnValues</a>	Return column values of a Word table as a Tcl list.
<a href="#">GetCompatibilityMode</a>	Return the compatibility version of a Word application.
<a href="#">GetDocumentId</a>	Get the document identifier of a Word component.
<a href="#">GetDocumentIdByIndex</a>	Find a document by its index.
<a href="#">GetDocumentName</a>	Get the name of a document.
<a href="#">GetEndRange</a>	Return the text range representing the end of the document.
<a href="#">GetEnum</a>	Get numeric value of an enumeration.
<a href="#">GetEnumName</a>	Get name of a given enumeration type and numeric value.
<a href="#">GetEnumNames</a>	Get names of a given enumeration type.
<a href="#">GetEnumTypes</a>	Get available enumeration types.
<a href="#">GetEnumVal</a>	Get numeric value of an enumeration name.
<a href="#">GetExtString</a>	Return the default extension of a Word file.
<a href="#">GetImageId</a>	Find an image by its index or name.
<a href="#">GetImageName</a>	Return the name of an image.
<a href="#">GetListGalleryId</a>	Get one of the 3 predefined list galleries.
<a href="#">GetListTemplateId</a>	Get one of the 7 predefined list templates.
<a href="#">GetMatrixValues</a>	Return table values as a matrix.



<a href="#">GetNumCharacters</a>	Return the number of characters in a Word document.
<a href="#">GetNumColumns</a>	Return the number of columns of a Word table.
<a href="#">GetNumDocuments</a>	Return the number of documents in a Word application.
<a href="#">GetNumImages</a>	Return the number of images of a Word document.
<a href="#">GetNumRows</a>	Return the number of rows of a Word table.
<a href="#">GetNumTables</a>	Return the number of tables of a Word document.
<a href="#">GetRangeEndIndex</a>	Return the end index of a text range.
<a href="#">GetRangeInformation</a>	Get information about a text range.
<a href="#">GetRangeStartIndex</a>	Return the start index of a text range.
<a href="#">GetRowRange</a>	Return a row of a Word table as a range.
<a href="#">GetRowValues</a>	Return row values of a Word table as a Tcl list.
<a href="#">GetSelectionRange</a>	Return the text range representing the current selection.
<a href="#">GetStartRange</a>	Return a text range representing the start of the document.
<a href="#">GetTableIdByIndex</a>	Find a table by its index.
<a href="#">GetVersion</a>	Return the version of a Word application.
<a href="#">InsertCaption</a>	Insert a caption into a range of a document.
<a href="#">InsertFile</a>	Insert a file into a Word document.
<a href="#">InsertImage</a>	Insert an image into a range of a document.
<a href="#">InsertList</a>	Insert a Word list.
<a href="#">InsertText</a>	Insert text in a Word document.
<a href="#">IsValidCell</a>	Check, if a Word table cell is valid.
<a href="#">Open</a>	Open a Word instance. Use an already running instance, if available.
<a href="#">OpenDocument</a>	Open a document, i.e. load a Word file.
<a href="#">OpenNew</a>	Open a new Word instance.
<a href="#">PrintRange</a>	Print the indices of a text range.
<a href="#">Quit</a>	Quit a Word instance.
<a href="#">ReplaceByProc</a>	Replace a string in a text range. Procedural case.
<a href="#">ReplaceImage</a>	Replace an existing image.
<a href="#">ReplaceString</a>	Replace a string in a text range or a document. Simple case.
<a href="#">SaveAs</a>	Save a document to a Word file.
<a href="#">SaveAsPdf</a>	Save a document to a PDF file.
<a href="#">ScaleImage</a>	Scale an image.
<a href="#">Search</a>	Search or replace a string in a text range or a document. Generic case.
<a href="#">SelectRange</a>	Select a text range.
<a href="#">SetCellValue</a>	Set the value of a Word table cell.
<a href="#">SetColumnsWidth</a>	Set the width of a range of table columns.
<a href="#">SetColumnValues</a>	Insert column values into a Word table.
<a href="#">SetColumnWidth</a>	Set the width of a table column.
<a href="#">SetCompatibilityMode</a>	Set the compatibility mode of a document.
<a href="#">SetContentControlDropdown</a>	N/A
<a href="#">SetContentControlText</a>	N/A
<a href="#">SetHeaderRow</a>	Insert row values into a Word table and format as a header row.
<a href="#">SetHyperlink</a>	Insert an external hyperlink into a Word document.
<a href="#">SetHyperlinkToFile</a>	Insert a hyperlink to a file into a Word document.
<a href="#">SetImageName</a>	Set the name of an image.
<a href="#">SetInternalHyperlink</a>	Insert an internal hyperlink into a Word document.
<a href="#">SetLinkToBookmark</a>	Insert an internal link to a bookmark into a Word document.
<a href="#">SetMatrixValues</a>	Insert matrix values into a Word table.
<a href="#">SetRangeBackgroundColor</a>	Set the background color of a table cell range.

<a href="#">SetRangeBackgroundColorByEnum</a>	Set the background color of a table cell range.
<a href="#">SetRangeEndIndex</a>	Set the end index of a text range.
<a href="#">SetRangeFontBackgroundColor</a>	Set the background color of a text range.
<a href="#">SetRangeFontBold</a>	Toggle the bold font style of a text range.
<a href="#">SetRangeFontItalic</a>	Toggle the italic font style of a text range.
<a href="#">SetRangeFontName</a>	Set the font name of a text range.
<a href="#">SetRangeFontSize</a>	Set the font size of a text range.
<a href="#">SetRangeFontUnderline</a>	Toggle the underline font style of a text range.
<a href="#">SetRangeHighlightColorByEnum</a>	Set the highlight color of a text range.
<a href="#">SetRangeHorizontalAlignment</a>	Set the horizontal alignment of a text range.
<a href="#">SetRangeMergeCells</a>	Merge a range of cells.
<a href="#">SetRangeStartIndex</a>	Set the start index of a text range.
<a href="#">SetRangeStyle</a>	Set the style of a text range.
<a href="#">SetRowValues</a>	Insert row values from a Tcl list.
<a href="#">SetTableBorderLineStyle</a>	Set the border line styles of a Word table.
<a href="#">SetTableBorderLineWidth</a>	Set the border line widths of a Word table.
<a href="#">ToggleSpellCheck</a>	Toggle checking of grammatical and spelling errors.
<a href="#">TrimString</a>	Trim a string.
<a href="#">UpdateFields</a>	Update all fields as well as tables of content and figures of a document.
<a href="#">Visible</a>	Toggle the visibility of a Word application window.

**Table 12: 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, Outlook, PowerPoint and Word.

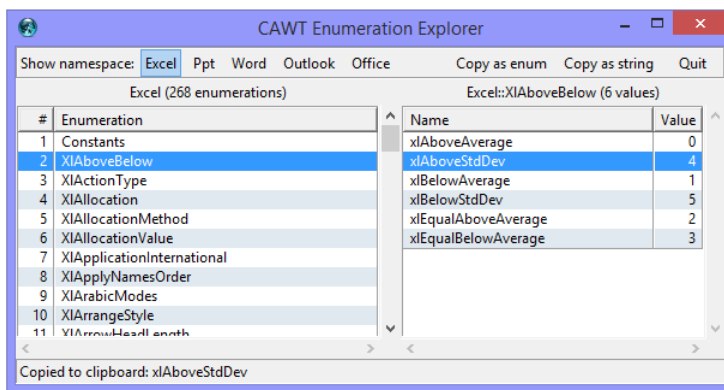


Figure 10: Screenshot of EnumExplorer.tcl

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 Office
```

```
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
```

### 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
```

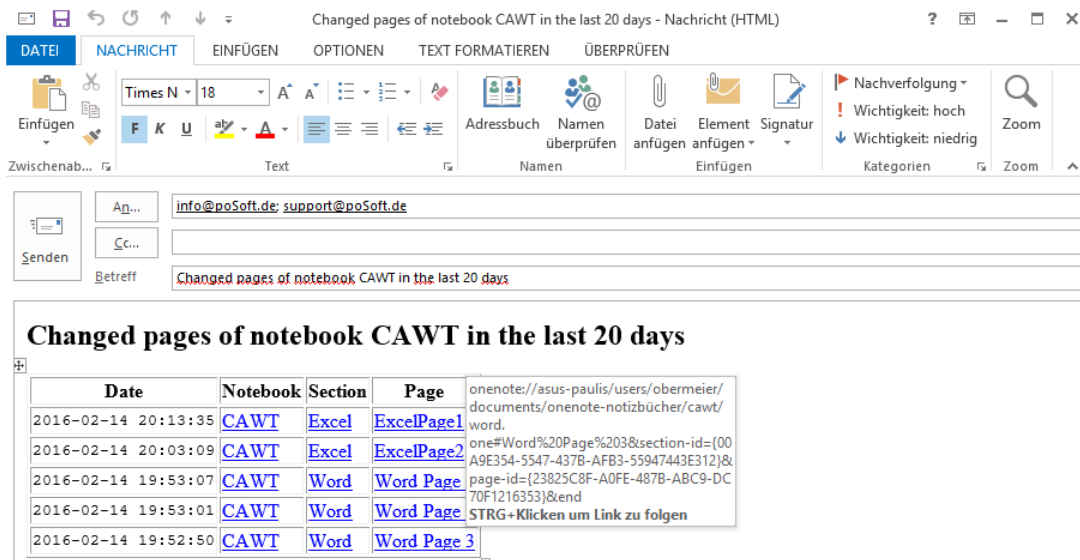


Figure 11: Auto-generated Outlook mail from OneNoteInfo.tcl

## 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.

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

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

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

```
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.
--csv            : Write result data in CSV format.
                   Default: Space seperated.
--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.
```

## 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 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-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-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.
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.
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.
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 info@poSoft.de.
Outlook-03_Holiday.tcl	Test 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.
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.
Reader-01_Basic.tcl	Test basic functionality of the CawtReader 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-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. 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.
Word-11_Tables.tcl	Test CawtWord procedures related to Word table management.

**Table 13: 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, 2016
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
CawtOneNote	Windows 7, Windows 8	2010, 2013, 2016
CawtOutlook	Windows 7, Windows 8	2010, 2013, 2016
CawtPpt	Windows XP, Windows 7, Windows 8	2003, 2007, 2010, 2013, 2016
CawtReader	Windows 7, Windows 8	DC
CawtWord	Windows XP, Windows 7, Windows 8	2003, 2007, 2010, 2013, 2016

(\*) 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: Excel Ppt Word Outlook OneNote Ocr Reader 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 common Office enumerations (*officeConst.tcl*) as well as 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 2016. 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

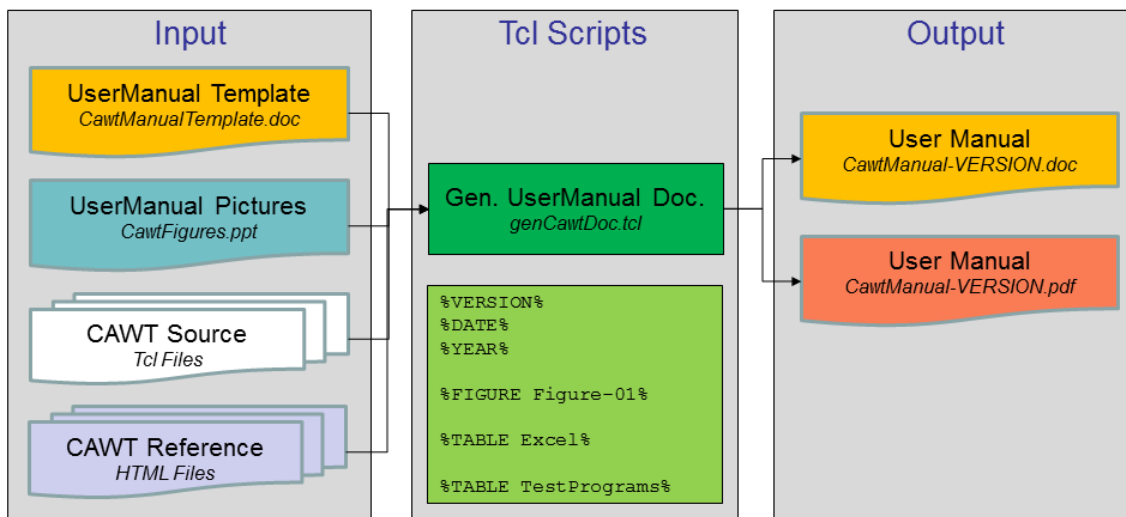
The CAWT documentation comes in 2 parts, the user manual (this document) and a reference manual.

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 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 it's predecessors **TcomOffice** and **TcomExcel**.

Version	Date	Release notes
<b>TcomExcel</b>		
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.
<b>TcomOffice</b>		
0.4.0	2011-07-17	New module TcomWord for Word automation.
0.4.1	2011-08-28	Extended functionality.
<b>CAWT</b>		
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"> <li>Clipboard2Img, Img2Clipboard</li> </ul> New procedures in CawtExcel: <ul style="list-style-type: none"> <li>SetRangeBorder</li> </ul>
1.0.3	2013-08-30	New procedures in CawtExcel: <ul style="list-style-type: none"> <li>ExcelFileToMediaWikiFile, ExcelFileToWikiFile</li> <li>ExcelFileToRawImageFile, RawImageFileToExcelFile</li> <li>ExcelFileToMatlabFile, MatlabFileToExcelFile</li> <li>GetTablelistValues, SetTablelistValues</li> </ul>
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"> <li>SaveAsPdf</li> <li>UpdateFields</li> <li>CropImage.</li> </ul> New procedures in CawtExcel: <ul style="list-style-type: none"> <li>CopyWorksheetBefore, CopyWorksheetAfter</li> <li>GetWorksheetIndexByName</li> <li>IsWorksheetProtected, IsWorksheetVisible</li> <li>SetWorksheetTabColor</li> <li>UnhideWorksheet</li> </ul>

		<ul style="list-style-type: none"> <li>DiffExcelFiles</li> </ul>
1.0.5	2014-01-26	<p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> <li>SetCommentDisplayMode, SetRangeComment</li> <li>SetRangeMergeCells, GetRangeCharacters</li> <li>SetRangeFontSubscript, SetRangeFontSuperscript</li> </ul>
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"> <li>GetWorksheetAsMatrix</li> <li>GetMaxRows, GetMaxColumns</li> <li>GetFirstUsedRow, GetLastUsedRow</li> <li>GetFirstUsedColumn, GetLastUsedColumn</li> </ul>
1.0.7	2014-06-14	<p>Updated Twapi version to official 4.0.61.  CawtExcel:</p> <ul style="list-style-type: none"> <li>Added support for reading and writing CSV files with multi-line cells.</li> </ul> <p>CawtPpt:</p> <ul style="list-style-type: none"> <li>Extended CopySlide to copy slides between presentations.</li> <li>Extended AddPres with optional parameter for template file.</li> <li>Extended AddSlide to supply a custom layout object as type parameter.</li> </ul> <p>Extended test suite for changed and new procedures.  New procedures in CawtCore:</p> <ul style="list-style-type: none"> <li>ColorToRgb</li> </ul> <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> <li>UseImgTransparency, WorksheetToImg, ImgToWorksheet</li> <li>SetRowHeight, SetRowsHeight</li> <li>GetRangeFillColor</li> <li>SetHyperlinkToFile, SetHyperlinkToCell, SetLinkToCell</li> <li>SetRangeTooltip</li> </ul> <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> <li>MoveSlide,</li> <li>GetTemplateExtString</li> <li>GetNumCustomLayouts</li> <li>GetCustomLayoutName, GetCustomLayoutId</li> </ul>
1.1.0	2014-08-30	<p>Compatibility issue:</p> <ul style="list-style-type: none"> <li>Incompatible changes in module CawtWord.</li> <li>Unified signatures of AddText, AppendText and AddParagraph, AppendParagraph.</li> <li>Changed handling of text ranges.</li> </ul> <p>New module CawtOutlook to control Microsoft Outlook applications:</p> <ul style="list-style-type: none"> <li>Currently only functionality for creating and sending mails is implemented.</li> </ul> <p>Extended test suite for changed and new procedures.  New procedures in CawtExcel:</p> <ul style="list-style-type: none"> <li>FreezePanels, ScreenUpdate</li> </ul> <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> <li>SelectRange, GetRangeInformation, CreateRange</li> <li>SetRangeFontName, SetRangeStyle, SetRangeFontSize</li> <li>InsertText, AddText, GetNumCharacters</li> </ul>



		<ul style="list-style-type: none"> <li>• AddPageBreak, ToggleSpellCheck</li> </ul>
1.2.0	2014-12-14	<p>Compatibility issue:</p> <ul style="list-style-type: none"> <li>• Incompatible changes in module CawtWord. Removed parameter docId from all procedures, which had both docId and rangeId parameters:</li> <li>• SetRangeStartIndex, SetRangeEndIndex, ExtendRange,</li> <li>• AddText, SetHyperlink, AddTable.</li> </ul> <p>CawtExcel:</p> <ul style="list-style-type: none"> <li>• Added optional startRow parameter to TablelistToWorksheet.</li> </ul> <p>Extended test suite for changed and new procedures.</p> <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> <li>• GetDocumentId</li> <li>• SetRangeFontUnderline, CreateRangeAfter</li> <li>• InsertCaption, ConfigureCaption</li> <li>• AddBookmark, GetBookmarkName, SetLinkToBookmark</li> <li>• GetListGalleryId, GetListTemplateId, InsertList</li> </ul>
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"> <li>• Updated Twapi to version 4.1.27.</li> <li>• Updated Img (32 and 64 bit) to version 1.4.3.</li> <li>• Updated Tablelist to version 5.13.</li> </ul> <p>CawtExcel:</p> <ul style="list-style-type: none"> <li>• New implementation of InsertImage based on Shapes.AddPicture instead of Pictures.Insert</li> </ul> <p>CawtWord:</p> <ul style="list-style-type: none"> <li>• Extended procedure UpdateFields to additionally update TablesOfContents and TablesOfFigures of a document.</li> </ul> <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> <li>• GetApplicationVersion, IsApplicationId</li> <li>• PushComObjects, PopComObjects</li> <li>• PrintNumComObjects, CheckComObjects</li> <li>• GetComObjects, GetNumComObjects</li> <li>• Replaced procedure IsValidId with IsComObject</li> </ul> <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> <li>• GetRangeAsIndex, GetRangeAsString, GetRangeTextColor</li> </ul> <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> <li>• ScaleImage, SetInternalHyperlink, InsertFile, DiffWordFile</li> </ul>
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"> <li>• Take hidden flag of both Excel and tablelist columns into account in procedures TablelistToWorksheet and WorksheetToTablelist.</li> <li>• Fixed SetCellValue and SetRangeFormat using new</li> </ul>

		<p>TclString procedure.</p> <p>CawtPpt:</p> <ul style="list-style-type: none"> <li>Extended functionality of ExportPptFile and ExportSlides to take into account slide comments regarding export file names.</li> </ul> <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> <li>TclString</li> </ul> <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> <li>DeleteColumn, DeleteRow</li> <li>HideColumn, GetHiddenColumns</li> <li>GetDecimalSeparator (replacing GetFloatSeparator)</li> <li>GetThousandsSeparator</li> <li>GetNumberFormat (replacing GetLangNumberFormat)</li> </ul> <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> <li>AddTextbox, AddTextboxText, SetTextboxFontSize</li> <li>GetNumComments, GetComments, GetCommentKeyValue</li> </ul> <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> <li>AddContentControl</li> <li>SetContentControlDropdown, SetContentControlText</li> <li>GetDocumentProperties, GetDocumentProperty</li> <li>SetDocumentProperty.</li> </ul>
2.1.1	2015-10-31	<p>Support for Office 2016.</p> <p>External packages:</p> <ul style="list-style-type: none"> <li>Updated Tablelist to version 5.14.</li> </ul>
2.1.2	2015-11-10	<p>Extended support for Excel page setup.</p> <p>Changed all Office procedures with size parameters to accept inches, centimeters or points.</p> <p>CawtExcel:</p> <ul style="list-style-type: none"> <li>Corrected SetWorksheetFitToPages to accept zero as values for wide and tall parameters. Zero indicates automatic determination of number of pages.</li> </ul> <p>New procedures in CawtCore:</p> <ul style="list-style-type: none"> <li>SetPrinterCommunication,</li> <li>ValueToPoints, PointsToCentiMeters, PointsToInches.</li> </ul> <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> <li>SetWorksheetPrintOptions, SetWorksheetPaperSize,</li> <li>SetWorksheetMargins, SetWorksheetFooter,</li> <li>SetWorksheetHeader.</li> </ul>
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"> <li>AddWorksheet now adds the new sheet at the end, as was already written in the documentation. Previous behaviour was to insert before active worksheet.</li> </ul> <p>New module CawtOffice:</p> <ul style="list-style-type: none"> <li>Moved basic Office procedures into namespace Office.</li> <li>Added aliases in namespace Cawt for backwards compatibility.</li> <li>Added new enumeration constants file for basic Office types based on type library in mso.dll.</li> </ul> <p>CawtCore:</p> <ul style="list-style-type: none"> <li>Colors can now be specified in hex notation, Tcl color names, RGB or as Office color numbers.</li> </ul>

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

		<ul style="list-style-type: none"> <li>• CheckBoolean</li> </ul> <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> <li>• GetCellComment</li> </ul> <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> <li>• Search SetRangeFontBackgroundColor</li> </ul> <p>External packages:</p> <ul style="list-style-type: none"> <li>• Updated Img (32 and 64 bit) to version 1.4.6.</li> <li>• Updated Tablelist to version 5.16.</li> </ul>
2.4.0	2017-06-18	<p>New module CawtReader.</p> <p>Compatibility issue:</p> <ul style="list-style-type: none"> <li>• Excel::ExcelFileToHtmlFile has changed signature.</li> <li>• Now uses parameter args for extended options.</li> </ul> <p>CawtReader:</p> <ul style="list-style-type: none"> <li>• Added basic functionality for Acrobat Reader (not via COM).</li> </ul> <p>CawtExcel:</p> <ul style="list-style-type: none"> <li>• Extended module excelHtml to convert Excel hyperlinks.</li> </ul> <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> <li>• IsValidCell</li> </ul> <p>External packages:</p> <ul style="list-style-type: none"> <li>• Updated Tablelist to version 5.17.</li> <li>• Updated Twapi to version 4.2a5.</li> </ul>
2.4.1	2017-12-30	<p>Enhanced functionality in Outlook module.</p> <p>CawtOutlook:</p> <ul style="list-style-type: none"> <li>• Added handling of appointments, calendars and categories.</li> <li>• Added ability to read and apply Outlook holiday files.</li> </ul> <p>CawtExcel:</p> <ul style="list-style-type: none"> <li>• Added ability to save CSV files in UTF-8 format.</li> </ul> <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> <li>• CreateRangeString, SetChartTicks</li> </ul> <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> <li>• AddImageTable, GetImageId, GetImageName,</li> <li>• GetNumImages, ReplaceImage, SetImageName,</li> <li>• CountWords</li> </ul> <p>External packages:</p> <ul style="list-style-type: none"> <li>• Updated Tablelist to version 6.0.</li> <li>• Updated Twapi to version 4.2.12.</li> <li>• Updated tDOM to version 0.9.0.</li> <li>• Updated Img to version 1.4.7.</li> </ul>
2.4.2	2018-04-26	<p>Enhanced functionality in several modules.</p> <p>CawtPpt:</p> <ul style="list-style-type: none"> <li>• Added new configure options for shapes: -beginsite, -</li> </ul>

		<p>endsite</p> <ul style="list-style-type: none"> <li>Added new configure option for connectors: -weight</li> </ul> <p>CawtWord:</p> <ul style="list-style-type: none"> <li>Corrected procedure SetDocumentProperty.</li> </ul> <p>New procedures in CawtExcel:</p> <ul style="list-style-type: none"> <li>Import, CopyColumn, SetChartSourceByIndex,</li> <li>SetChartTitle, GetChartNumSeries, GetChartSeries,</li> <li>SetSeriesLineWidth</li> </ul> <p>New procedures in CawtPpt:</p> <ul style="list-style-type: none"> <li>SetPresPageSetup, SetHyperlinkToSlide, GetNumSlides</li> </ul> <p>New procedures in CawtWord:</p> <ul style="list-style-type: none"> <li>DeleteRow, SetRangeMergeCells</li> </ul>
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