

# BAWT - Build Automation With Tcl

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# 1 Introduction

This document describes **BAWT** version 3.3.0.

**BAWT** is a configurable framework written in **Tcl** for building **C/C++** based software libraries from source code without user interaction. Its main usage is for the **Windows** operating system, where heterogeneous build environments and compilers are needed (or wanted) to build these libraries:

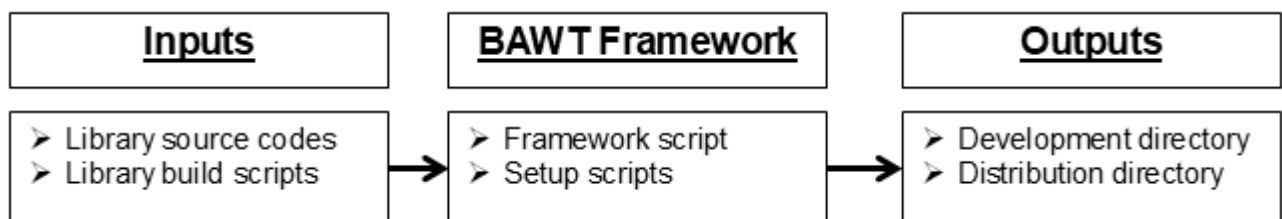
- `configure/make` (via MSYS / MinGW)
- `nmake`
- `CMake`
- Visual Studio Solutions
- `gcc` (via MSYS / MinGW)
- Visual Studio

Due to the portable nature of **Tcl** the framework can be used on **Linux**, **Darwin**, **SunOS** and **IRIX** as well using the `configure/make/gcc` build chain.

The libraries currently supported by **BAWT** are mainly from the **Tcl** and **OpenSceneGraph** domain. For these two domains the framework supports creating Windows installation executables based on **InnoSetup** and simple shell-based installation programs for Unix. Version 3.2.0 introduced creation of DEB (Linux) and DMG (Darwin) installation files.

See chapter [8 Supported Libraries](#) for a list of currently supported libraries.

The framework itself is just one plain Tcl file *Bawt.tcl*, which reads a *Setup* file containing all the libraries to be built. Each library must have an accompanying *Build* file, which contains the details on how to extract, configure, compile and distribute the library. The library itself is stored as one or more zipped source code files, which may contain different versions of the library. The generated shared or static libraries, programs and header files are finally copied into ready-to-use directory structures for use by developers or for software distribution.



The **BAWT** framework (including *Bootstrap* and *Setup* files) as well as the needed MSYS/MinGW files (if running on Windows) must be downloaded manually. You do not need to have Tcl installed to execute the framework. **BAWT** comes with `Tclkits` (single-file Tcl interpreter) for Windows, Linux, Darwin, SunOS (Solaris / OpenIndiana) and IRIX.

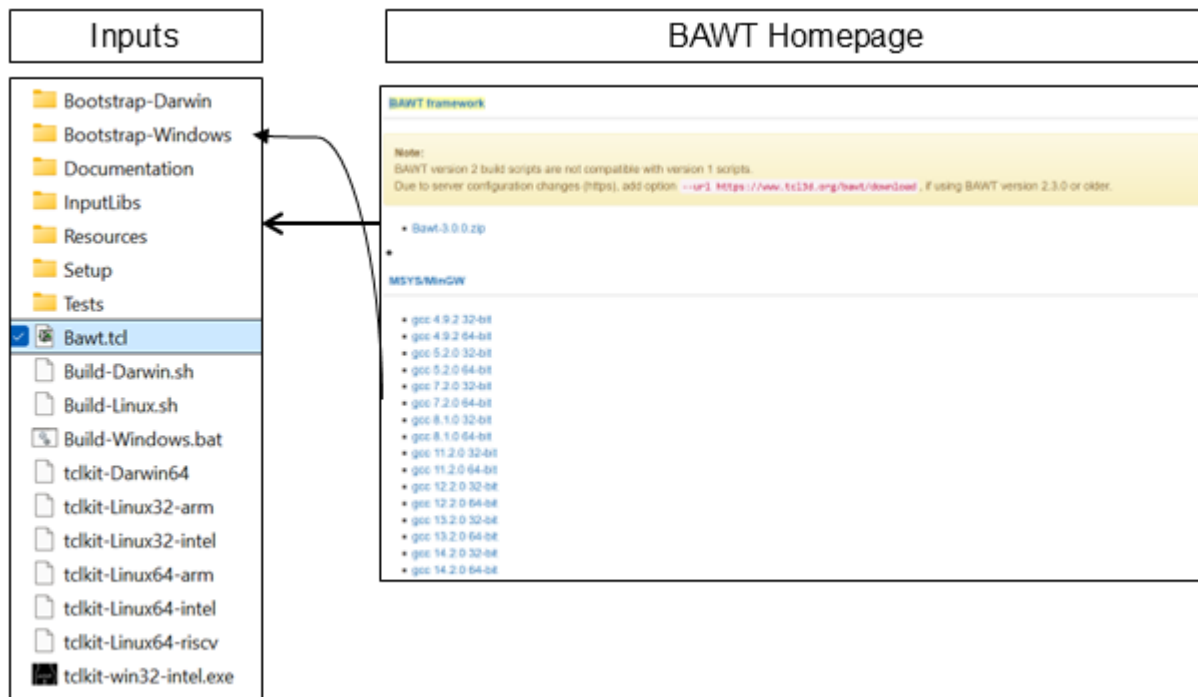
The library *Build* and source files can be downloaded automatically on demand.

The **BAWT** homepage is at <https://www.tcl3d.org/bawt>.

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## 2 Installation and Usage Examples

This chapter explains the installation of the **BAWT** framework and gives first simple use cases. **BAWT** related downloads are available at <https://www.tcl3d.org/bawt/download.html>.



### 2.1 Installation on Windows

#### Prerequisites:

- None for building libraries supporting MSYS / MinGW.
- Otherwise, Visual Studio (Express, Community, Professional, Insiders).
  - Visual Studio Versions 2013, 2015, 2017, 2019, 2022 and 2026 are currently supported.
  - If Visual Studio is not installed in the standard location, you have to use procedure *SetVcvarsProg* with the absolute path to batch script *vcvarsall.bat*.

#### Downloads:

- **BAWT** framework *Bawt-3.3.0.zip*
- MSYS / MinGW distribution file(s), ex. *gcc14.2.0\_x86\_64-w64-mingw32.7z*

#### Installation:

- Extract **BAWT** framework *Bawt-3.3.0.zip* in a directory of choice, ex. *C:\Bawt*
- Copy MSYS / MinGW distribution file(s) into *C:\Bawt\Bawt-3.3.0\Bootstrap-Windows*
- Open command shell window and go into directory *C:\Bawt\Bawt-3.3.0*

#### Usage examples:

- Create basic Tcl packages for a 32-bit Intel machine (using only MSYS / MinGW):
 

```
> Build-Windows.bat intel 32 gcc Setup\Tcl_Basic.bawt update
```
- Create basic Tcl packages for a 64-bit Intel machine (using only MSYS / MinGW):
 

```
> Build-Windows.bat intel 64 gcc Setup\Tcl_Basic.bawt update
```

- Create Tcl-Pure distribution including InnoSetup installation executable for a 64-bit Intel machine:  
> Build-Windows.bat intel 64 gcc Setup\Tcl\_MinimalDist.bawt update
- Create Tcl-BI distribution including InnoSetup installation executable for a 64-bit Intel machine (using Visual Studio 2022 to build Tcl and Tk stubs libraries):  
> Build-Windows.bat intel 64 gcc+vs2022 Setup\Tcl\_Distribution.bawt update
- Run the test suite of Tcl and Tk:  
> Build-Windows.bat intel 64 gcc Setup\Tcl\_MinimalDist.bawt test Tcl Tk

*MSYS/MinGW gcc 14.2.0 is set as default (use option --gccversion to change).*

*It is not recommended to use gcc 4.9.2 and 5.2.0 anymore.*

## 2.2 Installation on Linux

### **Prerequisites:**

- Required: C/C++ development package, curl, p7zip
- Optional: Dependent on the libraries. See below for distribution specific examples.

### **Downloads:**

- **BAWT** framework *Bawt-3.3.0.zip*

### **Installation:**

- Extract **BAWT** framework *Bawt-3.3.0.zip* in a directory of choice, ex. *~/Bawt*
- Open shell (Terminal window), go into created directory *~/Bawt Bawt-3.3.0* and execute:

```
> chmod u+x Build*.sh
> chmod u+x tclkit*
```

### **Usage examples:**

- Create basic Tcl packages for a 64-bit Intel machine:  
> ./Build-Linux.sh intel 64 Setup/Tcl\_Basic.bawt update
- Create Tcl-Pure distribution including simple shell-based installation script for a 64-bit Risc-V machine:  
> ./Build-Linux.sh riscv 64 Setup/Tcl\_MinimalDist.bawt update
- Create Tcl-BI distribution including simple shell-based installation script for a 64-bit ARM machine:  
> ./Build-Linux.sh arm 64 Setup/Tcl\_Distribution.bawt update
- Run the test suite of Tcl and Tk:  
> ./Build-Linux.sh arm 64 gcc Setup/Tcl\_MinimalDist.bawt test Tcl Tk

*If compiling Tcl3DFull on slow machines like Raspberry or Risc-V, you should add the following BAWT options:*

```
--osgversion 3.4.1 --libjobs tcl3dFull 1 --copt tcl3dFull OptOsg=OFF
```

### Distribution specific prerequisites:

See chapter [3.2 Setup Files](#) for a list of available Setup files and the dependencies between Setup files. If you want to build ex. *Tcl\_Extended.bawt*, you must not only install the prerequisites of this Setup file, but also the prerequisites of the dependent Setup file *Tcl\_Basic.bawt*.

#### Debian 12.0 Bookworm (gcc 12.2.0)

- Install default Debian 12.0 desktop distribution (ex. *debian-12.0.0-amd64-DVD-1.iso*)
- Use ex. *Synaptic* to install further packages:

| Setup file        | Debian package     | Needed by library          |
|-------------------|--------------------|----------------------------|
| All               | build-essential    | All C/C++ based libraries. |
|                   | curl               | BAWT framework.            |
|                   | p7zip              |                            |
|                   | zip                |                            |
| Tcl_Basic.bawt    | libx11-dev         | Tk                         |
|                   | libxft-dev         | Tk (anti-aliased fonts)    |
|                   | libcups2-dev       | Tk (printing)              |
|                   | libcairo2-dev      | tkpath                     |
|                   | libglx-dev         | Canvas3d                   |
|                   | libglu1-mesa-dev   |                            |
|                   | libasound2-dev     | Snack                      |
| Tcl_Extended.bawt | libxrandr-dev      | tcl3dBasic                 |
|                   | libpython3.11-dev  | tclpy                      |
|                   | python3-numpy      |                            |
|                   | libxcursor-dev     | tkdnd                      |
|                   | libudev-dev        | tcluvc                     |
|                   | libjpeg*-turbo-dev | tcluvc libgd               |
| Tcl3D.bawt        | libxi-dev          | glfw                       |
|                   | libxinerama-dev    |                            |
| OSG_Extended.bawt | freeglut3-dev      | Cal3D                      |

#### Raspberry Pi OS (gcc 10.2.1)

- Install default Raspberry Pi OS using the Raspberry Pi Imager.
- Packages *build-essential*, *curl* and *p7zip* are part of the OS installation.
- As Raspberry Pi OS is based on Debian, install additional packages as for Debian.

#### Ubuntu 23.04 (gcc 12.2.0)

- Install default Ubuntu 23.04 desktop distribution (ex. *ubuntu-23.04-desktop-amd64.iso*)
- Use ex. *Synaptic* to install further packages:

| Setup file | Ubuntu package  | Needed by library          |
|------------|-----------------|----------------------------|
| All        | build-essential | All C/C++ based libraries. |
|            | curl            | BAWT framework.            |
|            | p7zip           |                            |
|            | zip             |                            |

|                          |                    |                         |
|--------------------------|--------------------|-------------------------|
|                          |                    |                         |
| <i>Tcl_Basic.bawt</i>    | libx11-dev         | Tk                      |
|                          | libxft-dev         | Tk (anti-aliased fonts) |
|                          | libcups2-dev       | Tk (printing)           |
|                          | libcairo2-dev      | tkpath                  |
|                          | libglx-dev         | Canvas3d                |
|                          | libglul-mesa-dev   |                         |
|                          | libasound2-dev     | Snack                   |
|                          |                    |                         |
| <i>Tcl_Extended.bawt</i> | libxrandr-dev      | tcl3dBasic              |
|                          | libpython3.11-dev  | tclpy                   |
|                          | python3-numpy      |                         |
|                          | libxcursor-dev     | tkdnd                   |
|                          | libudev-dev        | tcluvc                  |
|                          | libjpeg*-turbo-dev | tcluvc libgd            |
|                          |                    |                         |
| <i>Tcl3D.bawt</i>        | libxi-dev          | glfw                    |
|                          | libxinerama-dev    |                         |
|                          |                    |                         |
| <i>OSG_Extended.bawt</i> | freeglut3-dev      | Cal3D                   |

### SUSE 15.5 (gcc 7.5.0)

- Install default SUSE 15.5 desktop distribution (ex. *openSUSE-Leap-15.5-DVD-x86\_64-Build491.1-Media.iso*)
- Use `Yast` to install further packages:

| Setup file               | SUSE schema         | Needed by library          |
|--------------------------|---------------------|----------------------------|
| <i>All</i>               | General development | All C/C++ based libraries. |
|                          | C++ development     |                            |
|                          |                     |                            |
| Setup file               | SUSE package        | Needed by library          |
| <i>Tcl_Basic.bawt</i>    | libx11-devel        | Tk                         |
|                          | libxft-devel        | Tk (anti-aliased fonts)    |
|                          | cups-devel          | Tk (printing)              |
|                          | cairo-devel         | tkpath                     |
|                          | alsa-devel          | Snack                      |
|                          |                     |                            |
| <i>Tcl_Extended.bawt</i> | glu-devel           | tcl3dBasic                 |
|                          | libxrandr-devel     |                            |
|                          | python3-devel       | tclpy                      |
|                          | python3-numpy       |                            |
|                          | libxcursor-devel    | tkdnd                      |
|                          | systemd-devel       | tcluvc                     |
|                          | libjpeg*-devel      | tcluvc libgd               |
|                          |                     |                            |
| <i>Tcl3D.bawt</i>        | libxi-devel         | glfw                       |
|                          | libxinerama-devel   |                            |
|                          |                     |                            |
| <i>OSG_Extended.bawt</i> | freeglut-devel      | Cal3D                      |

### Fedora 38.1 (gcc 13.1.1)

- Install default Fedora 38.1 workstation distribution (ex. *Fedora-Workstation-Live-x86\_64-38-1.6.iso*)
- Use `dnf` to install further packages:

| Setup file | dnf groupinstall | Needed by library |
|------------|------------------|-------------------|
|------------|------------------|-------------------|

| All               | Development Tools      | All C/C++ based libraries. |
|-------------------|------------------------|----------------------------|
|                   | Development Libraries  |                            |
|                   | X Software Development |                            |
|                   |                        |                            |
| Setup file        | dnf install            | Needed by library          |
| Tcl_Basic.bawt    | cups-devel             | Tk (printing)              |
|                   | gcc-g++                | photoresize                |
|                   | cairo-devel            | tkpath                     |
|                   | alsa-lib-devel         | Snack                      |
|                   |                        |                            |
| Tcl_Extended.bawt | mesa-libGLU-devel      | tcl3dBasic                 |
|                   | jbigkit-devel          | openjpeg                   |
|                   | liblerc-devel          |                            |
|                   | libudev-devel          | tcluvc                     |
|                   |                        |                            |
| Tcl3D.bawt        | libXinerama-devel      | glfw                       |
|                   |                        |                            |
| OSG_Extended.bawt | freeglut-devel         | Cal3D                      |

## 2.3 Installation on Darwin

### Prerequisites:

- XCode
- curl (should be available by default on Darwin)

### Downloads:

- **BAWT** framework *Bawt-3.3.0.zip*

### Installation:

- Extract **BAWT** framework *Bawt-3.3.0.zip* in a directory of choice, ex. *~/Bawt*
- Open shell (Terminal window), go into created directory *~/Bawt Bawt-3.3.0* and execute:

```
> chmod u+x Build*.sh
> chmod u+x tclkit*
```

### Usage examples:

Note, that Darwin only supports 64-bit programs.

- Create basic Tcl packages as universal binaries:

```
> ./Build-Darwin.sh universal Setup/Tcl_Basic.bawt update
```
- Create Tcl-BI distribution including simple shell-based installation script as native binaries:

```
> ./Build-Darwin.sh native Setup/Tcl_Distribution.bawt update
```
- Run the test suite of Tcl and Tk:

```
> ./Build-Darwin.sh native Setup/Tcl_MinimalDist.bawt test Tcl Tk
```

*Usage of homebrew or other package managers may conflict with BAWT library versions. Either disable the building of conflicting libraries (if not needed) or rename the homebrew directory name before BAWT builds.*



## 2.4 Installation on SunOS

### Prerequisites:

- Required: C/C++ development package (build-essential), curl, p7zip

### Downloads:

- **BAWT** framework *Bawt-3.3.0.zip*

### Installation:

- Extract **BAWT** framework *Bawt-3.3.0.zip* in a directory of choice, ex. *~/Bawt*
- Open shell (Terminal window), go into created directory *~/Bawt Bawt-3.3.0* and execute:

```
> chmod u+x Build*.sh
> chmod u+x tclkit*
```

### Usage examples:

SunOS means either Solaris11 or OpenIndiana running on x86\_64 architecture.

- Create basic Tcl packages:
 

```
> ./Build-SunOS.sh Setup/Tcl_Basic.bawt update
```
- Create Tcl-BI distribution including simple shell-based installation script:
 

```
> ./Build-SunOS.sh Setup/Tcl_Distribution.bawt update
```
- Run the test suite of Tcl and Tk:
 

```
> ./Build-SunOS.sh Setup/Tcl_MinimalDist.bawt test Tcl Tk
```

- *Creation of starpacks using tclkits does not work.*
- *Creation of starpacks using zipkits works with Tcl9.*
- *Build-SunOS.sh therefore sets the default Tcl version to Tcl9.0.4 and zipkit usage is enabled.*
- *Only Setup file *Tcl\_Basic.bawt* works with Tcl/Tk 8.6.18.*

## 2.5 Installation on IRIX

As the IRIX operating system running on Silicon Graphics (SGI) computers is not supported anymore, the installation of BAWT and prerequisites needs more actions as for current operating systems.

The necessary steps are described on the [SgiTcl](#) project site.

## 2.6 Further Steps

- To compile using Tcl/Tk 9.0.4, add option `--tclversion 9.0.4` to the batch script.
- To use zipkits instead of tclkits, add option `--zipkit` to the batch script.
- To avoid checking for online updates, add option `--noonline` to the batch script.

- To use another gcc version on Windows, add ex. `--gccversion 15.2.0` to the batch script.
- To customize build scripts, see chapter [3.3.2 User configurable build files](#).
- To add custom libraries or programs, see chapter [5.2 Developer Perspective](#).

## 2.7 Use of Batch Scripts

As the **BAWT** framework is generic and has lots of command line options (see chapter [7 Command Line Options](#)), a batch or shell script for each supported platform is included in the distribution for ease of use in the most common use cases:

- Build-Windows.bat
- Build-Linux.sh
- Build-Darwin.sh
- Build-SunOS.sh
- Build-IRIX.sh

These batch scripts have been used in the examples of the previous chapters and may serve as starting point for your own batch scripts suited exactly to your needs.

### Batch script *Build-Windows.bat*

```
@echo off
setlocal

rem Default values for some often used options.
set OUTROOTDIR=./BawtBuild
set NUMJOBS=%NUMBER_OF_PROCESSORS%

rem First 5 parameters are mandatory.
if "%1" == "" goto ERROR
if "%2" == "" goto ERROR
if "%3" == "" goto ERROR
if "%4" == "" goto ERROR
if "%5" == "" goto ERROR

set PROCESSOR=%1
set BITS=%2
set COMPILER=%3
set SETUPFILE=%4
set ACTION=%5
shift
shift
shift
shift
shift

rem If no target is given, use target "all".
if "%1"=="" goto BUILDALL

rem Loop through the rest of the parameter list for targets.
set TARGETS=
:PARAMLOOP
rem There is a trailing space in the next line. It's there for formatting.
set TARGETS=%TARGETS%1
shift
if not "%1"=="" goto PARAMLOOP
goto BUILD

:BUILDALL
```

```

if "%ACTION%"=="clean" goto WARNING
if "%ACTION%"=="complete" goto WARNING

set TARGETS=all

:BUILD

if "%BITS%"=="32" set ARCH=x86
if "%BITS%"=="64" set ARCH=x64
if "X%ARCH%"=="X" goto ERROR

if "X%TCLKIT%"=="X" set TCLKIT=tclkit-win32-intel.exe

set ACTION=--%ACTION%
set BAWTOPTS=--rootdir %OUTROOTDIR% ^
             --architecture %ARCH% ^
             --compiler %COMPILER% ^
             --numjobs %NUMJOBS% ^
             --logviewer

rem Build all libraries as listed in Setup file.
CALL %TCLKIT% Bawt.tcl %BAWTOPTS% %ACTION% %SETUPFILE% %TARGETS%

goto EOF

:WARNING
echo Warning: This may clean or rebuild everything.
echo Use "clean all" or "complete all" to allow this operation.

:ERROR
echo.
echo Usage: %0 Processor Bits Compiler SetupFile Action [Target1] [TargetN]
echo Processor      : intel
echo Bits           : 32 64
echo Compiler       : gcc vs2013 vs2015 vs2017 vs2019 vs2022 vs2026
echo                 gcc+vs20XX vs20XX+gcc
echo Actions        : list clean extract configure compile distribute
echo                 finalize complete update simulate touch test
echo Default target : all
echo.
echo Output directory: %OUTROOTDIR%
echo.
echo Specify variable TCLKIT on the command line to use a separate bootstrap program.
echo Example:
echo set TCLKIT=tclsh ^&^& Build-Windows.bat intel 64 gcc Setup\Tcl_Basic.bawt update
echo.
:EOF

```

See chapter [5.5 Advanced Batch Scripts](#) for examples of more complex batch scripts.

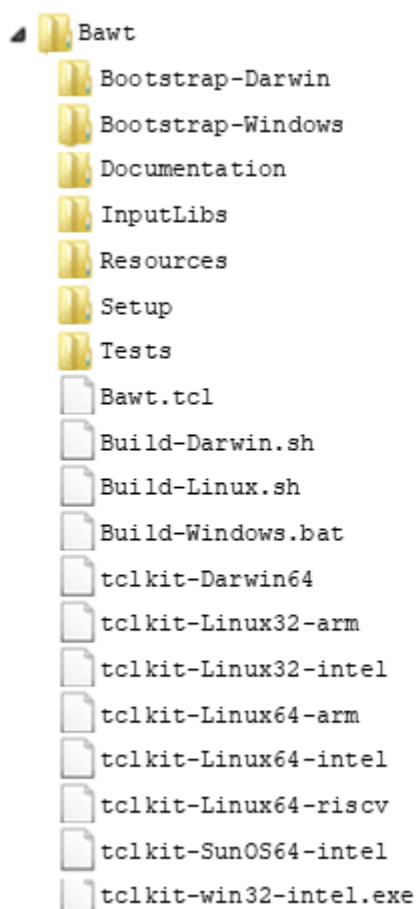
## 3 Directory and File Structure

This chapter explains the directory structure of the input and output files as well as the contents and structure of the *Setup* and *Build* files.

### 3.1 Directory Structure

#### 3.1.1 Structure of the input directories

If **BAWT** was downloaded and installed according to the instructions in chapter [2 Installation and Usage Examples](#), the following directory structure should exist.



The *Bootstrap* directories contain zipped versions of the 7-zip program for Windows, Darwin and IRIX and zipped versions of the zip program for Windows and Linux.

In directory *Bootstrap-Windows* there should be at least one version of the MSYS/MinGW distributions, which you must have downloaded manually.

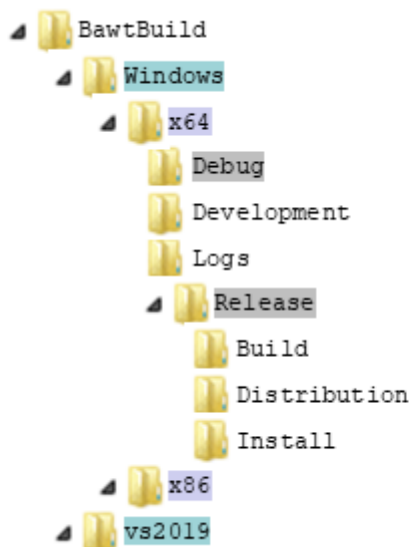
Directory *InputLibs* contains the zipped source code versions of the libraries and the associated *Build* files, see chapter [3.3 Build Files](#) for a detailed description of *Build* files. Note, that this directory is empty after a fresh installation of **BAWT**, because the corresponding files are downloaded on demand at the first start of a **BAWT** build by default. See chapter [5 Build Process](#) on how to avoid automatic downloads and updates.

The *Setup* files (see chapter [3.2 Setup Files](#)) supplied with **BAWT** are located in directory *Setup*.

Directory *Tests* contains several simple test scripts for checking correct compilation and installation of Tcl related packages.

For each supported platform there is also a Tclkit executable supplied, which is needed to run the **BAWT** framework, if no Tcl interpreter is available on your machine (Bootstrapping). A Tclkit is a single-file Tcl interpreter executable.

### 3.1.2 Structure of the output directories



The root directory of the output files of a **BAWT** build (*BawtBuild* in the above example) can be specified with command line option `--rootdir`. In a *Build* script this directory can be queried with Tcl procedure *GetOutputRootDir*.

Beneath the root build directory there can be several directories named according to the build environment used: *Windows*, *Linux*, *Darwin*, *SunOS* for builds with *gcc* or *vs2013*, *vs2015*, *vs2017*, *vs2019*, *vs2022* or *vs2026*, if a Visual Studio version was used for building.

Beneath these environment specific directories two directory names can appear, depending on the build architecture: *x86* for 32-bit or *x64* for 64-bit builds.

In these architecture specific directories 3 to 4 subdirectories are contained.

The *Logs* directory contains the overall build log file *\_BawtBuild.log* as well as the library specific build log files. See chapter 6 [Logging](#) for an in-depth explanation of **BAWT** logging functionality.

The *Development* directory contains all the files needed for a developer using the built libraries. Depending on the specified build types, directories called *Release* and *Debug* will be created. These directories contain the *Build* and *Install* subdirectories, where the actual sources are extracted and built as well as a *Distribution* subdirectory, which will contain all files needed for a software distribution of the compiled libraries.

The *Distribution* and *Development* directories contain mostly identical content. The *Development* directory typically contains additional library include files and import files (*\*.lib*). It is the task of the library specific *Build* file to copy the needed files into the *Distribution* and *Development* directories.

### 3.1.3 Directory access

The next figure shows the input and output directory hierarchy together with the procedures which can be used to get the path to the corresponding directory. The first procedure column (grey boxes) shows the names used in BAWT versions prior to 1.0, the second column (green boxes) shows the names as used by BAWT 1.0 and newer.

The last column shows the available command line options to change the location of a specific input or output directory.



The library search paths, which can be obtained with procedure *GetInputLibsDirs* are set at BAWT start-up to the following values:

- `file join [GetInputRootDir] "InputLibs"`
- `file join [pwd] "InputLibs"`

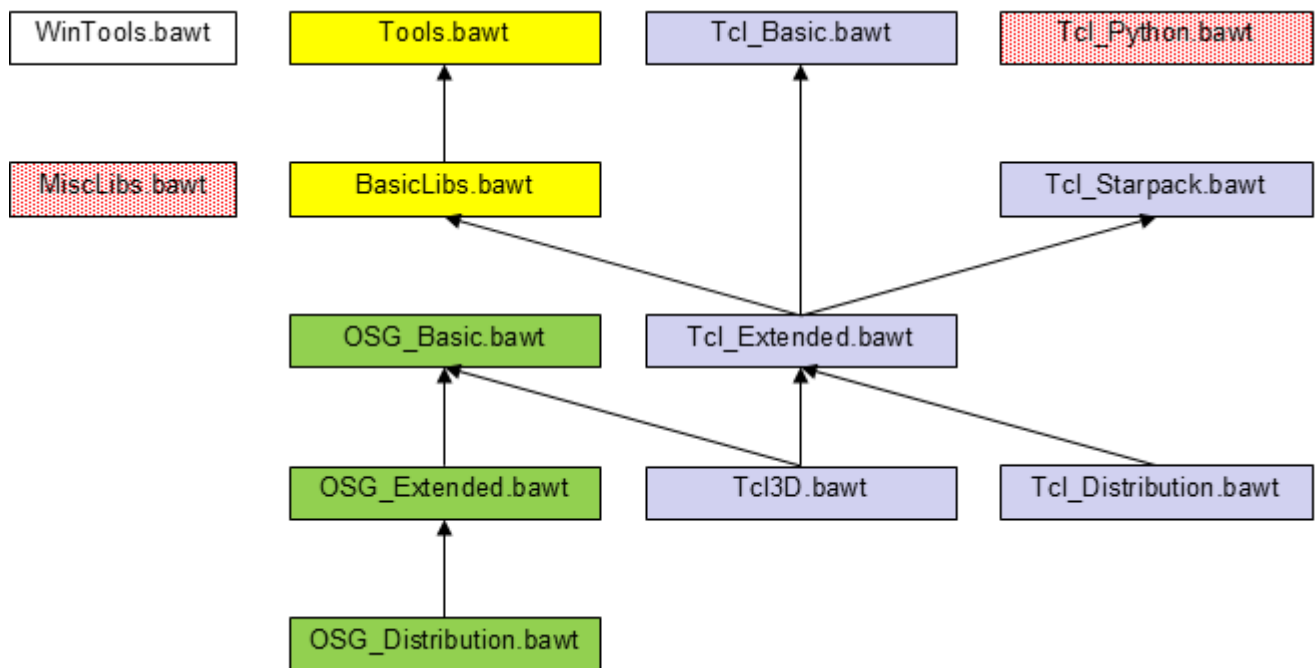
This list can be extended by using command line option [--libdir](#).

If command line option [--nosubdirs](#) is specified, procedures *GetOutputArchDir* and *GetOutputRootDir* return the same directory path.

See chapter [4 Build Stages](#) for an in-depth tour through the directory structure of **BAWT** in conjunction with the different build stages.

## 3.2 Setup Files

The following figure shows available *Setup* files and their dependencies.



For the **Tcl** ecosystem the following *Setup* files are currently supported.

|                              |                                                                                                                                                                                                                                          |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Tcl_MinimalDist.bawt</i>  | Builds Tcl, Tk and creates an InnoSetup based setup file on Windows or an installation shell script on Unix.                                                                                                                             |
| <i>Tcl_Tclkit.bawt</i>       | Builds Tcl, Tk and Tclkits.                                                                                                                                                                                                              |
| <i>Tcl_Basic.bawt</i>        | Builds Tcl, Tk, Tclkits and Tcl/Tk packages, which do not depend on 3rd party libraries. On Windows all libraries can be compiled with MSYS/MinGW.                                                                                       |
| <i>Tcl_Starpack.bawt</i>     | Builds all supported starpacks. Depending on the <a href="#">--zipkit</a> option, these are wrapped using tclkits or zipkits.                                                                                                            |
| <i>Tcl_Python.bawt</i>       | Extracts the binary Python distribution on Windows and builds the tclpy package.<br><b>Note, that the libraries listed in this file are not updated or supported since BAWT version 3.3.</b>                                             |
| <i>Tcl_Extended.bawt</i>     | Builds all libraries of <i>Tcl_Basic.bawt</i> , <i>Tcl_Python.bawt</i> and Tcl/Tk packages which depend on 3rd party libraries, like SWIG, CMake, libressl or image libraries. On Windows all libraries can be compiled with MSYS/MinGW. |
| <i>Tcl3D.bawt</i>            | Builds all libraries of <i>Tcl_Extended.bawt</i> and the extended version of Tcl3D, which depends on 3rd party libraries like OpenSceneGraph, SDL, FTGL.                                                                                 |
| <i>Tcl_Distribution.bawt</i> | Builds all libraries of <i>Tcl_Extended.bawt</i> and creates an InnoSetup based setup file on Windows or an installation shell script on Unix.                                                                                           |

For the **OpenSceneGraph** ecosystem the following *Setup* files are currently supported.

|                              |                                                                                                                                                                         |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>OSG_Basic.bawt</i>        | Builds OpenSceneGraph with basic plugin libraries as needed by Tcl3D. On Windows all libraries can be compiled with MSYS/MinGW.                                         |
| <i>OSG_Extended.bawt</i>     | Builds all libraries of <i>OSG_Basic.bawt</i> and builds OpenSceneGraph with extended plugin libraries, as well as libraries depending on OpenSceneGraph like osgEarth. |
| <i>OSG_Distribution.bawt</i> | Builds all libraries of <i>OSG_Extended.bawt</i> and creates an InnoSetup based setup file on Windows or an installation shell script on Unix.                          |

Both the **OpenSceneGraph** ecosystem as well as the extended **Tcl** versions need special tools for building or basic libraries they depend upon.

|                       |                                                                                                                    |
|-----------------------|--------------------------------------------------------------------------------------------------------------------|
| <i>Tools.bawt</i>     | Builds tools needed for building of libraries, like CMake or SWIG.                                                 |
| <i>BasicLibs.bawt</i> | Builds basic libraries needed by other libraries like several image libraries, zlib, freetype, ffmpeg and openssl. |

There are two other *Setup* files not directly related to one of the above-mentioned ecosystems.

|                      |                                                                                                                                                                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>WinTools.bawt</i> | Convenience tools for Windows supplied as precompiled binaries like Vim or Doxygen.                                                                                                                                                          |
| <i>MiscLibs.bawt</i> | Builds miscellaneous libraries not directly related to Tcl or OpenSceneGraph like mathematical, geographical or XML libraries.<br><br><b>Note, that the libraries listed in this file are not updated or supported since BAWT version 3.</b> |

See the tables at the end of this chapter for the detailed content of the *Setup* files.

*Setup* files are standard Tcl script files. They must have one or more calls to the **BAWT** *Setup* procedure for each library being built. Optionally one or more calls to the **BAWT** *Include* procedure can be specified to add dependent libraries.

The *Setup* procedure has the following signature:

```
proc Setup { libName zipFile buildFile args }
```

The following 3 mandatory parameters must be specified:

- **libName:** Library name.
- **zipFile:** Zipped library source file or library source directory.
- **buildFile:** File containing build script for the library (see next chapter).

The following optional build parameters are currently supported:

|                        |                                                                                                 |
|------------------------|-------------------------------------------------------------------------------------------------|
| <i>Release</i>         | Build the Release version of the library. This is the default.                                  |
| <i>Debug</i>           | Build the Debug version of the library.<br>Note, that not all libraries may support Debug mode. |
| <i>NoTcl8 NoTcl9</i>   | Do not build the library with Tcl 8 resp. Tcl 9.                                                |
| <i>NoTk8 NoTk9</i>     | Do not build the library with Tk 8 resp. Tk 9.                                                  |
| <i>NoGccX</i>          | Do not build the library with gcc major version X.                                              |
| <i>NoUniversal</i>     | Do not build the library as MacOS universal binary.                                             |
| <i>NoWindows</i>       | Do not build the library on Windows.                                                            |
| <i>NoLinux</i>         | Do not build the library on Linux.                                                              |
| <i>NoDarwin</i>        | Do not build the library on Darwin.                                                             |
| <i>NoSunOS</i>         | Do not build the library on SunOS.                                                              |
| <i>NoSunOS-solaris</i> | Do not build the library on Solaris11.                                                          |
| <i>NoSunOS-indiana</i> | Do not build the library on OpenIndiana.                                                        |
| <i>NoWindows-arm</i>   | Do not build the library on ARM based Windows.                                                  |
| <i>NoWindows-intel</i> | Do not build the library on Intel (x86) based Windows.                                          |
| <i>NoLinux-arm</i>     | Do not build the library on ARM based Linux.                                                    |
| <i>NoLinux-intel</i>   | Do not build the library on Intel (x86) based Linux.                                            |
| <i>NoLinux-riscv</i>   | Do not build the library on RISC-V based Linux.                                                 |
| <i>NoDarwin-arm</i>    | Do not build the library on ARM based Darwin.                                                   |
| <i>NoDarwin-intel</i>  | Do not build the library on Intel based Darwin.                                                 |



|                                                       |                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>WinCompiler=winCompiler</code>                  | Specify the Windows compiler to use. Valid Windows compiler names are: <code>gcc</code> , <code>vs</code> .<br>Note, that the <i>Build</i> file must have support for both Visual Studio and MSYS/MinGW instructions.                                                                                                                                                                  |
| <code>ForceVS</code> <i>(Deprecated)</i>              | Force using Visual Studio instead of using MSYS/MinGW.<br>Note, that the <i>Build</i> file must have support for both Visual Studio and MSYS/MinGW instructions.                                                                                                                                                                                                                       |
| <code>Version=X.Y.Z</code>                            | Specify or override a version string for the library. Use this option, if building a library from a directory (ex. your repository workspace), which does not have a version number included in the directory name.                                                                                                                                                                    |
| <code>URL=UrlString</code>                            | Specify the URL location of the library source code file.                                                                                                                                                                                                                                                                                                                              |
| <code>MaxParallel=Platform:NumJobs</code>             | Specify the number of parallel build jobs for a specific platform. Some build systems do not work correctly with lots of parallel builds.<br>Valid platform names are: Windows, Linux, Darwin, SunOS. The platform name may be optionally appended by the compiler type <code>vs</code> or <code>gcc</code> .<br>Example: <code>MaxParallel=Windows-gcc:2</code>                       |
| <code>NoParallel=Platforms</code> <i>(Deprecated)</i> | Specify platforms as comma separated list for which parallel builds should be disabled. Valid platform names are: Windows, Linux, Darwin.                                                                                                                                                                                                                                              |
| <code>All other strings</code>                        | Strings not matching any of the above patterns are interpreted as a user configuration string. User configuration strings are either appended to the <code>CMake</code> or <code>configure</code> commands of the library or can be evaluated by the Build script.<br>See chapter <a href="#">3.3.2 User configurable build files</a> for a description of user configuration strings. |

The next tables list the contents of the currently available *Setup* files.

| Setup file Tools.bawt                                                           |           |                     |                                                 |
|---------------------------------------------------------------------------------|-----------|---------------------|-------------------------------------------------|
| # Builds tools needed for building of libraries, like CMake or SWIG.            |           |                     |                                                 |
| # Setup                                                                         | LibName   | ZipFile             | BuildFile BuildOptions                          |
| if { [UseVisualStudio "primary"] && [GetVisualStudioVersion] <= 2010 } {        |           |                     |                                                 |
| # Use this CMake version, so that Visual 2010 still works.                      |           |                     |                                                 |
| Setup CMake CMake-3.21.4.7z CMake.bawt                                          |           |                     |                                                 |
| } elseif { [UseVisualStudio "primary"] && [GetVisualStudioVersion] <= 2013 } {  |           |                     |                                                 |
| # Use this CMake version, so that Visual 2013 still works.                      |           |                     |                                                 |
| Setup CMake CMake-3.25.2.7z CMake.bawt                                          |           |                     |                                                 |
| } elseif { [IsRiscV]    ( [IsArm] && [Is32Bit] ) } {                            |           |                     |                                                 |
| # CMake 4.2 does not compile on RiscV and 32-bit ARM due to missing "-latomic". |           |                     |                                                 |
| Setup CMake CMake-3.25.2.7z CMake.bawt                                          |           |                     |                                                 |
| } elseif { [IsIRIX] } {                                                         |           |                     |                                                 |
| # CMake 2.8.12.2 is the last official CMake IRIX binary from cmake.org.         |           |                     |                                                 |
| Setup CMake CMake-2.8.12.2.7z CMake.bawt                                        |           |                     |                                                 |
| } else {                                                                        |           |                     |                                                 |
| Setup CMake CMake-4.2.0.7z CMake.bawt                                           |           |                     |                                                 |
| }                                                                               |           |                     |                                                 |
| Setup                                                                           | pandoc    | pandoc-3.5.7z       | pandoc.bawt NoLinux-riscv NoLinux32-arm NoSunOS |
| Setup                                                                           | pkgconfig | pkgconfig-0.29.2.7z | pkgconfig.bawt                                  |
| if { [IsGccCompilerNewer "4.9.2"] } {                                           |           |                     |                                                 |
| Setup SWIG SWIG-4.4.0.7z SWIG.bawt                                              |           |                     |                                                 |
| } else {                                                                        |           |                     |                                                 |
| Setup SWIG SWIG-4.3.1.7z SWIG.bawt                                              |           |                     |                                                 |
| }                                                                               |           |                     |                                                 |
| Setup                                                                           | yasm      | yasm-1.3.0.7z       | yasm.bawt                                       |
| Setup                                                                           | nasm      | nasm-2.16.3.7z      | nasm.bawt                                       |

**Setup file BasicLibs.bawt**

```
# Builds basic libraries needed by several other libraries.

Include "Tools.bawt"

# All of the following libraries can be compiled on Linux or Darwin,
# but it is better to use the system provided libraries.

# Setup LibName ZipFile BuildFile BuildOptions

# Basic libraries needed by most other libraries.
Setup ZLib ZLib-1.3.1.7z ZLib.bawt NoLinux NoDarwin
Setup xz xz-5.4.1.7z xz.bawt NoLinux NoDarwin

# Basic Image libraries.
Setup giflib giflib-5.2.1.7z giflib.bawt NoLinux NoSunOS
Setup libwebp libwebp-1.2.4.7z libwebp.bawt NoLinux
Setup JPEG JPEG-9.f.7z JPEG.bawt NoLinux NoSunOS NoDarwin
Setup openjpeg openjpeg-2.5.3.7z openjpeg.bawt NoSunOS-solaris
Setup PNG PNG-1.6.48.7z PNG.bawt NoLinux NoSunOS MaxParallel=Windows-gcc:1
Setup TIFF TIFF-4.7.0.7z TIFF.bawt NoLinux NoSunOS NoDarwin

if { [IsGccCompilerNewer "4.9.0"] } {
    Setup ffmpeg ffmpeg-7.1.3.7z ffmpeg.bawt
} else {
    Setup ffmpeg ffmpeg-4.4.4.7z ffmpeg.bawt
}

Setup Freetype Freetype-2.13.3.7z Freetype.bawt NoLinux NoDarwin
if { [GetTlsVersion] == 1 } {
    Setup libressl libressl-2.9.2.7z libressl.bawt
} else {
    Setup openssl openssl-3.5.4.7z openssl.bawt NoSunOS-solaris
}

if { [UseVisualStudio "primary"] && [GetVisualStudioVersion] <= 2008 } {
    # Visual Studio 2008
    Setup SDL SDL-2.0.4.7z SDL.bawt
} elseif { [UseVisualStudio "primary"] && [GetVisualStudioVersion] == 2010 } {
    # Visual Studio 2010
    Setup SDL SDL-2.0.8.7z SDL.bawt
} else {
    Setup SDL SDL-2.26.2.7z SDL.bawt
}
```

**Setup file Tcl\_MinimalDist.bawt**

```
# Builds just Tcl and Tk and creates a distribution setup file.

# Setup LibName ZipFile BuildFile BuildOptions

# Tcl and Tk.
Setup Tcl Tcl-[GetTclVersion].7z Tcl.bawt
Setup Tk Tk-[GetTkVersion].7z Tk.bawt

# Tcl/Tk distribution as InnoSetup installer.
Setup InnoSetup InnoSetup-6.5.4.7z InnoSetup.bawt
Setup SetupTcl SetupTcl.7z SetupTcl.bawt
```

**Setup file Tcl\_Tclkit.bawt**

```
# Builds just Tcl, Tk and Tclkit.

# Setup LibName ZipFile BuildFile BuildOptions

# Tcl and Tk.
Setup Tcl Tcl-[GetTclVersion].7z Tcl.bawt
Setup Tk Tk-[GetTkVersion].7z Tk.bawt
Setup Tclkit Tclkit.7z Tclkit.bawt
```

**Setup file Tcl\_Basic.bawt**

```
# Builds Tcl, Tk, Starkit and Tcl/Tk packages, which do not depend on 3rd party libraries.
# On Windows all libraries can be compiled with MSys/MinGW.
```

| # Setup LibName                                                             | ZipFile                 | BuildFile           | BuildOptions              |
|-----------------------------------------------------------------------------|-------------------------|---------------------|---------------------------|
| # Tcl/Tk, stubs and manual.                                                 |                         |                     |                           |
| Setup Tcl                                                                   | Tcl-[GetTclVersion].7z  | Tcl.bawt            |                           |
| Setup TclStubs                                                              | Tcl-[GetTclVersion].7z  | TclStubs.bawt       |                           |
| Setup Tk                                                                    | Tk-[GetTkVersion].7z    | Tk.bawt             |                           |
| Setup TkStubs                                                               | Tk-[GetTkVersion].7z    | TkStubs.bawt        |                           |
| Setup TclTkManual                                                           | TclTkManual.7z          | TclTkManual.bawt    |                           |
| # Compiled Tcl packages.                                                    |                         |                     |                           |
| Setup argparse                                                              | argparse-0.62.7z        | argparse.bawt       |                           |
| Setup critcl                                                                | critcl-3.3.7z           | critcl.bawt         |                           |
| Setup expect                                                                | expect-6.0a1.7z         | expect.bawt         |                           |
| Setup DiffUtil                                                              | DiffUtil-0.4.3.7z       | DiffUtil.bawt       |                           |
| Setup memchan                                                               | memchan-2.3.1.7z        | memchan.bawt        | NoTcl9                    |
| Setup Mpexpr                                                                | Mpexpr-1.2.1.7z         | Mpexpr.bawt         | NoUniversal               |
| Setup nacl                                                                  | nacl-1.2.7z             | nacl.bawt           |                           |
| Setup nsf                                                                   | nsf-2.4.0.7z            | nsf.bawt            | NoTcl9                    |
| Setup oratcl                                                                | oratcl-4.6.1.7z         | oratcl.bawt         |                           |
| Setup parse_args                                                            | parse_args-0.5.1.7z     | parse_args.bawt     |                           |
| Setup poMemory                                                              | poMemory-1.0.1.7z       | poMemory.bawt       |                           |
| Setup rl_json                                                               | rl_json-0.16.0.7z       | rl_json.bawt        | NoSunOS-solaris           |
| Setup tbcload                                                               | tbcload-2.0a0.7z        | tbcload.bawt        |                           |
| Setup tclcompiler                                                           | tclcompiler-2.0a0.7z    | tclcompiler.bawt    |                           |
| Setup tclcsv                                                                | tclcsv-2.4.3.7z         | tclcsv.bawt         |                           |
| Setup tclparser                                                             | tclparser-1.9.7z        | tclparser.bawt      |                           |
| Setup tclvfs                                                                | tclvfs-1.5.0.7z         | tclvfs.bawt         |                           |
| Setup tclx                                                                  | tclx-9.0.0.7z           | tclx.bawt           |                           |
| Setup tdom                                                                  | tdom-0.9.6.7z           | tdom.bawt           |                           |
| Setup trofs                                                                 | trofs-0.4.9.7z          | trofs.bawt          | NoTcl9                    |
| Setup tserialport                                                           | tserialport-1.2.7z      | tserialport.bawt    | MaxParallel=Windows-gcc:1 |
| NoSunOS                                                                     |                         |                     |                           |
| if { [IsWindows] && ! [IsGccCompilerNewer "8.1.0"] } {                      |                         |                     |                           |
| Setup udp                                                                   | udp-1.0.12.7z           | udp.bawt            |                           |
| } else {                                                                    |                         |                     |                           |
| Setup udp                                                                   | udp-1.0.13.7z           | udp.bawt            |                           |
| }                                                                           |                         |                     |                           |
| Setup vectcl                                                                | vectcl-0.2.1.7z         | vectcl.bawt         | NoTcl9 NoSunOS-solaris    |
| Setup vlerq                                                                 | vlerq-4.1.7z            | vlerq.bawt          |                           |
| # Compiled Tk packages.                                                     |                         |                     |                           |
| Setup Canvas3d                                                              | Canvas3d-1.2.3.7z       | Canvas3d.bawt       | NoTcl9                    |
| Setup Img                                                                   | Img-[GetImgVersion].7z  | Img.bawt            |                           |
| Setup imgtools                                                              | imgtools-0.3.1.7z       | imgtools.bawt       |                           |
| Setup itk                                                                   | itk-4.2.5.7z            | itk.bawt            |                           |
| Setup iwidgets                                                              | iwidgets-4.1.2.7z       | iwidgets.bawt       |                           |
| Setup photoresize                                                           | photoresize-0.2.1.7z    | photoresize.bawt    |                           |
| Setup poImg                                                                 | poImg-3.0.2.7z          | poImg.bawt          |                           |
| Setup rtext                                                                 | rtext-0.1.1.7z          | rtext.bawt          | NoTcl8                    |
| if { [GetMajor [GetTclVersion]] == 9 && [GetMinor [GetTclVersion]] >= 1 } { |                         |                     |                           |
| SetExcludeOption "rtext" "NoTcl >= 9.1"                                     |                         |                     |                           |
| }                                                                           |                         |                     |                           |
| Setup Snack                                                                 | Snack-2.2.12.7z         | Snack.bawt          |                           |
| Setup Tix                                                                   | Tix-8.4.4.7z            | Tix.bawt            | NoDarwin NoTk9            |
| Setup Tkhtml                                                                | Tkhtml-3.0.2.7z         | Tkhtml.bawt         |                           |
| Setup tkpath                                                                | tkpath-0.4.2.7z         | tkpath.bawt         | NoSunOS-solaris           |
| Setup tko                                                                   | tko-0.4.7z              | tko.bawt            | NoDarwin                  |
| Setup tksvg                                                                 | tksvg-0.16.7z           | tksvg.bawt          |                           |
| Setup Tktable                                                               | Tktable-2.12.2.7z       | Tktable.bawt        |                           |
| Setup treectrl                                                              | treectrl-2.5.2.7z       | treectrl.bawt       | Shellicon=ON              |
| if { [GetMajor [GetTclVersion]] < 9 } {                                     |                         |                     |                           |
| Setup rbc                                                                   | rbc-0.2.0.7z            | rbc.bawt            | NoTk9                     |
| } else {                                                                    |                         |                     |                           |
| Setup rbc                                                                   | rbc_Tk9-0.2.0.7z        | rbc.bawt            | NoTk8                     |
| }                                                                           |                         |                     |                           |
| # Compiled Tcl and Tk packages. Windows only.                               |                         |                     |                           |
| Setup iocp                                                                  | iocp-2.0.2.7z           | iocp.bawt           |                           |
| Setup shellicon                                                             | shellicon-0.2.0.7z      | shellicon.bawt      |                           |
| if { [Is32Bit] && ! [IsGccCompilerNewer "8.1.0"] } {                        |                         |                     |                           |
| Setup twapi                                                                 | twapi-5.1.1.7z          | twapi.bawt          |                           |
| } else {                                                                    |                         |                     |                           |
| Setup twapi                                                                 | twapi-5.2.0.7z          | twapi.bawt          |                           |
| }                                                                           |                         |                     |                           |
| Setup winhelp                                                               | winhelp-1.1.1.7z        | winhelp.bawt        |                           |
| # Compiled Tcl packages. Darwin only.                                       |                         |                     |                           |
| Setup Tcladdressbook                                                        | Tcladdressbook-1.2.4.7z | Tcladdressbook.bawt | NoTcl9                    |
| Setup Tclapplescript                                                        | Tclapplescript-2.2.7z   | Tclapplescript.bawt | NoTcl9                    |

|                         |                      |                    |        |
|-------------------------|----------------------|--------------------|--------|
| Setup tclAE             | tclAE-2.0.7.7z       | tclAE.bawt         | NoTcl9 |
| # Pure Tcl/Tk packages. |                      |                    |        |
| Setup apave             | apave-4.4.10.7z      | apave.bawt         |        |
| Setup awthemes          | awthemes-10.4.0.7z   | awthemes.bawt      |        |
| Setup BWidget           | BWidget-1.10.1.7z    | BWidget.bawt       |        |
| Setup cawt              | cawt-3.1.1.7z        | cawt.bawt          |        |
| Setup materialicons     | materialicons-0.2.7z | materialicons.bawt |        |
| Setup mentry            | mentry-4.5.1.7z      | mentry.bawt        |        |
| Setup mqtt              | mqtt-4.0.7z          | mqtt.bawt          |        |
| Setup ooxml             | ooxml-1.13.1.7z      | ooxml.bawt         |        |
| Setup pdf4tcl           | pdf4tcl-0.9.4.7z     | pdf4tcl.bawt       |        |
| Setup pgintcl           | pgintcl-3.5.2.7z     | pgintcl.bawt       |        |
| Setup poFti             | poFti-1.0.0.7z       | poFti.bawt         |        |
| Setup poLibs            | poApps-3.3.0.7z      | poLibs.bawt        |        |
| Setup publisher         | publisher-2.0.7z     | publisher.bawt     |        |
| Setup puppyicons        | puppyicons-0.1.7z    | puppyicons.bawt    |        |
| Setup ruff              | ruff-3.0.4.7z        | ruff.bawt          |        |
| Setup scrollutil        | scrollutil-2.10.7z   | scrollutil.bawt    |        |
| Setup thtmlview         | thtmlview-2.0.0.7z   | thtmlview.bawt     |        |
| Setup tablelist         | tablelist-7.11.7z    | tablelist.bawt     |        |
| Setup tcl9migrate       | tcl9migrate-1.0.7z   | tcl9migrate.bawt   |        |
| Setup tclargp           | tclargp-0.2.7z       | tclargp.bawt       |        |
| Setup tclfpdf           | tclfpdf-1.7.3.7z     | tclfpdf.bawt       |        |
| Setup tcllib            | tcllib-2.1.7z        | tcllib.bawt        |        |
| Setup tclws             | tclws-3.5.0.7z       | tclws.bawt         |        |
| Setup tkcon             | tkcon-2.8.7z         | tkcon.bawt         |        |
| Setup tklib             | tklib-0.9.7z         | tklib.bawt         |        |
| Setup tsw               | tsw-1.4.2.7z         | tsw.bawt           |        |
| Setup ukaz              | ukaz-2.1.7z          | ukaz.bawt          |        |
| Setup wcb               | wcb-4.2.7z           | wcb.bawt           |        |
| Setup windetect         | windetect-2.0.1.7z   | windetect.bawt     |        |
| Setup tkwintrack        | tkwintrack-2.1.1.7z  | tkwintrack.bawt    |        |
| # Tclkits and Zipkits.  |                      |                    |        |
| Setup Tclkit            | Tclkit.7z            | Tclkit.bawt        |        |
| Setup Zipkit            | Zipkit.7z            | Zipkit.bawt        |        |

### Setup file Tcl\_Starpack.bawt

|                                             |                               |                        |              |
|---------------------------------------------|-------------------------------|------------------------|--------------|
| # Builds all starpacks available with BAWT. |                               |                        |              |
| # Setup LibName                             | ZipFile                       | BuildFile              | BuildOptions |
| Setup cawtapp                               | cawt-3.1.1.7z                 | cawtapp.bawt           |              |
| Setup jigsaw                                | jigsaw-2.0.7z                 | jigsaw.bawt            |              |
| Setup gorilla                               | gorilla-1.6.1.7z              | gorilla.bawt           |              |
| Setup tcldebugger                           | tcldebugger-2.0.1.7z          | tcldebugger.bawt       |              |
| Setup tclssg                                | tclssg-3.0.1.7z               | tclssg.bawt            |              |
| Setup tkchat                                | tkchat-1.482.7z               | tkchat.bawt            |              |
| Setup tksqlite                              | tksqlite-0.5.14.7z            | tksqlite.bawt          |              |
| Setup BawtLogViewer                         | BawtLogViewer-[GetVersion].7z | BawtLogViewer.bawt     |              |
| Setup poApps                                | poApps-3.3.0.7z               | poApps.bawt            |              |
| Setup poClipboardViewer                     | poApps-3.3.0.7z               | poClipboardViewer.bawt |              |
| Setup OglInfo                               | tcl3d-1.0.3.7z                | OglInfo.bawt           | NoDarwin     |

### Setup file Tcl\_Python.bawt

|                                                                    |                           |             |               |
|--------------------------------------------------------------------|---------------------------|-------------|---------------|
| # Builds binary Python distribution for Windows and tclpy package. |                           |             |               |
| Include "Tcl_Basic.bawt"                                           |                           |             |               |
| # Setup LibName                                                    | ZipFile                   | BuildFile   | BuildOptions  |
| Setup Python                                                       | Python-3.7.7-[GetBits].7z | Python.bawt | Version=3.7.7 |
| Setup tclpy                                                        | tclpy-0.4.1.7z            | tclpy.bawt  |               |

### Setup file Tcl\_Extended.bawt

|                                                                                                                  |  |  |  |
|------------------------------------------------------------------------------------------------------------------|--|--|--|
| # Builds Tcl/Tk packages which depend on 3rd party libraries,<br># like SWIG, CMake, openssl or image libraries. |  |  |  |
| Include "Tools.bawt"                                                                                             |  |  |  |
| Include "BasicLibs.bawt"                                                                                         |  |  |  |
| Include "Tcl_Basic.bawt"                                                                                         |  |  |  |

```

Include "Tcl_Starpack.bawt"
Include "Tcl_Experimental.bawt" -mustexist false

# Setup LibName      ZipFile      BuildFile      BuildOptions
Setup mawt            mawt-0.5.0.7z    mawt.bawt
Setup FTGL            FTGL-2.1.3.7z    FTGL.bawt      NoDarwin
Setup tcl3d           tcl3d-1.0.3.7z    tcl3d.bawt      Dist=Extended NoDarwin

Setup tkdnd           tkdnd-2.9.5.7z    tkdnd.bawt
Setup tkribbon        tkribbon-1.2.7z   tkribbon.bawt

if { [GetTlsVersion] == 1 } {
    Setup tcltls       tcltls-1.7.23.7z    tcltls.bawt
} else {
    Setup tcltls       tcltls-2.0.1.7z    tcltls.bawt      NoSunOS-solaris
}
Setup Trf             Trf-2.1.4.7z        Trf.bawt         NoDarwin NoTcl9

Setup imgjpeg2        imgjpeg2-0.1.1.7z   imgjpeg2.bawt    NoSunOS-solaris
Setup tzint           tzint-1.2.7z        tzint.bawt       NoUniversal

Setup libgd           libgd-2.3.2.7z    libgd.bawt       NoSunOS-solaris
Setup tclgd           tclgd-1.4.1.7z    tclgd.bawt       NoUniversal NoSunOS-solaris

Setup tcluvc          tcluvc-0.1.7z        tcluvc.bawt

Setup cfitsio         cfitsio-4.1.0.7z    cfitsio.bawt
Setup fitsTcl         fitsTcl-2.5.1.7z    fitsTcl.bawt
Setup pawt            pawt-1.3.0.7z      pawt.bawt

Setup libffi          libffi-3.4.8.7z    libffi.bawt      NoUniversal
Setup cffi            cffi-2.0.3.7z      cffi.bawt        NoUniversal
Setup Ffidl           Ffidl-0.9.1.7z      Ffidl.bawt       NoUniversal NoSunOS-solaris

# MuPDF (and therefore dependent libraries tclMuPdf and MuPDFWidget)
# are not available with VisualStudio < 2019.
if { ( [UseVisualStudio "primary"] && [GetVisualStudioVersion] < 2019 ) || \
    ! [IsGccCompilerNewer "4.9.2"] } {
    Setup mupdf        mupdf-1.18.2.7z    mupdf.bawt
    Setup tclMuPdf     tclMuPdf-2.1.1.7z    tclMuPdf.bawt
} else {
    Setup mupdf        mupdf-1.26.0.7z    mupdf.bawt      NoSunOS-solaris
    Setup tclMuPdf     tclMuPdf-2.5.1.7z    tclMuPdf.bawt    NoSunOS-solaris
}
Setup MuPDFWidget     MuPDFWidget-2.4.7z    MuPDFWidget.bawt

Setup hdc             hdc-0.2.0.1.7z      hdc.bawt
Setup gdi             gdi-0.9.9.15.7z    gdi.bawt
Setup printer         printer-0.9.6.16.7z printer.bawt

```

### Setup file Tcl3D.bawt

```

# Builds the full version of Tcl3D, which depends on
# 3rd party libraries (OpenSceneGraph, SDL, FTGL).

Include "Tcl_Extended.bawt"
Include "OSG_Basic.bawt"

# Setup LibName      ZipFile      BuildFile      BuildOptions
Setup glfw           glfw-3.3.8.7z    glfw.bawt
Setup tcl3d          tcl3d-1.0.3.7z    tcl3d.bawt      Dist=Full NoDarwin NoSunOS

```

### Setup file Tcl\_Distribution.bawt

```

# Use this Setup file to create a Tcl/Tk distribution.

# Builds Tcl/Tk with basic package libraries.
# Include "Tcl_Basic.bawt"

# Builds Tcl/Tk with extended package libraries including Tcl3D.
# Include "Tcl3D.bawt"

# Builds Tcl/Tk with extended package libraries.
Include "Tcl_Extended.bawt"

```

| # Setup LibName                               | ZipFile             | BuildFile             | BuildOptions |
|-----------------------------------------------|---------------------|-----------------------|--------------|
| # Tcl/Tk distribution as InnoSetup installer. |                     |                       |              |
| Setup InnoSetup                               | InnoSetup-6.5.4.7z  | InnoSetup.bawt        |              |
| Setup Redistributables                        | Redistributables.7z | Redistributables.bawt |              |
| Setup SetupTcl                                | SetupTcl.7z         | SetupTcl.bawt         |              |

## Setup file OSG\_Basic.bawt

| # Builds OpenSceneGraph with basic plugin libraries as needed by Tcl3D.<br># OpenSceneGraph does not work with CMake 4.X and thus cannot be<br># compiled with VS2026.                       |                                   |                         |                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------|------------------|
| # Setup LibName                                                                                                                                                                              | ZipFile                           | BuildFile               | BuildOptions     |
| # Tools needed for compilation of libraries.                                                                                                                                                 |                                   |                         |                  |
| Setup CMake                                                                                                                                                                                  | CMake-3.25.2.7z                   | CMake.bawt              |                  |
| Setup yasm                                                                                                                                                                                   | yasm-1.3.0.7z                     | yasm.bawt               |                  |
| # The following libraries can be compiled on Linux, but for OpenSceneGraph<br># we use the libraries installed by the Linux distribution.<br># Basic library needed by most other libraries. |                                   |                         |                  |
| Setup ZLib                                                                                                                                                                                   | ZLib-1.2.13.7z                    | ZLib.bawt               | NoLinux          |
| Setup xz                                                                                                                                                                                     | xz-5.4.1.7z                       | xz.bawt                 | NoLinux NoDarwin |
| # Image libraries needed by OpenSceneGraph.                                                                                                                                                  |                                   |                         |                  |
| Setup giflib                                                                                                                                                                                 | giflib-5.2.1.7z                   | giflib.bawt             | NoLinux          |
| Setup JPEG                                                                                                                                                                                   | JPEG-9.e.7z                       | JPEG.bawt               | NoLinux          |
| Setup PNG                                                                                                                                                                                    | PNG-1.6.39.7z                     | PNG.bawt                | NoLinux          |
| Setup TIFF                                                                                                                                                                                   | TIFF-4.5.0.7z                     | TIFF.bawt               | NoLinux          |
| Setup freeglut                                                                                                                                                                               | freeglut-3.2.2.7z                 | freeglut.bawt           | NoLinux NoDarwin |
| Setup FreeType                                                                                                                                                                               | FreeType-2.10.4.7z                | FreeType.bawt           | NoLinux          |
| Setup SDL                                                                                                                                                                                    | SDL-2.26.2.7z                     | SDL.bawt                |                  |
| Setup ffmpeg                                                                                                                                                                                 | ffmpeg-4.4.4.7z                   | ffmpeg.bawt             |                  |
| Setup openjpeg                                                                                                                                                                               | openjpeg-2.5.3.7z                 | openjpeg.bawt           |                  |
| if { [UseVisualStudio "primary"] && [GetVisualStudioVersion] <= 2010 } {                                                                                                                     |                                   |                         |                  |
| Setup jasper                                                                                                                                                                                 | jasper-2.0.14.7z                  | jasper.bawt             | NoLinux NoDarwin |
| } else {                                                                                                                                                                                     |                                   |                         |                  |
| Setup jasper                                                                                                                                                                                 | jasper-2.0.25.7z                  | jasper.bawt             | NoLinux NoDarwin |
| }                                                                                                                                                                                            |                                   |                         |                  |
| Setup libressl                                                                                                                                                                               | libressl-2.9.2.7z                 | libressl.bawt           |                  |
| # OpenSceneGraph 3rd party libraries.                                                                                                                                                        |                                   |                         |                  |
| if { [IsGccCompilerNewer "13.0.0"] } {                                                                                                                                                       |                                   |                         |                  |
| Setup curl                                                                                                                                                                                   | curl-7.88.1.7z                    | curl.bawt               |                  |
| } else {                                                                                                                                                                                     |                                   |                         |                  |
| Setup curl                                                                                                                                                                                   | curl-7.70.0.7z                    | curl.bawt               |                  |
| }                                                                                                                                                                                            |                                   |                         |                  |
| # OpenSceneGraph                                                                                                                                                                             |                                   |                         |                  |
| Setup OpenSceneGraph                                                                                                                                                                         | OpenSceneGraph-[GetOsgVersion].7z | OpenSceneGraph.bawt     |                  |
| Setup OpenSceneGraphData                                                                                                                                                                     | OpenSceneGraphData-3.4.0.7z       | OpenSceneGraphData.bawt |                  |

## Setup file OSG\_Extended.bawt

| # Builds OpenSceneGraph with extended plugin libraries, as<br># well as libraries depending on OpenSceneGraph like osgEarth. |                |            |                           |
|------------------------------------------------------------------------------------------------------------------------------|----------------|------------|---------------------------|
| Include "OSG_Basic.bawt"                                                                                                     |                |            |                           |
| # Setup LibName                                                                                                              | ZipFile        | BuildFile  | BuildOptions              |
| # Extended OpenSceneGraph 3rd party libraries.                                                                               |                |            |                           |
| Setup Cal3D                                                                                                                  | Cal3D-0.120.7z | Cal3D.bawt | NoLinux-arm NoLinux-riscv |
| if { [UseVisualStudio "primary"] && [GetVisualStudioVersion] <= 2013 } {                                                     |                |            |                           |
| Setup gdal                                                                                                                   | gdal-2.2.0.7z  | gdal.bawt  |                           |
| Setup geos                                                                                                                   | geos-3.6.3.7z  | geos.bawt  |                           |
| } else {                                                                                                                     |                |            |                           |
| Setup gdal                                                                                                                   | gdal-2.4.4.7z  | gdal.bawt  | NoLinux-riscv             |
| Setup geos                                                                                                                   | geos-3.7.2.7z  | geos.bawt  |                           |
| }                                                                                                                            |                |            |                           |
| Setup GLEW                                                                                                                   | GLEW-2.2.0.7z  | GLEW.bawt  |                           |
| Setup Gl2ps                                                                                                                  | Gl2ps-1.4.2.7z | Gl2ps.bawt |                           |

```
# Libraries based on OpenSceneGraph.
Setup osgcal      osgcal-0.2.1.7z      osgcal.bawt      NoLinux-arm NoLinux-riscv MaxParallel=Linux:1
MaxParallel=Windows-gcc:1

if { [UseVisualStudio "primary"] && [GetVisualStudioVersion] <= 2008 } {
    Setup osgearth osgearth-2.8.7z      osgearth.bawt
} else {
    Setup osgearth osgearth-2.10.1.7z   osgearth.bawt   NoLinux-arm NoLinux-riscv
}
```

### Setup file OSG\_Distribution.bawt

```
# Use this Setup file to create an OpenSceneGraph distribution.

# Builds OpenSceneGraph with basic plugin libraries.
# Include "OSG_Basic.bawt"

# Builds OpenSceneGraph with extended plugin libraries, as
# well as libraries depending on OpenSceneGraph like osgEarth.
Include "OSG_Extended.bawt"

# Setup LibName      ZipFile      BuildFile      BuildOptions

# OpenSceneGraph distribution as InnoSetup installer.
Setup InnoSetup      InnoSetup-6.5.4.7z   InnoSetup.bawt
Setup Redistributables Redistributables.7z Redistributables.bawt
Setup SetupOsg       SetupOsg.7z        SetupOsg.bawt
```

### Setup file MiscLibs.bawt

```
# Builds miscellaneous libraries not related to Tcl or OpenSceneGraph.
# Note, that the libraries listed in this file are not updated or
# supported anymore.

Include "Tools.bawt"
Include "BasicLibs.bawt"

# Setup LibName      ZipFile      BuildFile      BuildOptions

if { ( ! [UseVisualStudio "primary"] && [IsWindows] && [IsGccCompilerNewer "12.0.0"] ) || \
    ( [UseVisualStudio "primary"] && [GetVisualStudioVersion] >= 2022 ) } {
    # This boost version can only be compiled with
    # Windows: VS 2022 or newer.
    # Windows: gcc 12.0.0 or newer
    Setup Boost      Boost-1.78.0.7z      Boost.bawt
} elseif { ( [UseVisualStudio "primary"] && [GetVisualStudioVersion] >= 2015 ) || \
    ( ! [UseVisualStudio "primary"] && [IsWindows] ) || \
    ( ! [IsWindows] && [IsGccCompilerNewer "4.9.0"] ) } {
    # This boost version can only be compiled with
    # Windows: VS 2015 or newer.
    # Unix : gcc 4.9.0 or newer
    Setup Boost      Boost-1.75.0.7z      Boost.bawt
} else {
    # This boost version cannot be compiled with MinGW gcc.
    Setup Boost      Boost-1.58.0.7z      Boost.bawt
}

Setup ccl           ccl-4.0.6.7z         ccl.bawt
Setup Eigen         Eigen-3.3.9.7z       Eigen.bawt
Setup fftw          fftw-3.3.9.7z       fftw.bawt
if { [UseVisualStudio "primary"] && [GetVisualStudioVersion] <= 2013 } {
    Setup GeographicLib GeographicLib-1.50.1.7z GeographicLib.bawt
} else {
    Setup GeographicLib GeographicLib-1.52.7z   GeographicLib.bawt
}
Setup GeographicLibData GeographicLibData.7z   GeographicLibData.bawt
Setup KDIS          KDIS-2.9.0.7z         KDIS.bawt
Setup libxml2       libxml2-2.10.3.7z     libxml2.bawt
Setup sqlite3       sqlite3-3.51.3.7z     sqlite3.bawt
Setup tinyxml2      tinyxml2-9.0.0.7z     tinyxml2.bawt
Setup Xerces        Xerces-3.2.4.7z       Xerces.bawt
```

### Setup file WinTools.bawt

```
# Builds miscellaneous tools for Windows.
```

| # Setup LibName  | ZipFile               | BuildFile       | BuildOptions |
|------------------|-----------------------|-----------------|--------------|
| Setup Blender    | Blender-3.0.0.7z      | Blender.bawt    |              |
| Setup DirectXTex | DirectXTex-2021_11.7z | DirectXTex.bawt |              |
| Setup Doxygen    | Doxygen-1.8.15.7z     | Doxygen.bawt    |              |
| Setup Vim        | Vim-9.0.0.7z          | Vim.bawt        |              |

### 3.3 Build Files

Build files include the logic needed to extract, configure, compile and distribute a library. They must define the following two procedures, where `libName` is replaced with the name of the library as specified as first parameter of the `Setup` procedure:

- `Init_libName { libName libVersion }`
- `Build_libName { libName libVersion buildDir instDir devDir distDir }`

The parameter values for these procedures are supplied by the **BAWT** framework.

|                         |                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------|
| <code>libName</code>    | Library name as supplied with first parameter of procedure <code>Setup</code> .                                     |
| <code>libVersion</code> | Library version extracted from source file name as supplied with second parameter of procedure <code>Setup</code> . |
| <code>buildDir</code>   | <code>[file join [GetOutputBuildDir] \$libName]</code>                                                              |
| <code>instDir</code>    | <code>[file join [GetOutputInstDir] \$libName]</code>                                                               |
| <code>devDir</code>     | <code>[GetOutputDevDir]</code>                                                                                      |
| <code>distDir</code>    | <code>[GetOutputDistDir]</code>                                                                                     |

The logic of a *Build* file will be explained with the following excerpt of the *Build* file of Tcl package **udp**:

| Build file udp.bawt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre># Copyright: 2016-2026 Paul Obermeier (obermeier@tcl3d.org) # Distributed under BSD license. # # BuildType: MSys / gcc  proc Init_udp { libName libVersion } {     SetScriptAuthor    \$libName "Paul Obermeier" "obermeier@tcl3d.org"     SetLibHomepage     \$libName "https://core.tcl-lang.org/tcludp/"     SetLibDependencies \$libName "Tcl"     SetPlatforms       \$libName "All"     SetWinCompilers    \$libName "gcc" }  proc Build_udp { libName libVersion buildDir instDir devDir distDir } {     if { [UseStage "Extract" \$libName] } {         ExtractLibrary \$libName \$buildDir     }      if { [UseStage "Configure" \$libName] } {         set flags ""         set cflags ""         append cflags [GetPermissiveCFlags] " "         append cflags [GetDarwinCFlags] " "         if { [string trim \$cflags] ne "" } {             append flags "CFLAGS='\$cflags' "         }         TeaConfigTcl \$libName \$buildDir \$instDir \$flags     }      if { [UseStage "Compile" \$libName] } {         MSysBuild \$libName \$buildDir "install-binaries"     }      if { [UseStage "Distribute" \$libName] } {</pre> |



```

StripLibraries "$instDir"
LibFileCopy "$instDir" "$devDir/[GetTclDir]" "*" true
LibFileCopy "$instDir" "$distDir/[GetTclDir]" "*" true
}
return true
}

```

The `Init_libName` procedure must call the following **BAWT** framework procedures:

|                                 |                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>SetScriptAuthor</code>    | Specify name and mail address of the build script author.<br>This information is used for command line option <code>--authors</code> .                                                                                                                                     |
| <code>SetLibHomepage</code>     | Specify the homepage of the library.<br>This information is used for command line option <code>--homepages</code> .                                                                                                                                                        |
| <code>SetLibDependencies</code> | Specify the dependencies of the library.<br>If the library has no dependencies, specify <code>"None"</code> as parameter.<br>Otherwise, a variable number of library names can be given.<br>This information is used for command line option <code>--dependencies</code> . |
| <code>SetPlatforms</code>       | Specify the supported platforms.<br>Valid keywords are: <code>"Windows"</code> <code>"Linux"</code> <code>"Darwin"</code> <code>"SunOS"</code> <code>"IRIX"</code> <code>"All"</code> .<br>This information is used for command line option <code>--platforms</code> .     |
| <code>SetWinCompilers</code>    | Specify the supported compilers on Windows. Optional.<br>The first specified compiler is used as default.<br>Valid keywords are: <code>"gcc"</code> <code>"vs"</code> .<br>This information is used for command line option <code>--wincompilers</code> .                  |

The `Build_libName` procedure must check, which stage or stages should be executed (using procedure `UseStage`) and supply appropriate Tcl commands for each stage.

The following four stages can be handled in a build file:

- Extract
- Configure
- Compile
- Distribute

See chapter 4 *Build Stages* for details on these stages and typical commands executed for each stage.

Errors can be indicated by calling the **BAWT** procedure `SetErrorMessage` and returning `false`.

Optionally a procedure named `Env_libName` may be specified in a build file. This procedure has the same signature as the `Build_libName` procedure and may be used to specify library specific environment variables (using **BAWT** procedure `SetEnvVar`) or to add a value to the system environment variable `Path` (using **BAWT** procedure `AddToPathEnv`).

The following excerpt from the Tcl build file shows a usage example:

```

proc Env_Tcl { libName libVersion buildDir instDir devDir distDir } {
    SetEnvVar      "TCLLIBPATH" "$devDir/[GetTclDir]/lib"
    AddToPathEnv   "$devDir/opt/$libName/bin"
}

```

Another optional procedure named `Test_libName` was introduced in **BAWT 3.0**. This procedure has the same signature as the `Build_libName` procedure and may be used to execute test scripts using command line option `--test`.

The following excerpt from the Tcl build file shows how to execute the Tcl test suite by calling BAWT procedure `MSysTest`:

```

proc Test_Tcl { libName libVersion buildDir instDir devDir distDir } {
    if { [UseStage "Test" $libName] } {

```

```

MSysTest $libName $buildDir "test"
}
return true
}

```

It is also possible to execute a shell test script instead of MSysTest:

```

proc Test_poApps { libName libVersion buildDir instDir devDir distDir } {
    if { [UseStage "Test" $libName] } {
        if { [IsUnix] } {
            MSysRun $libName "Test$libName" "$buildDir/TestPrograms" "./RunTests.sh"
        } else {
            DosRun $libName "Test$libName" "$buildDir/TestPrograms" "RunTests.bat"
        }
    }
    return true
}

```

If using the [graphical log viewer](#), the test mode is automatically detected and the display of test results is switched on, as shown in the next figure.

The screenshot shows the BAWT graphical log viewer window. At the top, it says "Setup contains 10 libraries". Below this is a table with columns: #, Build-#, Library Name, User file, Version, Compiler, Exe. time, Est. time, Mod. time, Update cause, Stages, and User config. The table lists 10 libraries, with various update causes and stages. Below the table, there is a log file viewer showing the output of the build process, including the match file, build directory, and the execution of the test script. The log shows the execution of the test script and the summary of the build process.

| #  | Build-# | Library Name   | User file | Version | Compiler | Exe. time | Est. time | Mod. time           | Update cause                        | Stages        | User config                |
|----|---------|----------------|-----------|---------|----------|-----------|-----------|---------------------|-------------------------------------|---------------|----------------------------|
| 1  | 1       | InnoSetup      |           | 6.2.2   |          |           |           | 2025-10-02 21:18:26 | Excluded from test (No Test proc)   | No Test proc  |                            |
| 2  | 2       | Tcl            |           | 9.0.2   | gcc      | 9.25      | 8.06      | 2025-10-02 21:49:10 | Excluded from build (Darwin only)   | Darwin only   |                            |
| 3  | 3       | Tclapplescript |           | 2.2     |          |           |           | 2025-10-02 21:49:30 | Excluded from test (No Test proc)   | No Test proc  |                            |
| 4  | 4       | tcllib         | Yes       | 2.1     | gcc      |           |           | 2025-10-02 21:51:24 | Excluded from test (No Test proc)   | No Test proc  |                            |
| 5  | 5       | TclStubs       |           | 9.0.2   | vs2022   |           |           | 2025-10-02 21:52:38 | Excluded from test (No Test proc)   | No Test proc  |                            |
| 6  | 6       | Tk             |           | 9.0.2   | gcc      | 2.45      | 2.77      | 2025-10-02 21:53:21 | Excluded from test (No Test proc)   | No Test proc  |                            |
| 7  | 7       | TkStubs        |           | 9.0.2   | vs2022   |           |           | 2025-10-02 21:53:36 | Excluded from build (Option NoTcl9) | Option NoTcl9 |                            |
| 8  | 8       | udp            |           | 1.0.12  | gcc      |           |           | 2025-10-02 21:54:08 | Excluded from test (No Test proc)   | No Test proc  |                            |
| 9  | 9       | rtext          |           | 0.1.1   | vs2022   | 0.21      | 0.21      | 2025-10-02 21:54:08 | Excluded from test (No Test proc)   | No Test proc  |                            |
| 10 | 10      | SetupTcl       |           |         |          |           |           | 2025-10-02 21:54:08 | Excluded from test (No Test proc)   | No Test proc  | Tags - Doc Version=9.0.2.0 |

Log file C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Logs/\_BawtBuild.log (0.17 seconds to read)

```

Match file : C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/rtext/tests/_Bawt_PosixWin_testtext.bat
Build directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/rtext/tests
> tclsh all.tcl
Status: OK (Messages have been written to stderr)
WriteConsoleFile
File: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/rtext/_Bawt_StartMSysConsole.bat
22:17:10 > End rtext 0.1.1: 0.21 minutes

22:17:10 > Start SetupTcl (Library #10 of 10)
22:17:10 > Test SetupTcl
22:17:10 > End SetupTcl: Excluded from test (No Test proc)

22:17:10 > Summary
Setup file : C:/poSoft/BawtMine/Setup/DocSetup.bawt
Build directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build
Architecture : x64
Compilers : vs2022 gcc
Global stages : Test
# : Library Name Version Test time
-----
1: InnoSetup 6.2.2 Excluded No Test proc
2: Tcl 9.0.2 9.25 minutes
3: Tclapplescript 2.2 Excluded Darwin only
4: tcllib 2.1 Excluded No Test proc
5: TclStubs 9.0.2 Excluded No Test proc
6: Tk 9.0.2 2.45 minutes
7: TkStubs 9.0.2 Excluded No Test proc
8: udp 1.0.12 Excluded Option NoTcl9
9: rtext 0.1.1 0.21 minutes
10: SetupTcl Excluded No Test proc

Total: 11.91 minutes

```

Auto Update: OFF

### 3.3.1 User supplied build files

**BAWT** version 2.0 introduced the functionality of user supplied build files, which allows to add custom build files for existing libraries without the need to change the default build files.

To create a user supplied build file, make a copy of the build file (ex. *tcllib.bawt*) and give the copied file the name *tcllib\_User.bawt*. By appending the string *\_User* to the root file name, BAWT automatically detects the file as a user supplied build file and uses this file instead of the original build file.

You can then edit the user supplied build file according to your needs, ex. not create the `critcl` based modules for `tcllib`.

The user supplied build scripts must be located in directories included in the library search paths, see chapter [3.1.3 Directory access](#).

**Note, that user supplied build scripts are not considered in action `--update`, see chapter [5 Build Process](#).**

You may also give the user supplied build file any name you like. Then you have to notify BAWT to use that file for a specific library by using command line option `--user`.

If you do not want to use the user supplied files, there is no need to delete or rename them. Specify command line option `--nouserbuilds` to disable all user build files.

If using the [graphical log viewer](#), the application of a user supplied build file is indicated in column `User`, see library `tcllib` in next figure.

| #  | Build-# | Library Name    | User file | Version | Compiler | Exe. time | Est. time | Mod. time           | Update cause                        | Stages                                     | User config            |
|----|---------|-----------------|-----------|---------|----------|-----------|-----------|---------------------|-------------------------------------|--------------------------------------------|------------------------|
| 1  | 1       | InnoSetup       |           | 6.2.2   |          | 0.01      | 0.02      | 2025-10-02 22:43:14 | Build directory not existent        | Clean Extract Configure Compile Distribute |                        |
| 2  | 2       | Tcl             |           | 9.0.2   | gcc      | 4.58      | 4.00      | 2025-10-02 22:47:49 | Build directory not existent        | Clean Extract Configure Compile Distribute |                        |
| 3  | 3       | Tclappliescript |           | 2.2     |          |           |           |                     | Excluded from build (Darwin only)   | Darwin only                                |                        |
| 4  | 4       | tcllib          | Yes       | 2.1     | gcc      | 0.63      | 0.46      | 2025-10-02 22:48:27 | Build directory not existent        | Clean Extract Configure Compile Distribute |                        |
| 5  | 5       | TclStubs        |           | 9.0.2   | vs2022   | 1.58      | 0.94      | 2025-10-02 22:50:02 | Build directory not existent        | Clean Extract Configure Compile Distribute |                        |
| 6  | 6       | Tk              |           | 9.0.2   | gcc      | 1.11      | 1.08      | 2025-10-02 22:51:08 | Build directory not existent        | Clean Extract Configure Compile Distribute |                        |
| 7  | 7       | TkStubs         |           | 9.0.2   | vs2022   | 0.67      | 0.29      | 2025-10-02 22:51:48 | Build directory not existent        | Clean Extract Configure Compile Distribute |                        |
| 8  | 8       | udp             |           | 1.0.12  | gcc      |           | 0.30      |                     | Excluded from build (Option NoTcl9) | Option NoTcl9                              |                        |
| 9  | 9       | stext           |           | 0.1.1   | vs2022   | 0.22      | 0.22      | 2025-10-02 22:52:01 | Build directory not existent        | Clean Extract Configure Compile Distribute |                        |
| 10 | 10      | SetupTcl        |           |         |          | 0.55      | 1.38      | 2025-10-02 22:52:34 | Build directory not existent        | Clean Extract Configure Compile Distribute | Tags: -Doc Version=9.0 |

Log file C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Logs/\_BawtBuild.log (0.24 seconds to read)

```

22:52:34 > MultiFileCopy
  Source directory: C:/Program Files/Microsoft Visual Studio/2022/Community/VC/Redist/MSVC/14.44.35112/x64/Microsoft.VC143.CRT
  Target directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Development/bin
  File pattern : *.dll
  Number of copied files: 10
22:52:34 > MultiFileCopy
  Source directory: C:/Program Files/Microsoft Visual Studio/2022/Community/VC/Redist/MSVC/14.44.35112/x64/Microsoft.VC143.CRT
  Target directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Distribution/bin
  File pattern : *.dll
  Number of copied files: 10
22:52:34 > End FinalizeStage
22:52:34 > Summary
  Setup file : C:/poSoft/BawtMine/Setup/DocSetup.bawt
  Build directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build
  Architecture : x64
  Compiler : vs2022 gcc
  Global stages : Finalize
# : Library Name      Version      Build time      Stages
-----
1: InnoSetup          6.2.2        0.01 minutes    Clean Extract Configure Compile Distribute
2: Tcl                9.0.2        4.58 minutes    Clean Extract Configure Compile Distribute
3: Tclappliescript    2.2          Excluded        Darwin only
4: tcllib             2.1          0.63 minutes    Clean Extract Configure Compile Distribute
5: TclStubs           9.0.2        1.58 minutes    Clean Extract Configure Compile Distribute
6: Tk                 9.0.2        1.11 minutes    Clean Extract Configure Compile Distribute
7: TkStubs            9.0.2        0.67 minutes    Clean Extract Configure Compile Distribute
8: udp                1.0.12       Excluded        Option NoTcl9
9: stext              0.1.1        0.22 minutes    Clean Extract Configure Compile Distribute
10: SetupTcl          0.55 minutes  Clean Extract Configure Compile Distribute
Total: 9.35 minutes
  
```

Auto Update: OFF

### 3.3.2 User configurable build files

Some of the library build files are already setup to supply user configuration options. These configuration options can be supplied using the following methods:

As command line option `--copt`

As option string of the `Setup` procedure, see chapter [3.2 Setup Files](#).

The following build scripts currently support user configuration options:

| Build script | User options                                     |
|--------------|--------------------------------------------------|
| Tcl.bawt     | Build static tclsh: Static=ON OFF. Default: OFF. |

|         |                                                 |
|---------|-------------------------------------------------|
| Tk.bawt | Build static wish: Static=ON OFF. Default: OFF. |
|---------|-------------------------------------------------|

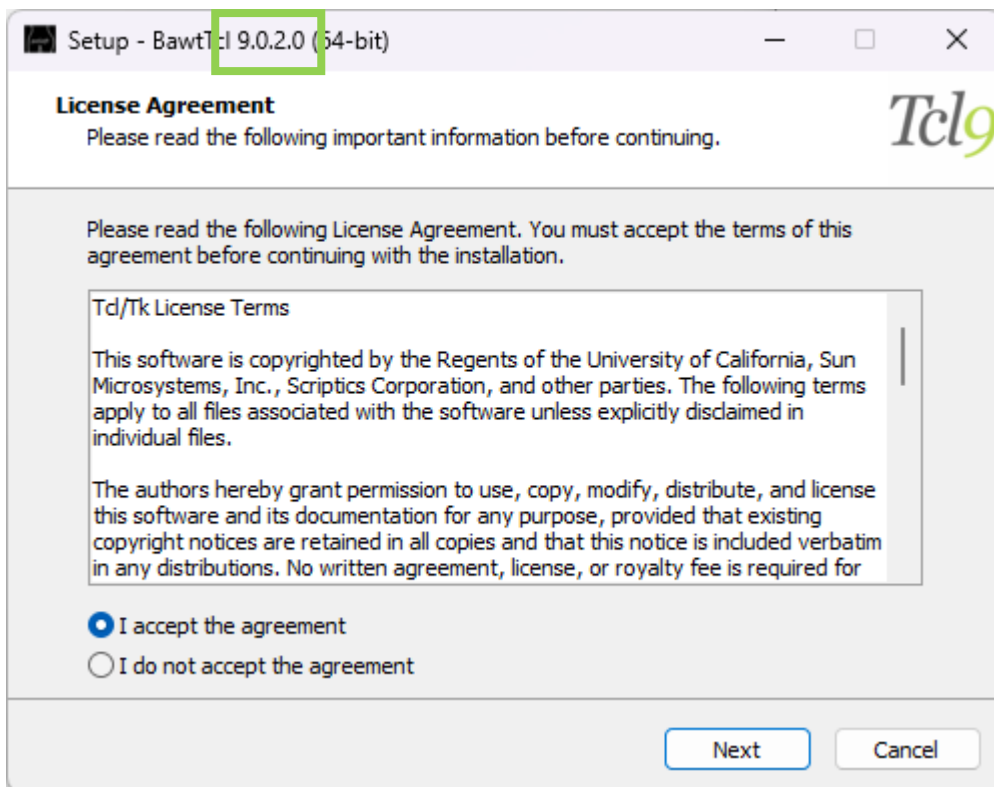
| Build script     | User options                                                                                                      |
|------------------|-------------------------------------------------------------------------------------------------------------------|
| SetupOsg.bawt    | Tag string for generated Setup file name: <i>Tag=XXX</i><br>Version string used for InnoSetup: <i>Version=XXX</i> |
| SetupPython.bawt |                                                                                                                   |
| SetupTcl.bawt    |                                                                                                                   |

The following example using Tcl version 9.0.2

```
--copt SetupTcl 'Tag=-BI' --copt SetupTcl 'Version=9.0.2.0'
```

generates an InnoSetup file with the following name:

*SetupTcl-**BI**-9.0.2-x64\_Bawt-3.2.0.exe*



| Build script  | User options                                                                                               |
|---------------|------------------------------------------------------------------------------------------------------------|
| SetupTcl.bawt | Setup type for Linux: Linux=tar deb. Default: tar.<br>Setup type for Darwin: Darwin=tar dmg. Default: tar. |

Example creating Debian distribution files on Linux and DMG files on Darwin:

```
--copt SetupTcl 'Linux=deb' --copt SetupTcl 'Darwin=dmg'
```

Note, that on Windows only InnoSetup distributions are supported. For a description of the different Unix setup types, see the section regarding creation of software distribution files in chapter [5.1.5 Use the generated libraries](#).

| Build script                         | User options                                                                                                                                                    |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| tcl3dExtended.bawt<br>tcl3dFull.bawt | Use static SDL library: StaticSDL=ON OFF. Default: OFF.<br>Currently only supported for Visual Studio builds, i.e. you must use vs20XXX+gcc as compiler option. |

Example:

```
--copt tcl3dExtended 'StaticSDL=ON'
```

| Build script | User options                                                                                                                                      |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| poImg.bawt   | Use threading: Threads=ON OFF. Default: ON.<br>Use Tk photos: Photos=ON OFF. Default: ON.<br>Use memory debugging: Memdebug=ON OFF. Default: OFF. |

Example:

```
--copt poImg 'Threads=OFF'
```

| Build script | User options                                                                                                                    |
|--------------|---------------------------------------------------------------------------------------------------------------------------------|
| tcllib.bawt  | Toggle critcl based compilation: Critcl=ON OFF. Default: ON.<br>Build dtplite starpack on Windows: Dtplite=ON OFF. Default: ON. |

Example:

```
--copt tcllib 'Critcl=OFF'
```

| Build script | User options                                                                                                                                                                                                                                                          |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| openssl.bawt | Specify configuration options: Options=None RedHat. Default: None.<br>None: No special configuration options except platform specific (ex. no-asm)<br>RedHat: Subset of the configuration options as used by RedHat. Available for Unix only. Supplied by Keith Nash. |

Example:

```
--copt openssl 'Options=RedHat'
```

| Build script | User options                                     |
|--------------|--------------------------------------------------|
| tcltls.bawt  | Toggle hardening: Hardening=ON OFF. Default: ON. |

Example:

```
--copt tcltls 'Hardening=OFF'
```

If `tcltls` is compiled with hardening set to ON, it is compiled with option `-fstack-protector-all`, which needs the `libssp-0.dll` library. That library is automatically copied into the `Tcl/bin` directory. Starting with gcc 13, the stack protector library is automatically linked statically. If hardening is set to OFF, `tcltls` does not need this external dependency.

| Build script  | User options                                                          |
|---------------|-----------------------------------------------------------------------|
| treectrl.bawt | Use shellicon integration on Windows: Shellicon=ON OFF. Default: OFF. |

Example:

```
--copt treectrl 'Shellicon=ON'
```

| Build script | User options                                                         |
|--------------|----------------------------------------------------------------------|
| SWIG.bawt    | Add Tcl dependency for SWIG test-suite: AddTcl=ON OFF. Default: OFF. |

Example:

```
--copt SWIG 'AddTcl=ON'
```

| Build script        | User options                                                                                                                                                |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OpenSceneGraph.bawt | Toggle example compilation:<br>-DBUILD_OSG_EXAMPLES=ON OFF. Default: OFF.<br>Keep the plugin directory structure:<br>KeepPluginFolder=ON OFF. Default: OFF. |

Example:

```
--copt OpenSceneGraph '-DBUILD_OSG_EXAMPLES=ON'
```

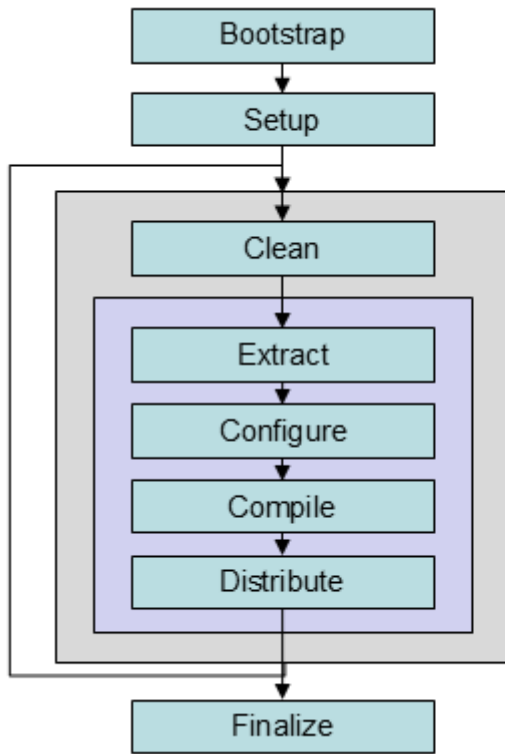
| Build script  | User options                                                                   |
|---------------|--------------------------------------------------------------------------------|
| osgearth.bawt | Toggle example compilation:<br>-DBUILD_OSGEARTH_EXAMPLES=ON OFF. Default: OFF. |

Example:

```
--copt osgearth '-DBUILD_OSGEARTH_EXAMPLES=ON'
```

## 4 Build Stages

This chapter describes the stages used in the **BAWT** framework to build the libraries specified in a *Setup* file.



The stages are grouped into global and library specific ones. The global stages `Bootstrap`, `Setup` and `Finalize` are called only once per **BAWT** execution, the library specific stages are called once for each library.

Four of the library specific stages (`Extract`, `Configure`, `Compile`, `Distribute`) are user configurable. Actions for these stages must be specified in the library *Build* files.

### 4.1 Stage Bootstrap

Extract and copy bootstrap tools.

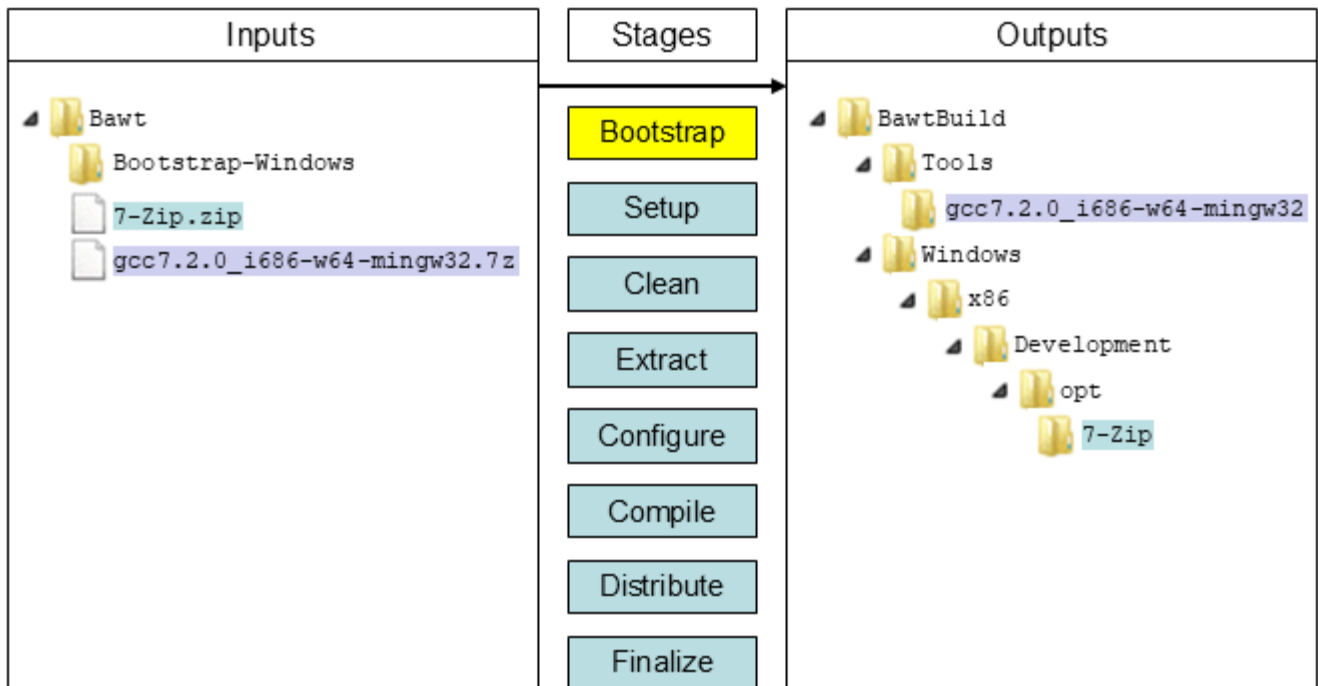
This stage is executed automatically on each invocation of *Bawt.tcl*.

It is not executed, if command line option `--list` is specified.

**BAWT** needs the **7-Zip** program to extract the library source distributions. For Windows and Darwin, a version of the **7-Zip** program is included in the **BAWT** framework. On Linux **7-Zip** is typically already available with the operating system or can be installed as Linux package `p7zip` or `p7zip-full`.

On Windows lots of the libraries are built with the MSYS/MinGW suite. Different versions of MSYS/MinGW are available on the **BAWT** download site.





Command line options influencing this stage:

[--gccversion](#)  
[--architecture](#)  
[--toolsdir](#)

The 7-Zip distribution itself must be compressed with standard ZIP, so that it can be extracted with the `vfss::zip` package contained in the `tkkit`. All other tools and libraries are compressed in 7-Zip format because of better compression rates (Example: MSYS/MinGW is 2 times smaller with 7z).

## 4.2 Stage Setup

Read and execute the specified *Setup* file.

This stage is executed automatically on each invocation of *Bawt.tcl*.

Check for existence of the library source code (either as a 7z file or directory) as well as the according *Build* file. If these do not exist in the library directory *InputLibs* of the current working directory (additional directories can be added with command line option [--libdir](#)) or are older than those available on the **BAWT** website, they are downloaded from the **BAWT** website.

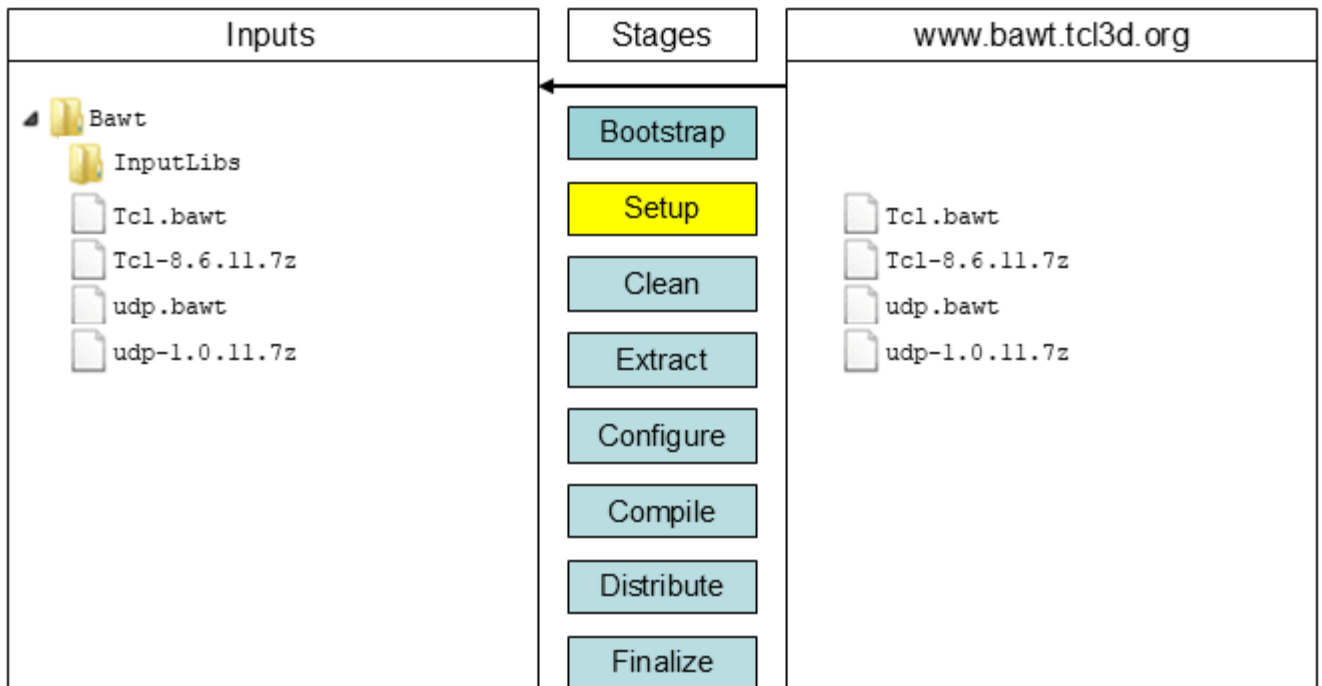
If this fails, a fatal error is thrown and the build process is stopped.

The version number of the library is extracted from the file or directory name of the library.

If build action is set to *Update*, the necessary build stages are determined according to the existence of the library source and *Build* files as well as to the modification times of the corresponding build and install directories.

Checking for newer versions and automatic downloading may be skipped by specifying command line option [--noonline](#).



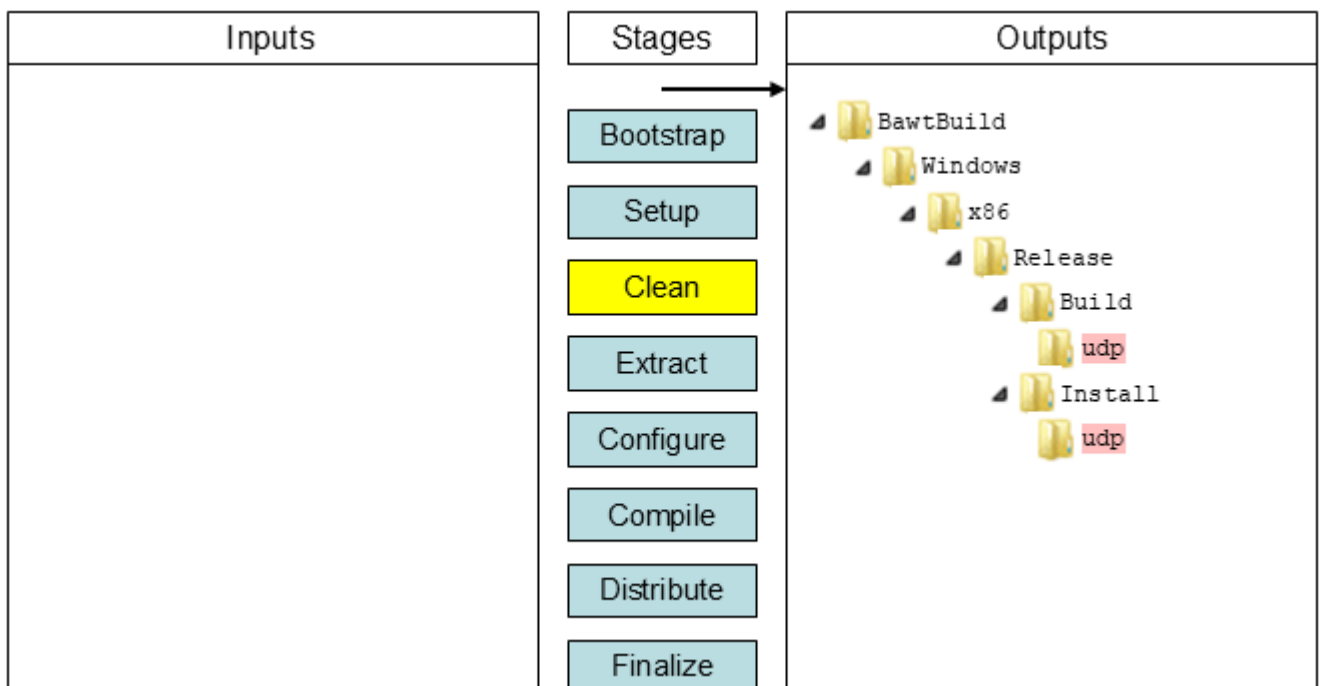


Command line options influencing this stage:

[--noonline](#)  
[--norecursive](#)  
[--sort](#)  
[--url](#)

### 4.3 Stage Clean

Remove library specific build and install directory.



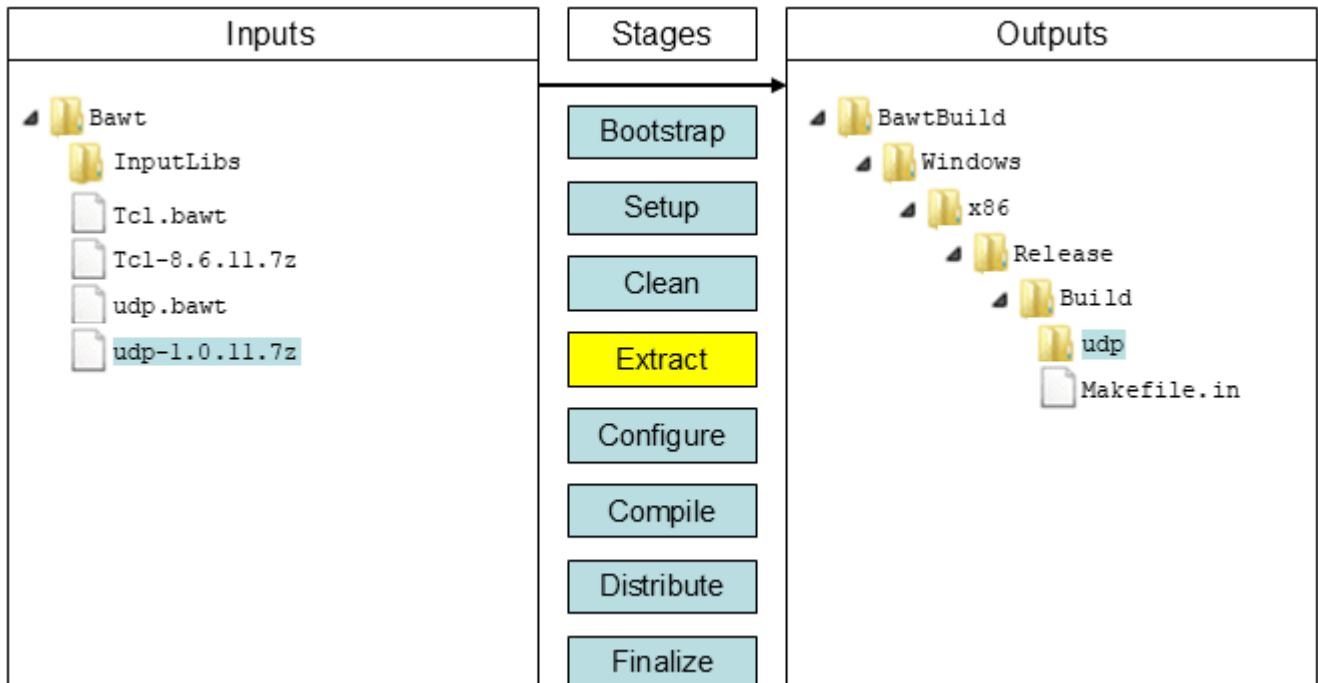
Command line options influencing this stage:

[--clean](#)

[--timeout](#)

## 4.4 Stage Extract

Extract library source code into build directory.



In stage `Extract` the library source code will be extracted and copied into the build directory. This is achieved by calling the **BAWT** procedure `ExtractLibrary`, which cares about having either a source directory or a compressed source file.

Ideally the source code can be compiled without any changes. If changes have to be done, it is preferred not to edit the source code manually, but make the changes in the build script after extraction.

**BAWT** has two utility procedures for this purpose:

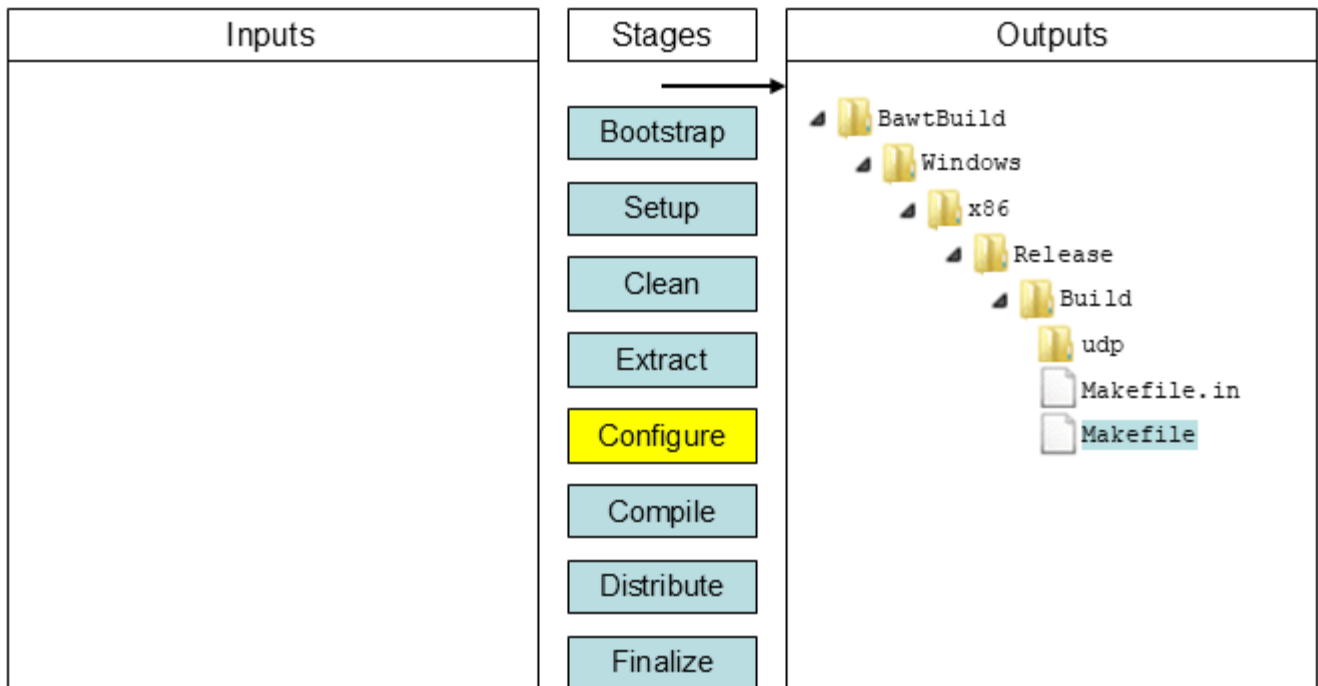
- `ReplaceLine`
- `ReplaceKeywords`

Command line options influencing this stage:

[--extract](#)

## 4.5 Stage Configure

Configure library for compilation.



In stage `Configure` the library will be configured, which generates the appropriate make files for the chosen compiler and platform.

The following high-level **BAWT** procedures are available for configuration tasks:

- `CMakeConfig` when using the CMake build infrastructure.
- `MSysConfig` when using a configure script with “standard” options.
- `TeaConfig` when using the Tcl Extension Architecture for Tcl packages.

See the source code of `Bawt.tcl` to get the default options set by these procedures.

If the build infrastructure does not fit any of the mentioned one above, the configuration command must be built up as a Tcl string and executed with the generic **BAWT** procedure `MSysRun`.

See the miscellaneous build scripts for usage examples.

The following **BAWT** procedures are typically used for configuration tasks:

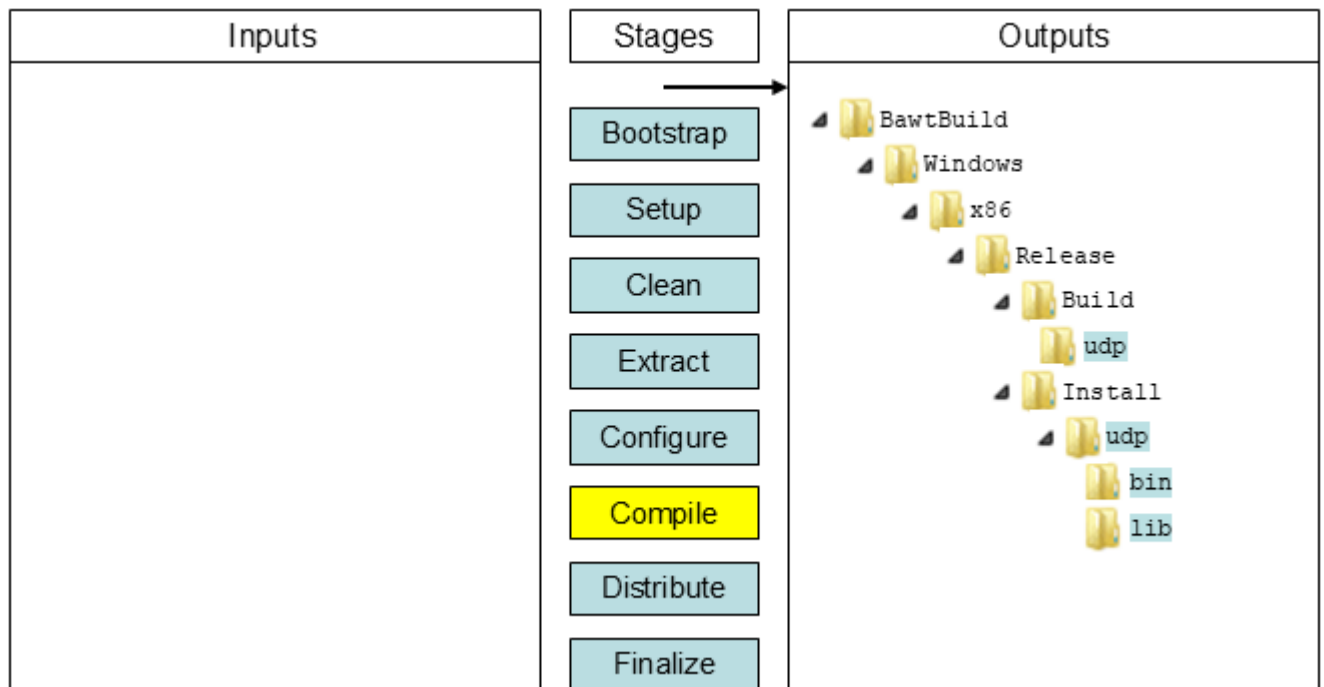
- `IsIntel`
- `IsArm`
- `IsRiscV`
- `IsDebugBuild`
- `IsReleaseBuild`
- `IsWindows`
- `IsLinux`
- `IsDarwin`
- `IsSunOS`
- `IsIRIX`
- `IsUnix`

Command line options influencing this stage:

[`--configure`](#)  
[`--architecture`](#)  
[`--compiler`](#)  
[`--gccversion`](#)  
[`--buildtype`](#)  
[`--copt`](#)

## 4.6 Stage Compile

Compile and install library.



In stage `Compile` the library will be compiled and installed.

The following high-level **BAWT** procedures are available for compilation tasks:

- `CMakeBuild` when using the CMake build infrastructure.
- `MSysBuild` when using the Tcl Extension Architecture for Tcl packages.

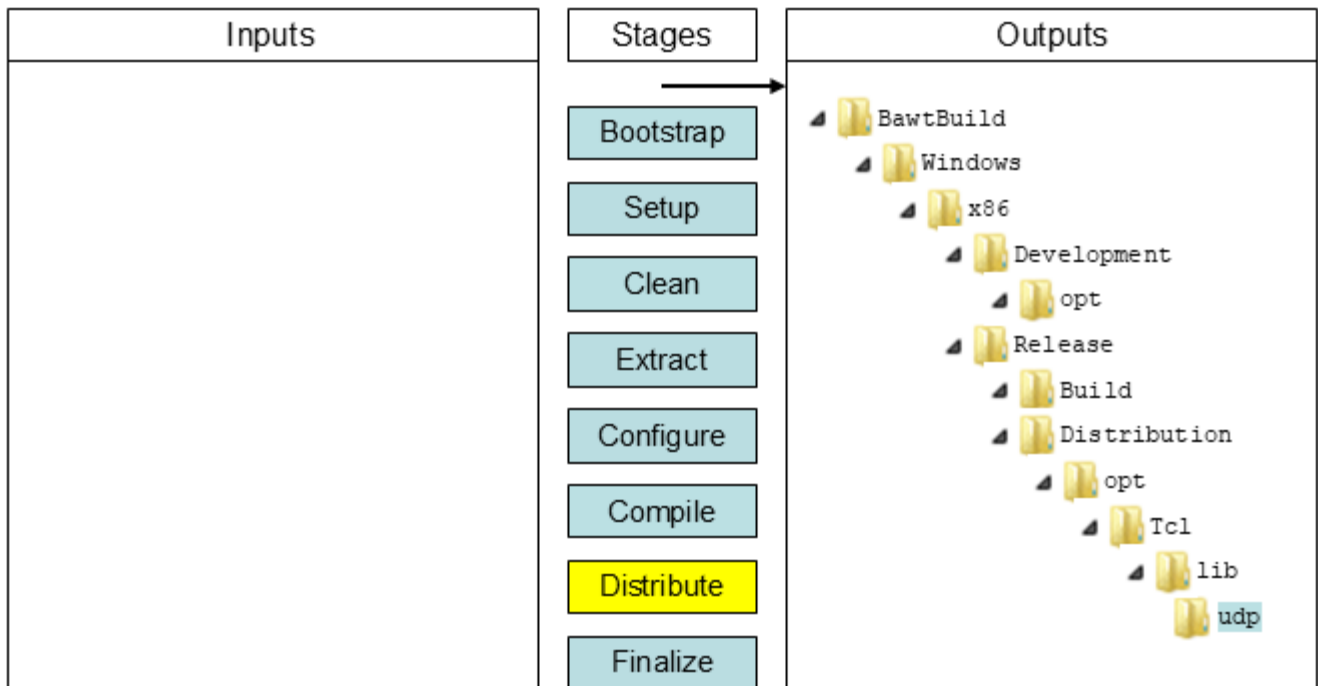
If the build infrastructure does not fit any of the two mentioned above, the compilation command must be built up as a Tcl string and executed with either **BAWT** procedure `MSysRun` or `DosRun`.

Command line options influencing this stage:

[--compile](#)  
[--numjobs](#)  
[--nostrip](#)  
[--noimportlibs](#)

## 4.7 Stage Distribute

Copy relevant files into developer and user distribution directories.



In stage `Distribute` the library will be copied into the distribution and development directories. The following **BAWT** procedures are typically used for distribution tasks:

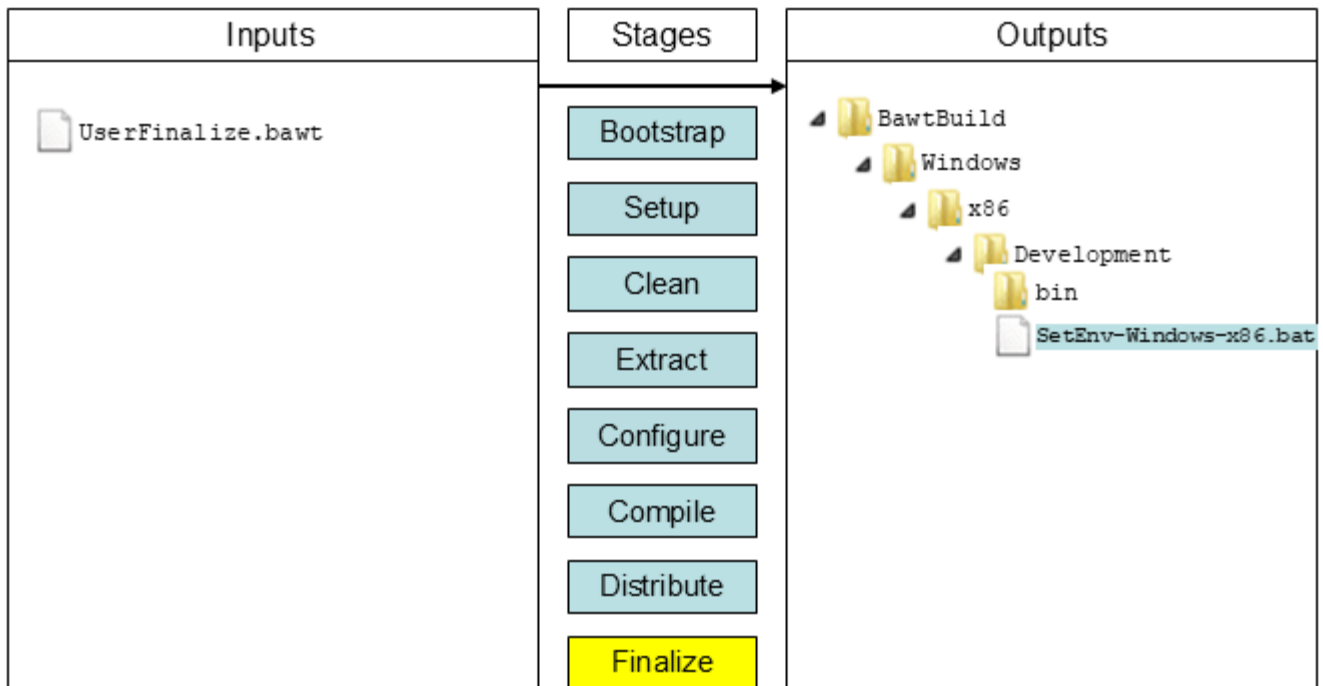
- `SingleFileCopy`
- `MultiFileCopy`
- `LibFileCopy`
- `FileRename`
- `UseTclPkgVersion`
- `IsDebugBuild`
- `IsReleaseBuild`
- `IsWindows`
- `IsLinux`
- `IsDarwin`
- `IsSunOS`
- `IsUnix`
- `ErrorAppend`

Command line options influencing this stage:

[`--distribute`](#)  
[`--noverison`](#)

## 4.8 Stage Finalize

Perform final actions, optionally call user supplied `Finalize` procedure and print summary.



The Finalize stage is performed automatically at the end of the build process or can be manually selected with command line option [--finalize](#).

The Finalize stage creates an environment file in the `Development/bin` directory called `SetEnv-*.bat` or `SetEnv-*.sh`. It contains all the environment variables set by the `Env_libName` procedures of the libraries.

If running on Windows with Visual Studio it also copies the appropriate Visual Studio runtime libraries into the `Development/bin` directory. If you do not want to copy these runtime libraries, use command line option [--noruntimelibs](#).

To supply a user defined finalize action to **BAWT**, create a file containing a procedure named `Finalize`. See the file `UserFinalize.tcl` in **BAWT** directory `Setup` as an example.

You can use any standard Tcl procedure or one of the **BAWT** procedures like `Log` or `MultiFileCopy` in the `Finalize` procedure.

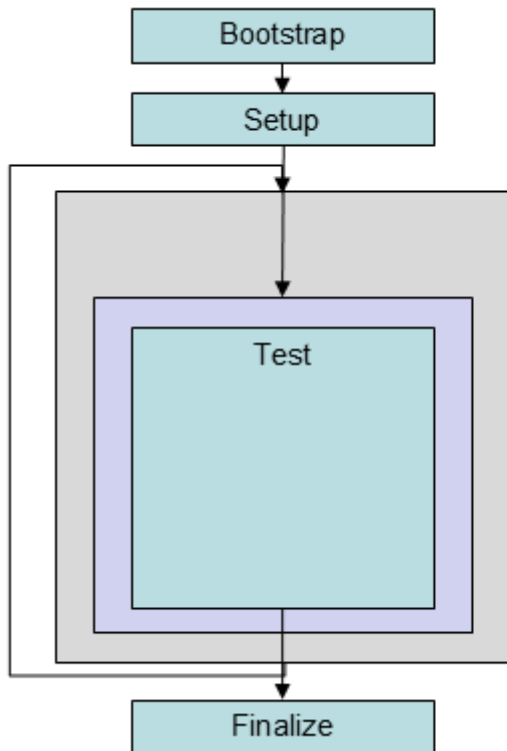
To make the file containing your Finalize procedure available for the **BAWT** build process, use command line option [--finalizefile](#).

Command line options influencing this stage:

[--finalize](#)  
[--finalizefile](#)  
[--noruntimelibs](#)

## 4.9 Stage Test

Perform test scripts as specified in procedure `Test_libName`.



See the section regarding test procedures `Test_libName` in chapter [3.3 Build Files](#).

The Test stage must be manually selected with command line option `--test`.

## 5 Build Process

This chapter gives insight into the BAWT build process from the perspective of a user of BAWT as well as from the perspective of a developer, who wants to extend BAWT with new libraries.

### 5.1 User Perspective

As described in the previous chapter a specific stage can be executed with one of the following command line action options. These specific action options are typically only used when integrating a new library into BAWT.

```
--clean      : Clean library specific build and install directories.
--extract    : Extract library source from a ZIP file or a directory.
--configure  : Perform the configure stage of the build process.
--compile    : Perform the compile stage of the build process.
--distribute : Perform the distribution stage of the build process.
--finalize   : Generate environment file and call user supplied Finalize procedure.
```

The following global command line action options are typically used for building or updating the BAWT libraries.

```
--complete : Perform the following stages in order:
              clean, extract, configure, compile, distribute, finalize.
--update    : Perform necessary stages depending on modification times.
              Note: Global stage finalize is always executed.
--simulate  : Simulate update action without actually building libraries.
--touch     : Set modification times of library build directories to current time.
```

Option `--complete` makes a complete rebuild of the specified libraries, while `--update` checks, which libraries have to be rebuilt.

The necessary build stages are determined according to the existence of the library source and *Build* files as well as to the modification times of the corresponding build directories.

It is also checked, if the build of a library has been cancelled or stopped by checking for the existence of a so-called *Progress File*, which is created in the *Logs* directory at the start of a library build and deleted after a successful library build.

Additionally, a check is performed, if a library is dependent of another library, which has been rebuilt. This recursive dependency checking can be switched off with command line option `--norecursive`.

The `--simulate` option performs the same actions as the `--update` option, but does not build anything. It just prints out, which libraries would be rebuilt, if you would execute the `--update` command line option.

It often happens, that only cosmetic changes are done to a Build file, which would cause this library (and all dependent libraries) to be rebuilt. To avoid rebuilding of these libraries, specify the option `--touch`, which sets the modification times of the build directories to the current date and time.

#### 5.1.1 Use Case: Cosmetic change of Build file *Tcl.bawt*

Due to the number of dependencies, a change of Build file *Tcl.bawt* would cause a lot of libraries to be rebuilt, as the next screenshot of the **BawtLogViewer** shows, when executing a `--simulate` run.



BAWT - Setup file C:/poSoft/BawtMine/Setup/DocSetup.bawt (vs2022 gcc)

File Settings Help

Setup contains 10 libraries

| #  | Build-# | Library Name   | User file | Version | Compiler | Exe. time       | Est. time | Mod. time           | Update cause                        | Stages | User config              |
|----|---------|----------------|-----------|---------|----------|-----------------|-----------|---------------------|-------------------------------------|--------|--------------------------|
| 1  | 1       | InnoSetup      |           | 6.2.2   |          | Simulation mode | 0.02      | 2025-10-02 21:18:26 |                                     |        |                          |
| 2  | 2       | Tcl            |           | 9.0.2   | gcc      | Simulation mode | 4.00      | 2025-10-02 21:41:40 | Build file newer than build dir     |        |                          |
| 3  | 3       | Tclapplescript |           | 2.2     |          |                 |           |                     | Excluded from build (Darwin only)   |        |                          |
| 4  | 4       | tcllib         | Yes       | 2.1     | gcc      | Simulation mode | 0.46      | 2025-10-02 21:23:40 | Recursive dependency on Tcl         |        |                          |
| 5  | 5       | TclStubs       |           | 9.0.2   | vs2022   | Simulation mode | 0.94      | 2025-10-02 21:25:15 | Build directory not existent        |        |                          |
| 6  | 6       | Tk             |           | 9.0.2   | gcc      | Simulation mode | 1.08      | 2025-10-02 21:26:21 | Recursive dependency on Tcl         |        |                          |
| 7  | 7       | TkStubs        |           | 9.0.2   | vs2022   | Simulation mode | 0.29      | 2025-10-02 21:26:56 | Recursive dependency on TclStubs    |        |                          |
| 8  | 8       | udp            |           | 1.0.12  | gcc      |                 | 0.30      |                     | Excluded from build (Option NoTcl9) |        |                          |
| 9  | 9       | rtext          |           | 0.1.1   | vs2022   | Simulation mode | 0.22      | 2025-10-02 21:27:09 | Recursive dependency on TclStubs    |        |                          |
| 10 | 10      | SetupTcl       |           |         |          | Simulation mode | 1.38      | 2025-10-02 21:27:40 | Recursive dependency on All         |        | Tag=-Doc Version=9.0.2.0 |

Log file C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Logs/\_BawtBuild.log (0.16 seconds to read)

```

21:43:54 > End wapr: Excluded from build (Option NoTcl9)

21:43:54 > Start rtext 0.1.1 (Library #9 of 10)
      Build types : Release
      Update cause: Recursive dependency on TclStubs
21:43:54 > End rtext 0.1.1: Simulation mode

21:43:54 > Start SetupTcl (Library #10 of 10)
      Build types : Release
      Update cause: Recursive dependency on All
21:43:54 > End SetupTcl : Simulation mode

21:43:54 > Summary
      Setup file      : C:/poSoft/BawtMine/Setup/DocSetup.bawt
      Build directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build
      Architecture   : x64
      Compilers      : vs2022 gcc
      Global stages   : None
      # : Library Name      Version      Build action      Build cause
      -----
      1: InnoSetup          6.2.2        None              Build file newer than build dir
      2: Tcl                 9.0.2        Update            Build file newer than build dir
      3: Tclapplescript      2.2          None              Darwin only
      4: tcllib              2.1          Update            Recursive dependency on Tcl
      5: TclStubs            9.0.2        Update            Build directory not existent
      6: Tk                  9.0.2        Update            Recursive dependency on Tcl
      7: TkStubs             9.0.2        Update            Recursive dependency on TclStubs
      8: udp                  1.0.12       None              Option NoTcl9
      9: rtext                0.1.1        Update            Recursive dependency on TclStubs
      10: SetupTcl           -            Update            Recursive dependency on All

      Total: 0.00 minutes
  
```

Auto Update: OFF

To avoid the rebuild of all of these libraries, which may take a lot of time, we execute a `--touch` run. Note the execution of the `DirTouch` procedure of the BAWT framework shown in the text widget in the lower half of the window.

BAWT - Setup file C:/poSoft/BawtMine/Setup/DocSetup.bawt (vs2022 gcc)

File Settings Help

Setup contains 10 libraries

| #  | Build-# | Library Name   | User file | Version | Compiler | Exe. time | Est. time | Mod. time           | Update cause                        | Stages        | User config             |
|----|---------|----------------|-----------|---------|----------|-----------|-----------|---------------------|-------------------------------------|---------------|-------------------------|
| 1  | 1       | InnoSetup      |           | 6.2.2   |          | 0.00      | 0.02      | 2025-10-02 21:18:26 |                                     |               |                         |
| 2  | 2       | Tcl            |           | 9.0.2   | gcc      | 0.00      | 4.00      | 2025-10-02 21:49:10 |                                     |               |                         |
| 3  | 3       | Tclapplescript |           | 2.2     |          |           |           |                     | Excluded from build (Darwin only)   | Darwin only   |                         |
| 4  | 4       | tcllib         | Yes       | 2.1     | gcc      | 0.00      | 0.46      | 2025-10-02 21:49:50 |                                     |               |                         |
| 5  | 5       | TclStubs       |           | 9.0.2   | vs2022   | 0.00      | 0.94      | 2025-10-02 21:51:24 |                                     |               |                         |
| 6  | 6       | Tk             |           | 9.0.2   | gcc      | 0.00      | 1.08      | 2025-10-02 21:52:38 |                                     |               |                         |
| 7  | 7       | TkStubs        |           | 9.0.2   | vs2022   | 0.00      | 0.29      | 2025-10-02 21:53:21 |                                     |               |                         |
| 8  | 8       | udp            |           | 1.0.12  | gcc      |           | 0.30      |                     | Excluded from build (Option NoTcl9) | Option NoTcl9 |                         |
| 9  | 9       | rtext          |           | 0.1.1   | vs2022   | 0.00      | 0.22      | 2025-10-02 21:53:36 |                                     |               |                         |
| 10 | 10      | SetupTcl       |           |         |          | 0.00      | 1.38      | 2025-10-02 21:54:08 |                                     |               | Tag=Doc Version=9.0.2.0 |

Log file C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Logs/\_BawtBuild.log (0.18 seconds to read)

```

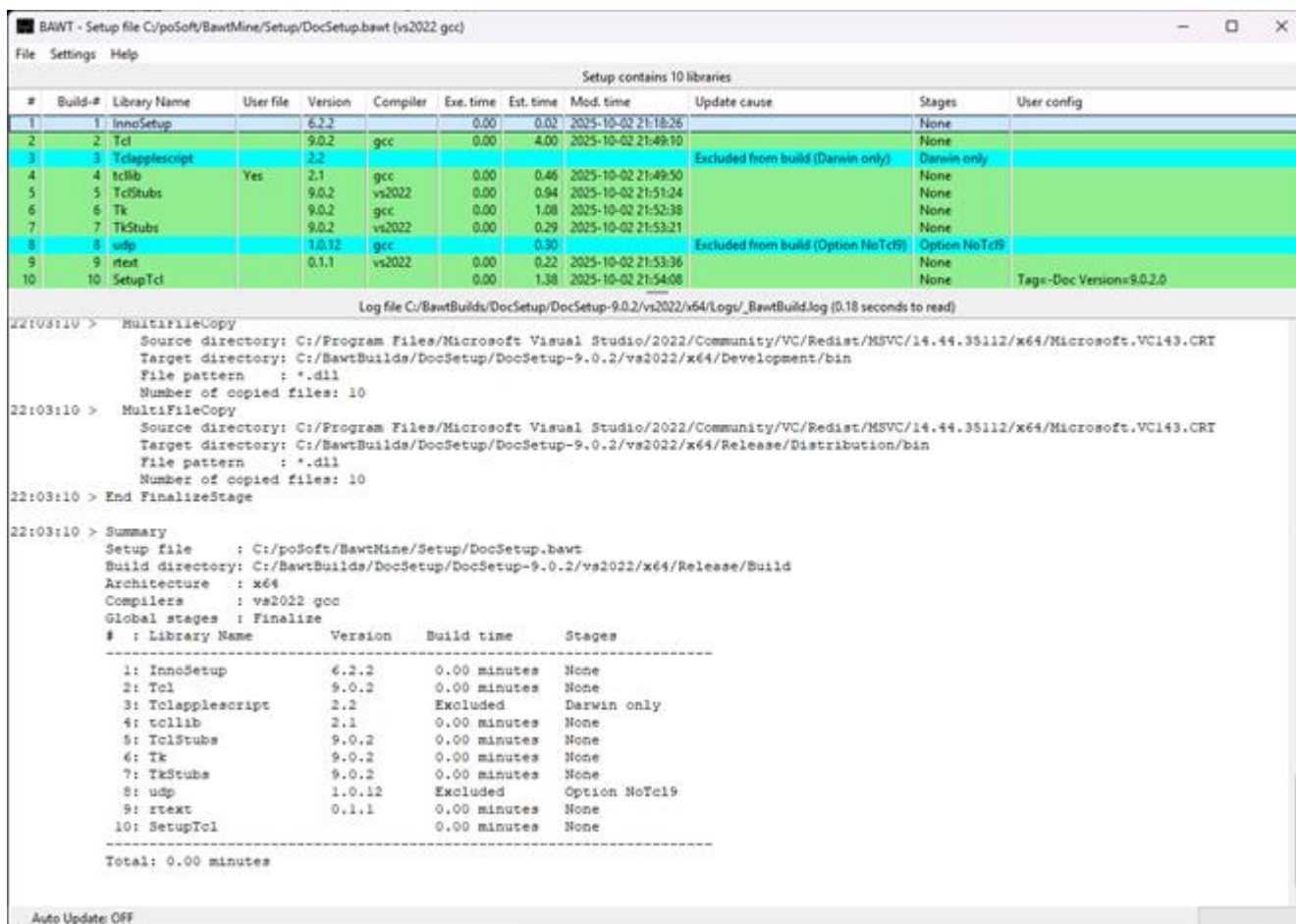
22:32:12 > Build rtext 0.1.1 (Release)
  DirTouch
  Directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/rtext
22:32:27 > End rtext 0.1.1: 0.00 minutes

22:32:27 > Start SetupTcl (Library #10 of 10)
  Build types : Release
22:32:27 > Build SetupTcl (Release)
  DirTouch
  Directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/SetupTcl
22:32:27 > End SetupTcl : 0.00 minutes

22:32:27 > Summary
  Setup file      : C:/poSoft/BawtMine/Setup/DocSetup.bawt
  Build directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build
  Architecture    : x64
  Compilers       : vs2022 gcc
  Global stages   : Touch
  # : Library Name      Version      Build time
  -----
  1: InnoSetup          6.2.2        0.00 minutes
  2: Tcl                9.0.2        0.00 minutes
  3: Tclapplescript     2.2          Excluded
  4: tcllib             2.1          0.00 minutes   Darwin only
  5: TclStubs           9.0.2        0.00 minutes
  6: Tk                 9.0.2        0.00 minutes
  7: TkStubs            9.0.2        0.00 minutes
  8: udp                1.0.12       Excluded        Option NoTcl9
  9: rtext              0.1.1        0.00 minutes
  10: SetupTcl          -            0.00 minutes
  -----
  Total: 0.00 minutes
  
```

Auto Update: OFF

If we now perform an `--update` run, none of the libraries are rebuilt.



### 5.1.2 Use case: Test Tcl/Tk alpha and beta releases

Using the options `URL` and `Version` of procedure `Setup`, it is now easy to download, build and test Tcl/Tk alpha or beta release candidates.

If not done already, download the BAWT framework and optionally on Windows the appropriate MinGW distribution as described in chapter [2 Installation and Usage Examples](#).

Then create a new Setup file, ex. `Tcl_TestAlphaBeta.bawt`.

The file should look like the one shown below, which was made to test the release candidate zero of Tcl/Tk 9.0.4.

```

# Use Tcl/Tk release candidates from SourceForge.
set tclUrl "https://sourceforge.net/projects/tcl/files/Tcl/9.0.4/"

# Setup LibName  ZipFile          BuildFile      BuildOptions
Setup Tcl        tcl9.0.4rc0-src.tar.gz  Tcl.bawt       Version=9.0.4 URL=$tclUrl
Setup Tk         tk9.0.4rc0-src.tar.gz  Tk.bawt        Version=9.0.4 URL=$tclUrl
  
```

*Note the usage of the `URL` option to point BAWT to the SourceForge location of the release candidates. Also note, that BAWT cannot extract the version number automatically from the source code file name, so the `Version` option has to be specified, too.*

You also have to specify the Tcl version by adding command line option `--tclversion 9.0.4` to variable `BAWTOPTS` in file `Build-Windows.bat` or `Build-Linux.sh`.

To download, build and test the release candidate on Windows, execute the following commands:

```
Build-Windows.bat intel 64 gcc Setup\Tcl_TestAlphaBeta.bawt update
Build-Windows.bat intel 64 gcc Setup\Tcl_TestAlphaBeta.bawt test
```

To download, build and test the release candidate on Linux, execute the following commands:

```
./Build-Linux.sh intel 64 Setup/Tcl_TestAlphaBeta.bawt update
./Build-Linux.sh intel 64 Setup/Tcl_TestAlphaBeta.bawt test
```

If you have done those steps once and a new alpha/beta release is available, you only have to change the Setup file regarding Tcl and Tk file names.

### 5.1.3 Compiler selection on Windows

On Linux, Darwin and SunOS only the gcc compiler suite is supported.

On Windows gcc and Visual Studio are supported. Some packages can be compiled only with gcc or only with Visual Studio. More and more libraries can be compiled with either gcc or Visual Studio.

Starting with version 2.0, **BAWT** supports the notion of primary and secondary compilers on Windows. Which compilers are supported by a build script is indicated with BAWT procedure *SetWinCompilers*.

```
proc Init_tkdnd { libName libVersion } {
    SetScriptAuthor      $libName "Paul Obermeier" "obermeier@tcl3d.org"
    SetLibHomepage       $libName "https://github.com/petasis/tkdnd"
    SetLibDependencies   $libName "CMake" "Tk"
    SetPlatforms         $libName "All"
    SetWinCompilers      $libName "gcc" "vs"
}
```

The above call of *SetWinCompilers* indicates, that the library can be compiled by both Visual Studio and gcc.

To see, which Windows compilers are supported, use the [--wincompilers](#) command line option or look for that information in the corresponding build files.

To determine, which compiler should be used in an actual compilation, there is the possibility to specify the compiler using command line option [--compiler](#).

This option has been extended to not only accept gcc or vs20XX as arguments, but also a combination of both using a plus sign as separator, ex. gcc+vs2019.

If a library does not support the Windows compiler selected when calling BAWT, then that library is excluded from the build. The log file contains a message like the following:

```
15:02:30 > Start Boost 1.58.0 (Library #2 of 137)
           Build types : Release
15:02:30 > End Boost: Excluded from build (Compiler gcc not supported)
```

#### Behaviour before BAWT version 2.0:

If the chosen Windows compiler is Visual Studio, but the package only supports gcc, the gcc compiler was automatically chosen as secondary compiler, as the MSYS/MinGW suite is part of BAWT and therefore always available. The other way is not supported, as a Visual Studio compiler may not be available.

The following 3 options of choosing a compiler on Windows were available up to BAWT version 1.3.0.

| BAWT 1.3.0 | Command line option <code>--compiler</code> | SetWinCompilers |          |        |
|------------|---------------------------------------------|-----------------|----------|--------|
|            |                                             | gcc             | vs       | gcc vs |
| Option 1   | Not specified                               | gcc             | Excluded | gcc    |
| Option 2   | <code>--compiler gcc</code>                 | gcc             | Excluded | gcc    |
| Option 3   | <code>--compiler vs20XX</code>              | gcc             | vs       | vs     |

### Behaviour since BAWT version 2.0:

With BAWT 2.0 two new options have been added, which specify the primary and secondary compiler.

| BAWT 2.0 | Command line option <code>--compiler</code> | SetWinCompilers |          |        |
|----------|---------------------------------------------|-----------------|----------|--------|
|          |                                             | gcc             | vs       | gcc vs |
| Option 1 | Not specified                               | gcc             | Excluded | gcc    |
| Option 2 | <code>--compiler gcc</code>                 | gcc             | Excluded | gcc    |
| Option 3 | <code>--compiler vs20XX</code>              | Excluded        | vs       | vs     |
| Option 4 | <code>--compiler gcc+vs20XX</code>          | gcc             | vs       | gcc    |
| Option 5 | <code>--compiler vs20XX+gcc</code>          | gcc             | vs       | vs     |

Options 1 and 2 work the same way as they did in BAWT versions before 2.0. Option 3 now does not compile packages supporting only gcc. This behaviour can now be achieved by specifying Option 4 (vs20XX+gcc).

To support this new functionality, several incompatible changes had to be implemented:

| New procedures                | Removed procedures                |
|-------------------------------|-----------------------------------|
| <i>SetCompilerVersions</i>    | <i>GetVSCompilerVersionNumber</i> |
| <i>GetCompilerVersions</i>    | <i>IsVSCompilerNewer</i>          |
| <i>UseVisualStudio</i>        | <i>IsVSCompiler</i>               |
| <i>GetVisualStudioVersion</i> | <i>SetForceVSCompiler</i>         |
| <i>NeedDll2Lib</i>            | <i>ForceVSCompiler</i>            |

Procedure *GetCompilerVersion* now has a changed and extended signature.

Compilation of **Tcl/Tk** and all supported Tcl packages (everything included in *Setup* files *Tcl\_Basic.bawt* and *Tcl\_Extended.bawt*) is possible without using Visual Studio with the exception of building Visual Studio compatible Tcl and Tk stub libraries. Those stub libraries can only be compiled using Visual Studio.

To generate Visual Studio compatible Tcl and Tk import libraries (\*.lib) the **BAWT** procedure *Dll2Lib* is used. It creates the import library from the DLL by using the **link.exe** program, which is part of Visual Studio.

If Visual Studio is not available, a warning message like the following is issued:

```
Warning > Dll2Lib tk86.lib: Creating import libraries needs VisualStudio
```

To avoid these warnings, add command line option `--noimportlibs`, if Visual Studio is not available or import libraries are not needed.

### 5.1.4 Online updates of libraries

If using the online update functionality, it is recommended that the local BAWT version is identical to the remote version on the BAWT server. If the local major or minor version is older than the remote version, a fatal error is generated:

FATAL &gt; Remote major version 3.2.0 different to major local version 2.3.0

If only the patch version differs, a warning is issued.

You are able to download with different local and remote versions by specifying the `--noexit` command line option, but this is not recommended.

To have a consistent set of library versions or if using **BAWT** on a computer without internet connection, use the command line option `--noonline` to avoid checking for updates and automatic downloading of new libraries.

### 5.1.5 Use the generated libraries

To use the generated libraries, the following possibilities exist:

- Manually copy the appropriate directory.
- Use the *Finalize* procedure.
- Create a software distribution setup file

#### **Manually copy the appropriate directories**

Copy the appropriate directories from either the *Distribution* or *Development* directory to a suitable location on your computer.

For example, after executing the Setup file *Tcl\_Basic.bawt* to generate a **Tcl** distribution for Windows, copy output directory *Development\opt\Tcl* to *C:\Tcl* and set the environment variables `PATH` and `TCLLIBPATH`.

*Note, that the entries of the `PATH` variable on Windows are separated by semicolons (;). The entries of variable `TCLLIBPATH` are separated by spaces and directory paths must use slashes (/) instead of backslashes (\).*

*On Unix the environment variables are typically set in the shell resource file, ex. `.bashrc`:*

#### **Use the Finalize procedure**

Instead of doing the copy manually, it is easier and faster to do the copying in the Finalize stage. The **BAWT** framework contains a template Finalize file *Setup/UserFinalize.bawt*, which is shown below.

Adapt the installation paths according to your local needs.

```
# Example script for user supplied Finalize procedure.
#
# The procedure copies the generated Tcl distribution
# from the Development folder into a folder specified
# in your Path environment variable.
#
# You have to adapt the installation paths (tclRootDir)
# according to your needs.
#
# To execute the Finalize procedure, the name of this file
# must be specified on the BAWT command line with option
# "--finalizefile".

proc Finalize {} {
    Log "Finalize (User defined)"

    # For safety reasons this is just a dummy mode.
    # Remove the next lines to enable functionality.
```



```

if { 1 } {
    Log "Finalize Dummy mode" 2 false
    return
}

if { [IsWindows] } {
    set tclRootDir "C:/opt"
} elseif { [IsLinux] } {
    set tclRootDir "~/opt"
} elseif { [IsDarwin] } {
    set tclRootDir "~/opt"
} elseif { [IsSunOS] } {
    set tclRootDir "~/opt"
} elseif { [IsIRIX] } {
    set tclRootDir "~/opt"
} else {
    ErrorAppend "Finalize: Cannot determine operating system" "FATAL"
}

set tclInstDir [file join $tclRootDir "Tcl"]

Log "Installing Tcl into $tclInstDir" 2 false
DirDelete $tclInstDir

MultiFileCopy [file join [GetOutputDevDir] [GetTclDir]] $tclInstDir "*" true
}

```

## Create a software distribution setup file

There are currently three *Build* files to create software distribution setup files:

- *SetupTcl.bawt* to create a **Tcl** Batteries-Included software distribution
- *SetupPython.bawt* to create a **Python** software distribution
- *SetupOsg.bawt* to create an **OpenSceneGraph** software distribution

These scripts take all contents of the *Release/Distribution* directory and create a software distribution setup file. This setup file is created with **InnoSetup** on Windows and as a simple, self-extracting shell script for Unix platforms.

The *SetupTcl.bawt* script also supports creation of Debian distribution files using user configuration option `Linux=deb` on Debian and Ubuntu. On Darwin a DMG software distribution file can be created using user configuration option `Darwin=dmg`.

The software distribution setup file itself is generated in the *Release/Distribution* directory.

The software distribution setup file name for **Tcl/Tk** has the Tcl version, the architecture and the BAWT version used to build the distribution encoded into the file name.

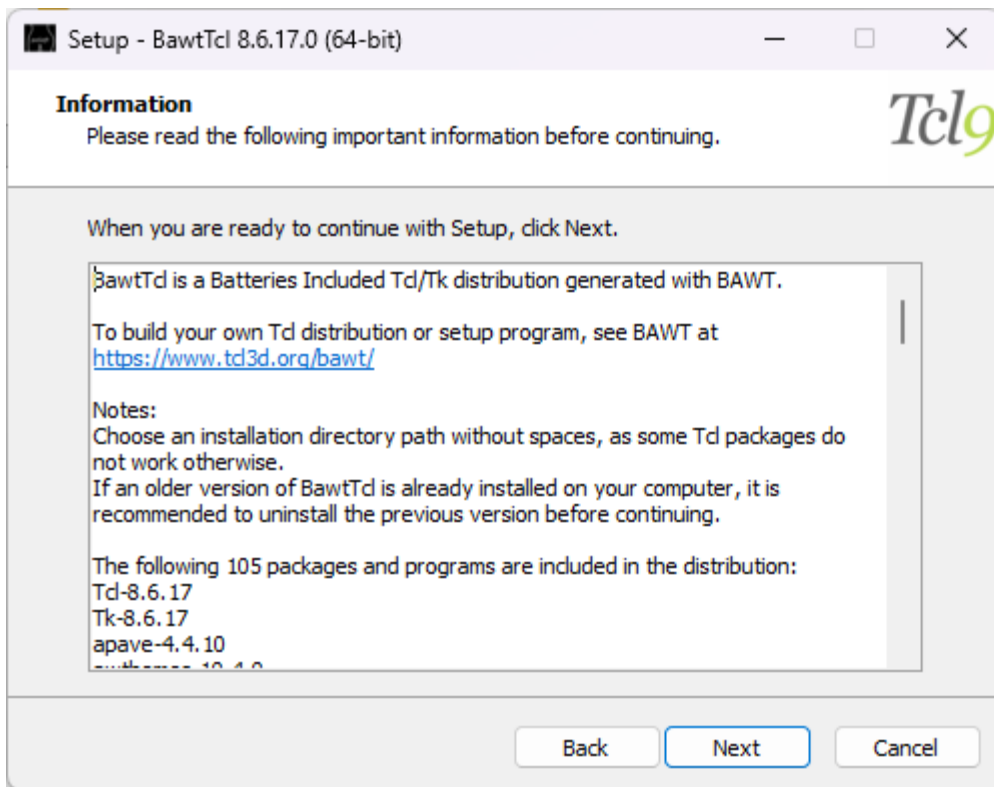
Example: `SetupTcl-BI-8.6.18-x64_Bawt-3.3.0.exe`

The software distribution setup file name for **OpenSceneGraph** has the OSG version, the compiler version, the architecture and the BAWT version used to build the distribution encoded into the file name.

Example: `SetupOsg-3.4.1-vs2013-x64_Bawt-3.3.0.exe`

In the same directory as the distribution setup files, text files named *SetupTcl-8.6.18.txt* resp. *SetupOsg-3.4.1.txt* are created, which list the contents of the software distribution setup file.

This list is used to display the contents of the **InnoSetup** based distribution setup file, see the following screenshot for an example.



For Unix (Linux, Darwin, SunOS and IRIX) a simple shell script-based distribution setup file is generated. If called without arguments, a simple usage message is displayed.

```
> ./SetupTcl-BI-8.6.18-x64_Bawt-3.3.0.sh

Usage: SetupTcl-BI-8.6.18-x64_Bawt-3.3.0.sh InstallationDirectory
Install folder Tcl into specified installation directory
```

If called with a not existing installation directory path, an error message is printed onto standard output.

```
> ./SetupTcl-BI-8.6.18-x64_Bawt-3.3.0.sh asdf

Installation directory asdf does not exist.
Check name or create manually.
```

If called with a valid installation directory, the contents are extracted into that directory and a message on how to set the needed environment variables is printed onto standard output.

```
> ./SetupTcl-BI-8.6.18-x64_Bawt-3.3.0.sh ~/bin
Extracting Tcl into /home/obermeier/bin ...

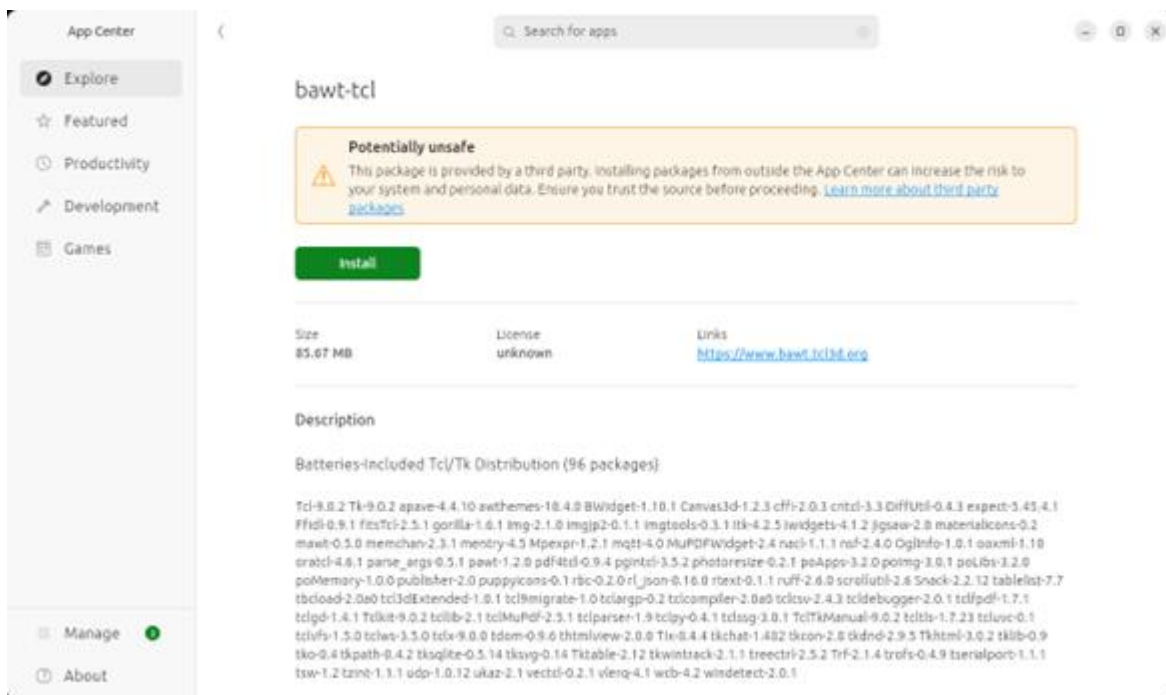
Add the following lines to your shell resource file (ex. ~/.bashrc):
export PATH="/home/obermeier/bin/Tcl/bin:$PATH"
export TCLLIBPATH="/home/obermeier/bin/Tcl/lib $TCLLIBPATH"
```

*Note, that the shell-based installation scripts need the GNU versions of grep and tar.*

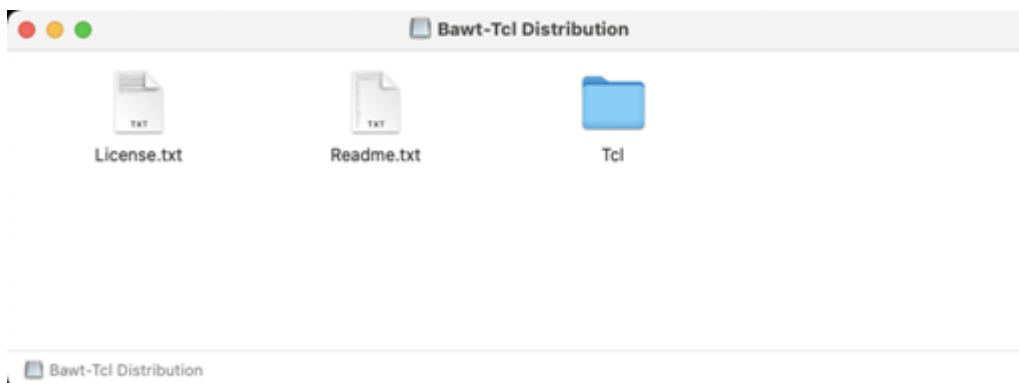
Debian *.deb* distribution files can be used to install a BawT-Tcl distribution on Linux system supporting the dpkg format. The Tcl distribution will be installed into directory */opt*, which conforms to the Debian standards for custom packages. If you want to change that path, adapt the corresponding line in script



*SetupTcl.bawt*. The control file for the Debian package manager is contained in file *SetupTcl.7z* (*DEBIAN/control*).



Disk Image Files (DMG) can be used on MacOS to install a Bawt-Tcl distribution by dragging the *Tcl* distribution directory from the mounted DMG image and following the instructions in the *Readme.txt* file.



### 5.1.6 Change icons of executables

To change the icon of the generated *tclkits*, *zipkits* and *starpacks* as well as the information shown about an executable on Windows (Resource), two command line options exist in the **BAWT** framework:

- [`--iconfile`](#)
- [`--resourcefile`](#)

*The user supplied icon and resource files can be either located in the Resources directory. Then it is sufficient to just specify the names of the files. If the files are located at other places, the path names of the files must be absolute.*

Use the icon file *poSoft.ico* and resource file *poSoft.rc* supplied by **BAWT** in directory *Resources* as starting point for your adapted ones.

If specifying your own resource file, do not change the name of the icon file in the following line of your resource file:

```
tk ICON DISCARDABLE "tclkit.ico"
```

The name must always be *tclkit.ico*.

If specifying a user supplied icon file for tclkits with command line option `--iconfile`, the icon file will be copied into the build directory *Tclkit/kbskit/win* and renamed to *tclkit.ico*, so that it is possible to only specify an icon file without specifying a resource file.

If using zipkits, the icon file will be copied into into build directory *Zipkit/Tcl/win* and renamed to *tclsh.ico* as well as copied into build directory *Zipkit/Tk/win* and renamed to *wish.ico*.

*Changes to the used icon and resource file are not considered by the BAWT update check process, so if using these options, it is necessary to at least rebuild package tclkit and its dependencies.*

### 5.1.7 Sign executables

Signing executables is currently only available on Windows and needs program `signtool.exe`, which is part of Visual Studio.

Signing of executables is done by calling procedure `SignExecutables` in a build script. This call is typically done in the Distribution stage. See build file *BawtLogViewer.bawt* for an example.

There are two command line options controlling the signature process:

`--certfile` (mandatory)  
`--timestampurl` (optional)

Directory *Resources* contains a self-signed certification file *poSoft.cer*, which is used for the BAWT distributions.

### 5.1.8 Parallel builds

All build environments used by BAWT support parallel compilation. The number of parallel build jobs can be specified globally for all libraries with command line option `--numjobs`.

Alternatively, the number of parallel build jobs can be restricted for specific libraries as additional parameter `MaxParallel` in the Setup procedure. See chapter [3.2 Setup Files](#) for a description of the Setup procedure and its parameters.

The following libraries consistently produce deadlocks when executed in parallel, so the number of parallel jobs is already limited in the corresponding BAWT Setup files by specifying option `MaxParallel=Windows-gcc:1`.

- CERTI
- PNG
- osgcal
- tserialport

Other libraries which occasionally tend to deadlock are the following:

- freeglut
- gdal
- geos
- openjpeg
- OpenSceneGraph
- osgearth

- SDL

*Deadlocks have occurred until now only on Windows using the gcc compiler.*

As reference point, the next table shows typical build times on my laptop for libraries needing 2 minutes or more. The laptop is equipped with an Intel QuadCore i7-4700 2.4Ghz with HyperThreading. 8 parallel compile jobs have been used.

| Estimated build time | Libraries                     |
|----------------------|-------------------------------|
| ~ 2 minutes          | ccl libgd libwebp SetupTcl xz |
| ~ 3 minutes          | geos kdis TIFF                |
| ~ 4 minutes          | SWIG tcltls tcl3dFull         |
| ~ 5 minutes          | gdal Tclkit Xerces            |
| ~ 6 minutes          | curl gdal libressl Tcl        |
| ~ 7 minutes          | boost ffmpeg Img              |
| ~ 9 minutes          | fftw                          |
| ~ 25 minutes         | osgearth                      |
| ~ 35 minutes         | OpenSceneGraph                |

## 5.2 Developer Perspective

### 5.2.1 Upgrade a library

If you want to use a new version of a library already supported by **BAWT**, chances are high, that the existing build scripts still work with the new version.

So just pack the sources of the new version into a 7z file and edit the corresponding entry in the *Setup* file. Also check the comments of the library build script regarding manual changes to the source code.

If the library is a **Tcl** package, you might get warnings from the **Starpack** build scripts. This indicates, that you will have 2 different versions in the **Tcl** library directory, which might lead to troubles.

The following warnings are issued, when upgrading library tablelist 6.20 to tablelist 6.22:

```
MakeStarpack: Found more than 1 package with prefix tablelist*:
  TclBasic-8.6.18/vs2019/x64/Development/opt/Tcl/lib/tablelist6.20
  TclBasic-8.6.18/vs2019/x64/Development/opt/Tcl/lib/tablelist6.22
```

So, when upgrading one or more libraries, you should either remove the development and distribution directories and do a fresh rebuild. The other possibility is to search for the directories of the old version (*tablelist6.10* in the above example) and just remove these directories from the development and distribution directory.

Another option is to use command line option [--noversion](#), which strips the version number from the names of Tcl package directories.

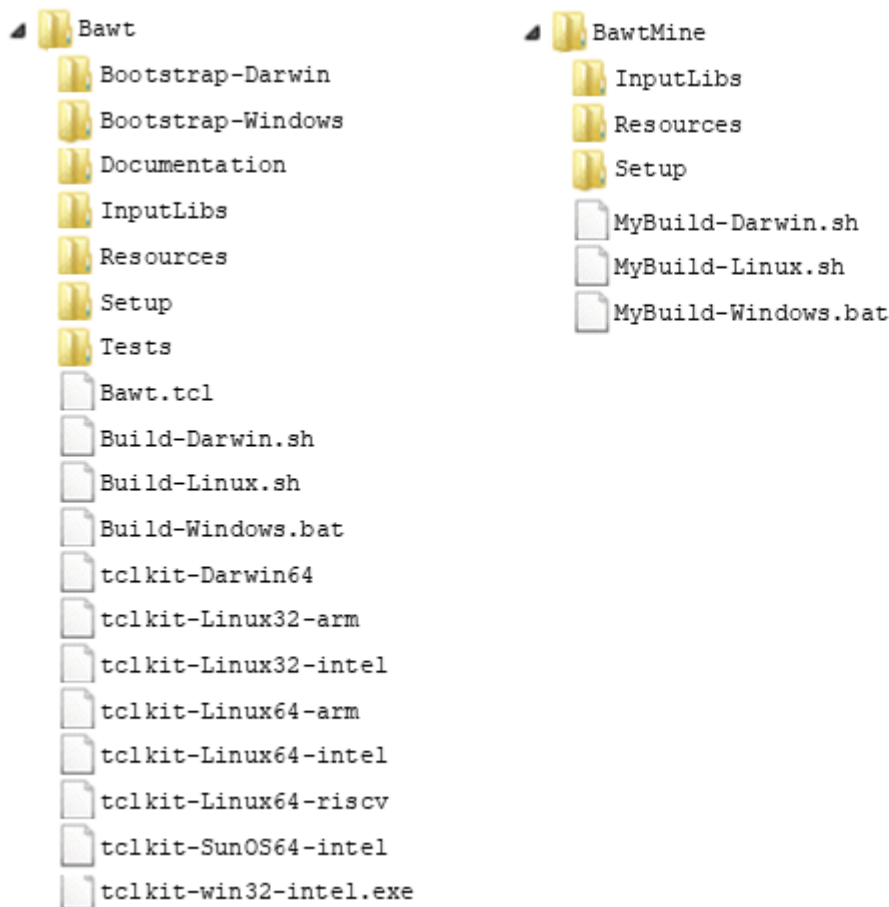
### 5.2.2 Add a library

Library sources should be specified either as a directory named *\$libName-\$libVersion* or as a compressed file named *\$libName-\$libVersion.7z*.

*libName must not contain a “-” character, because this character is used to separate the library name from the version string.*

It is easily possible to extend the libraries compiled by **BAWT** with COTS software, ex. company specific libraries. One possibility is to just add these libraries into the *InputLibs* directory of the standard **BAWT**

distribution. The better solution is to create a separate directory (ex. *BawtMine*), which holds your libraries in a similar structure like **BAWT** does. In this directory you create adapted versions of the batch scripts (ex. *MyBuild-Windows.bat*) and add *Setup* files, which reference your libraries as well as libraries of the standard BAWT distribution.



If you want to use a library, which is currently under development, it is possible to add the directory containing the local checkout of the library.

The following example shows the *Setup* file *mawtSvn.bawt* used to compile the current version of **MAWT** from my local SVN checkout.

```
Include "Tools.bawt"
Include "BasicLibs.bawt"
Include "Tcl_Basic.bawt"

if { [IsWindows] } {
    set dirName C:/poSoft/Mawt
} elseif { [IsLinux] } {
    set dirName /home/obermeier/poSoft/Mawt
} else {
    set dirName /Users/obermeier/poSoft/Mawt
}

Setup mawt $dirName mawt.bawt Version=0.5.0
```

*Note, that the checkout directory typically has no version number in it, so the version number is specified as optional argument of the Setup procedure.*

### 5.2.3 Add a Tcl program

Adding a Tcl program is similar to adding a library, i.e. the sources must be supplied as a compressed file as well as a corresponding *Build* script.

The Tcl program will be created as a starpack, i.e. a standalone executable containing the Tcl interpreter (either a tclkit or a zipkit), the program scripts as well as needed Tcl packages.

To ease the generation of starpacks, the BAWT framework offers procedures *MakeStarpackTcl* and *MakeStarpackTk* for this purpose. Use *MakeStarpackTcl*, if you want to create a console program, and *MakeStarpackTk*, if you want to create a program with a graphical Tk user interface.

```
proc MakeStarpackTcl { appScript appName starpackName buildDir args }
```

|                     |                                                                                                                                                                                                                                                                                               |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>appScript</i>    | Full path to the startup script of the Tcl program.                                                                                                                                                                                                                                           |
| <i>appName</i>      | The name of the application. Typically <code>\$libName</code> .                                                                                                                                                                                                                               |
| <i>starpackName</i> | The name of the starpack executable. Typically <code>\$libName[GetExeSuffix]</code> .                                                                                                                                                                                                         |
| <i>buildDir</i>     | The name of the output directory. Typically <code>\$instDir</code> .                                                                                                                                                                                                                          |
| <i>args</i>         | A list of files and directories to be included in the starpack. The path names of the files and directories must be absolute paths.<br>The files of the Tcl program are typically located in <code>\$buildDir</code> .<br>Needed Tcl packages are located in <code>[GetDevTclLibDir]</code> . |

Example Build files using these procedures are:

- *BawtLogViewer.bawt*
- *gorilla.bawt*
- *poApps.bawt*
- *tclssg.bawt*
- *tksqlite.bawt*

*The signature of procedure `MakeStarpackTk` is identical to procedure `MakeStarpackTcl`.*

*A starpack on Darwin is a directory using the extension `.app`.*

### 5.2.4 Manually compile a library

To configure and compile a library, the **BAWT** framework uses shell (`*.sh`) or batch files (`*.bat`). These batch files are created in the *Configure* and *Compile* phases and stored in the *Build* directory (or a suitable subdirectory like eg. *win*) of the library.

You can use these batch files to configure or compile a library manually. This is especially useful while developing the build file for a new **BAWT** library.

*Before running one of the shell or batch files on the command line, you have to remove the last line of the script containing the `exit` command or replace the `exit` command with an `echo` command.*

*You can easily open a library specific DOS or MSys shell window via the context menu of the *BawtLogViewer*, see chapter 6.1 Graphical Log Viewer.*

The first part of the file name defines the configure and compile environment and corresponds to the general **BAWT** procedures for executing commands with the same name:

*\_Bawt\_DosRun:*

- The commands will be executed in a standard Windows command line environment.
- If running the command manually on Windows, it must be executed from a DOS command shell.
- Example: `> _Bawt_DosRun_CMakeBuild.bat`

**`_Bawt_MSysRun:`**

- The commands will be executed in the MSYS/MinGW environment or a standard shell environment on Unix systems.
- If running the command manually on Windows, it must be executed from a MSYS/MinGW shell.
- Note, that on Unix systems all files are prefixed with `_Bawt_MSys`.
- Example: `> sh _Bawt_MSysRun_MSysBuild.bat`

The second part specifies the caller of the *DosRun* or *MSysRun* command. This is typically one of the following standard BAWT procedures:

- `NMakeBuild`
- `MsBuild`
- `CMakeConfig`
- `CMakeBuild`
- `MSysConfig`
- `TeaConfig`
- `MSysBuild`

For libraries, which cannot be built with one of the above standard procedures, it is common usage to specify the caller in the form:

- `_Bawt_LibName_Configure`
- `_Bawt_LibName_Compile`

One example is the Boost library, which has special configure and compile commands:

- `_Bawt_DosRun_Boost_Configure.bat`
- `_Bawt_DosRun_Boost_Compile.bat`

When using `NMakeBuild` or `MsBuild`, there is no need to specify commands for the configuration phase.

- `_Bawt_DosRun_MsBuild.bat`
- `_Bawt_DosRun_NMakeBuild.bat`

All other commands typically come in pairs, so you will see the following combination of configure and compile batch scripts:

- `_Bawt_DosRun_CMakeConfig.bat`
- `_Bawt_DosRun_CMakeBuild.bat`
- `_Bawt_MSysRun_TeaConfig.bat`
- `_Bawt_MSysRun_MSysBuild.bat`
- `_Bawt_MSysRun_MSysConfig.bat`
- `_Bawt_MSysRun_MSysBuild.bat`
- `_Bawt_MSysRun_CMakeBuild.bat`
- `_Bawt_MSysRun_CMakeConfig.bat`

## 5.3 Known issues

### 5.3.1 Build deadlock

**Problem:**

The build process does not continue with specific libraries.

**Workaround or solution:**

This is due to errors in the build infrastructure of the corresponding library in conjunction with parallel builds. See chapter [5.1.8 Parallel builds](#) for details.

**5.3.2 BawtLogViewer shows incorrect build time****Problem:**

If the build of a library starts before midnight and extends over midnight, the build time of this package will be negative in the BawtLogViewer table display, as the log file only stores time values as HH:MM:SS.

**Workaround or solution:**

None.

**5.3.3 Package SWIG****Problem:**

SWIG build fails occasionally on Windows due to problems renaming files. This behavior was noticed on systems running Sophos AntiVirus only.

**Workaround or solution:**

No real solution, other than retrying the build until it succeeds.

**5.3.4 Package Trf****Problem:**

The CRC module of Tcl package `Trf` crashes when compiled in x86 mode on Windows.

**Workaround or solution:**

None.

**5.3.5 Package tcllib/crc32****Problem:**

The `crc32` module of Tcl package `tcllib` crashes when compiled in x86 mode on Windows.

**Workaround or solution:**

The crash is not the fault of module `crc32` itself, but of the CRC module of package `Trf`, which gets called, if the `Trf` extension is available.

Either remove package `Trf` or remove loading of accelerator `trf` in file `crc32.tcl`

```
foreach e {trf critcl} {
    if {[LoadAccelerator $e]} break
}
```

**5.4 Tips and Tricks****5.4.1 Tips for Windows****Check generated library**

To check the architecture of a generated dynamic library, execute the following command in a Visual Studio developer command prompt:

```
> dumpbin /headers XXX.dll | more
```

The architecture of the library is contained in the file header section of the output:

```
FILE HEADER VALUES
      machine (x64)
```

## 5.4.2 Tips for Linux

### Check generated library

To check, if a library has been stripped, the commands `nm` or `file` can be used. To check the architecture of a generated library, the command `file` can be used.

A library built for Release should have no symbols and thus should generate the following outputs:

```
> nm libjpeg.so.9.1.0
nm: libjpeg.so.9.1.0: no symbols

> file libjpeg.so.9.1.0
libjpeg.so.9.1.0: ELF 32-bit LSB shared object, Intel 80386, version 1 (SYSV),
dynamically linked, stripped
```

A Debug build should have symbols and thus should generate the following outputs:

```
> nm libjpeg.so.9.1.0 | more
0002ffa0 r aanscalefactor.4133
0002fa60 r aanscalefactor.4178
0002ffe0 r aanscales.4125

> file libjpeg.so.9.1.0
libjpeg.so.9.1.0: ELF 32-bit LSB shared object, Intel 80386, version 1 (SYSV),
dynamically linked, not stripped
```

## 5.5 Advanced Batch Scripts

This section contains the batch scripts, which are used to generate the **Tcl-Pure** (minimal Tcl/Tk distribution) as well as the **Tcl-BI** (Batteries Included Tcl/Tk distribution) distributions.

### 5.5.1 Build Tcl-Pure distributions

The following batch scripts are used to create the **Tcl-Pure** distributions for all supported Tcl versions. A separate directory (`C:/BawtBuilds/TclMinimal/TclMinimal-%TCLVERS%-%TkVERS%-%LINKTYPE%`) is created for each Tcl version containing both the x86 and x64 versions.

The needed MSYS/MinGW versions are located in directory `C:/BawtBuildTools` (using option `--toolsdir`) to avoid extracting these for each Tcl version.

#### Batch script `UpdateTclMinimal.bat`

```
@echo off
setlocal

rem Architecture, TclVersion, TkVersion, TclString, LinkType and Finalize flag are
rem mandatory parameters
if "%1" == "" goto ERROR
if "%2" == "" goto ERROR
if "%3" == "" goto ERROR
if "%4" == "" goto ERROR
if "%5" == "" goto ERROR
```



```

if "%6" == "" goto ERROR

set ARCH=%1
set TCLVERS=%2
set TKVERS=%3
set TCLSTRING=%4
set LINKTYPE=%5
set FINALIZE=%6
shift
shift
shift
shift
shift
shift

rem If no target is given, use target "all".
if "%1"=="" goto BUILDALL

rem Loop through the rest of the parameter list for targets.
set TARGETS=
:PARAMLOOP
rem There is a trailing space in the next line. It's there for formatting.
set TARGETS=%TARGETS%1
shift
if not "%1"=="" goto PARAMLOOP
goto BUILD

:BUILDALL
set TARGETS=all

:BUILD

set LINKTYPEOPT=
if "%LINKTYPE%"=="Dynamic" goto NOSTATIC
set LINKTYPEOPT=--copt Tcl Static=ON --copt Tk Static=ON
:NOSTATIC

set BAWTROOT=..\Bawt
set SETUPFILE=%BAWTROOT%\Setup\Tcl_MinimalDist.bawt
set FINALIZEFILE=Setup\UserFinalize.bawt
set OUTROOTDIR=C:/BawtBuilds/TclMinimal/TclMinimal-%TCLVERS%-%TKVERS%-%LINKTYPE%
set TOOLSDIR=C:/BawtBuildTools
set TCLKIT=%BAWTROOT%\tclkit-win32-intel.exe
set NUMJOBS=%NUMBER_OF_PROCESSORS%
set ACTION=--update

set BAWTOPTS=--rootdir %OUTROOTDIR% ^
             --toolsdir %TOOLSDIR% ^
             --architecture %ARCH% ^
             --compiler gcc+vs2022 ^
             --numjobs %NUMJOBS% ^
             --noonline ^
             --nouserbuilds ^
             --iconfile poSoft.ico ^
             --resourcefile poSoft.rc ^
             --certfile poSoft.cer ^
             --tclversion %TCLVERS% ^
             --tkversion %TKVERS% ^
             --copt SetupTcl "Version=%TCLSTRING%"

set FINALIZEOPT=--logviewer
if "%FINALIZE%"=="0" goto NOFINALIZE
set FINALIZEOPT=--finalizefile %FINALIZEFILE%
:NOFINALIZE

```

```

rem Build all libraries as listed in build configuration file.
CALL %TCLKIT% %BAWTRoot%\Bawt.tcl %BAWTOPTS% %LINKTYPEOPT% %FINALIZEOPT% %ACTION%
%SETUPFILE% %TARGETS%

goto EOF

:ERROR
echo.
echo Usage: %0 Architecture TclVersion TkVersion TclString UseFinalizeScript [Target1]
[TargetN]
echo Architecture      : x86 x64
echo TclVersion        : 8.6.18  9.0.4
echo TkVersion         : 8.6.18  9.0.4
echo TclString         : 8.6.18.0 9.0.4.0
echo LinkType          : Static Dynamic
echo UseFinalizeScript: 0 1
echo Default target    : all
echo.

:EOF

```

*You might need to adapt the pathes specified in `OUTROOTDIR` and `TOOLS DIR` as well as the used Visual Studio version specified in command line option `--compiler`.*

#### Batch script *UpdateTclMinimals.bat*

```

@echo off
setlocal

REM Architecture TclVersion TkVersion TclString LinkType UseFinalizeScript

CALL UpdateTclMinimal x64 8.6.18 8.6.18 8.6.18.0 Dynamic 0
CALL UpdateTclMinimal x64 9.0.4 9.0.4 9.0.4.0 Dynamic 0

CALL UpdateTclMinimal x86 8.6.18 8.6.18 8.6.18.0 Dynamic 0
CALL UpdateTclMinimal x86 9.0.4 9.0.4 9.0.4.0 Dynamic 0

CALL UpdateTclMinimal x64 9.0.4 9.0.4 9.0.4.0 Static 0
CALL UpdateTclMinimal x86 9.0.4 9.0.4 9.0.4.0 Static 0

```

## 5.5.2 Build Tcl-BI distributions

The following batch scripts are used to create the **Tcl-BI** distributions for all supported Tcl versions. A separate directory (`C:/BawtBuilds/TclDistribution/TclDistribution-%TCLVERS%`) is created for each Tcl version containing both the x86 and x64 versions.

The needed MSYS/MinGW versions are located in directory `C:/BawtBuildTools` (using option `--toolsdir`) to avoid extracting these for each Tcl version.

#### Batch script *UpdateTclDistribution.bat*

```

@echo off
setlocal

rem Architecture, TclVersion, TkVersion, TclString, ImgVersion, Action and Finalize flag
are mandatory parameters
if "%1" == "" goto ERROR
if "%2" == "" goto ERROR
if "%3" == "" goto ERROR
if "%4" == "" goto ERROR
if "%5" == "" goto ERROR
if "%6" == "" goto ERROR
if "%7" == "" goto ERROR

```

```

set ARCH=%1
set TCLVERS=%2
set TKVERS=%3
set TCLSTRING=%4
set IMGVERS=%5
set ACTION=%6
set FINALIZE=%7
shift
shift
shift
shift
shift
shift
shift

rem If no target is given, use target "all".
if "%1"==" " goto BUILDALL

rem Loop through the rest of the parameter list for targets.
set TARGETS=
:PARAMLOOP
rem There is a trailing space in the next line. It's there for formatting.
set TARGETS=%TARGETS%1
shift
if not "%1"==" " goto PARAMLOOP
goto BUILD

:BUILDALL
set TARGETS=all

:BUILD

set BAWTROOT=..\Bawt
set SETUPFILE=%BAWTROOT%\Setup\Tcl_Distribution.bawt
set FINALIZEFILE=Setup\UserFinalize.bawt
set OUTROOTDIR=C:/BawtBuilds/TclDistribution/TclDistribution-%TCLVERS%-%TKVERS%
set TOOLSDIR=C:/BawtBuildTools
set TCLKIT=%BAWTROOT%\tclkit-win32-intel.exe
set NUMJOBS=%NUMBER_OF_PROCESSORS%
set ACTION=--%ACTION%

set BAWTOPTS=--rootdir %OUTROOTDIR% ^
    --toolsdir %TOOLSDIR% ^
    --architecture %ARCH% ^
    --compiler gcc+vs2022 ^
    --numjobs %NUMJOBS% ^
    --noonline ^
    --nouserbuilds ^
    --iconfile poSoft.ico ^
    --resourcefile poSoft.rc ^
    --certfile poSoft.cer ^
    --tclversion %TCLVERS% ^
    --tkversion %TKVERS% ^
    --imgversion %IMGVERS% ^
    --copt SWIG "AddTcl=ON" ^
    --copt SetupTcl "Tag=-BI" ^
    --copt SetupTcl "Version=%TCLSTRING%"

set FINALIZEOPT=--logviewer
if "%FINALIZE%"=="0" goto NOFINALIZE
set FINALIZEOPT=--finalizefile %FINALIZEFILE%
:NOFINALIZE

rem Build all libraries as listed in build configuration file.

```

```

CALL %TCLKIT% %BAWTRoot%\Bawt.tcl %BAWTOPTS% %FINALIZEOPT% %ACTION% %SETUPFILE%
%TARGETS%

goto EOF

:ERROR
echo.
echo Usage: %0 Architecture TclVersion TkVersion TclString ImgVersion Action
UseFinalizeScript [Target1] [TargetN]
echo Architecture      : x86 x64
echo TclVersion        : 8.6.18  9.0.4
echo TkVersion         : 8.6.18  9.0.4
echo TclString         : 8.6.18.0 9.0.4.0
echo ImgVersion        : 1.4.17 2.1.1
echo Action            : update test
echo UseFinalizeScript: 0 1
echo Default target    : all
echo.

:EOF

```

*You might need to adapt the pathes specified in `OUTROOTDIR` and `TOOLS DIR` as well as the used Visual Studio version specified in command line option `--compiler`.*

#### Batch script `UpdateTclDistributions.bat`

```

@echo off
setlocal

REM Architecture TclVersion TkVersion TclString ImgVersion Action UseFinalizeScript

CALL UpdateTclDistribution x64 8.6.18 8.6.18 8.6.18.0 2.1.1 update 0
CALL UpdateTclDistribution x86 8.6.18 8.6.18 8.6.18.0 2.1.1 update 0

CALL UpdateTclDistribution x64 9.0.4 9.0.4 9.0.4.0 2.1.1 update 0
CALL UpdateTclDistribution x86 9.0.4 9.0.4 9.0.4.0 2.1.1 update 0

```

## 6 Logging

The *Logs* output directory contains the overall build log file *\_BawtBuild.log* as well as the library specific build log files.

Library specific log files contain the output of the configuration and compile process. They also contain the error messages, if the build of a library does not succeed.

The overall log file contains the messages, which are printed onto standard output during the BAWT build process. The amount of log messages can be set by specifying the log level with command line option [--loglevel](#). Level 0 does not produce any log messages, while level 4 produces lots of log messages. The default value for the log level is 3.

Each stage or executed command is prefixed with a time code like shown in the next line:

```
21:35:30 > Build tclcompiler 1.7.1 (Release)
```

If log files of different configurations should be compared, these time codes may be disturbing. BAWT therefore allows to remove the time codes from the log messages by specifying command line option [--nologtime](#).

When rerunning a build, existing log files are renamed by appending *.bak* to the corresponding files before creating the new log files.

To view the build process online in a graphical window, the command line option [--logviewer](#) can be specified. See the next chapter for a detailed description of the graphical log file viewer **BawtLogViewer**.

Logging functionality is realized in namespace `BawtLog`. The most important procedure is `Log`, which may be used in build scripts, too.

Command line options influencing logging:

[--loglevel](#)  
[--nologtime](#)  
[--logviewer](#)

### 6.1 Graphical Log Viewer

The **BawtLogViewer** is a separate program to view and analyse the log output of BAWT. It is a Tcl script, which is wrapped as a Starpack and is included in the BAWT framework as a Windows executable in directory *Bootstrap-Windows*. For other platforms it can be built with BAWT or downloaded from the BAWT site at <https://www.tcl3d.org/bawt/apps.html#logviewers>.

To generate log messages usable by **BawtLogViewer**, the log level must be set to at least 3.

The graphical log viewer can either be used to analyse log files after a build process has finished (offline mode) or it can be used to interactively view the build process (online mode). Viewing the log messages online can be done by either using command line option [--logviewer](#) when starting the BAWT build process or by opening the log file *\_BawtBuild.log* anytime during the build process.

Log files can be opened by using the `File` menu or by dragging and dropping the icon of the log file onto the **BawtLogViewer** window.

The following figure shows the layout of the log viewer window, which has 2 main parts. In the upper part all libraries of the Setup file are listed in a scrollable table, while in the lower part the log messages of the build process are displayed in a scrollable text widget.

BAWT - Setup file C:/poSoft/BawtMine/Setup/DocSetup.bawt (vs2022 gcc)

File Settings Help

Setup contains 10 libraries. Remaining 5 libraries. Remaining estimated build time: 2.77 minutes.

| #  | Build-# | Library Name   | User file | Version | Compiler | Exe. time | Est. time | Mod. time           | Update cause                      | Stages | User config               |
|----|---------|----------------|-----------|---------|----------|-----------|-----------|---------------------|-----------------------------------|--------|---------------------------|
| 1  | 1       | InnoSetup      |           | 6.2.2   |          | 0.03      | 0.02      | 2025-10-03 00:01:49 | Build directory not existent      |        |                           |
| 2  | 2       | Tcl            |           | 9.0.2   | gcc      | 4.62      | 4.00      | 2025-10-03 00:06:26 | Build directory not existent      |        |                           |
| 3  | 3       | Tclapplescript |           | 2.2     |          |           |           |                     | Excluded from build (Darwin only) |        |                           |
| 4  | 4       | Tcllib         | Yes       | 2.1     | gcc      | 0.64      | 0.46      | 2025-10-03 00:07:05 | Build directory not existent      |        |                           |
| 5  | 5       | TclStubs       |           | 9.0.2   | vs2022   | 1.59      | 0.94      | 2025-10-03 00:08:40 | Build directory not existent      |        |                           |
| 6  | 6       | Tk             |           | 9.0.2   | gcc      | 0.50      | 1.08      | 2025-10-03 00:08:56 | Build directory not existent      |        |                           |
| 7  | 7       | TkStubs        |           | 9.0.2   | vs2022   |           | 0.29      | 2025-10-02 23:05:27 |                                   |        |                           |
| 8  | 8       | udp            |           | 1.0.12  | gcc      |           | 0.30      |                     |                                   |        |                           |
| 9  | 9       | ntext          |           | 0.1.1   | vs2022   |           | 0.22      | 2025-10-02 23:05:40 |                                   |        |                           |
| 10 | 10      | SetupTcl       |           |         |          |           | 1.38      | 2025-10-02 23:06:10 |                                   |        | Tags: Doc Version=9.0.2.0 |

Log file C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Logs/\_BawtBuild.log (0.17 seconds to read)

```

Source directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Install/tcllib/lib
Target directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Distribution/opt/Tcl/lib
File pattern : *
Number of copied files: 732
00:07:04 > FileRename
Source: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Development/opt/Tcl/lib/tcllib2.1
Target: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Development/opt/Tcl/lib/tcllib
00:07:05 > FileRename
Source: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Distribution/opt/Tcl/lib/tcllib2.1
Target: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Distribution/opt/Tcl/lib/tcllib
WriteConsoleFile
File: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/tcllib/_Bawt_StartMSysConsole.bat
00:07:05 > End tcllib 2.1: 0.64 minutes

00:07:05 > Start TclStubs 9.0.2 (Library #5 of 10)
Build types : Release
Update cause: Build directory not existent
00:07:05 > Clean TclStubs (Release)
00:07:05 > DirDelete
Directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/TclStubs
00:07:05 > DirDelete
Directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Install/TclStubs
00:07:05 > Build TclStubs 9.0.2 (Release)
DirCreate
Directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/TclStubs
DirCreate
Directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Install/TclStubs
00:07:05 > ExtractLibrary
ZIP file : C:/poSoft/Bawt/InputLibs/Tcl-9.0.2.7z
Target directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/TclStubs
00:07:08 > FileRename
Source: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/Tcl-9.0.2
Target: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build/TclStubs
Auto Update: ON (Library Tk running since 0.50 minutes. Estimated build time 1.08 minutes)

```

Different row background colors indicate the build status of a library. A green background indicates a successful build of a library, a blue background indicates an excluded library, a yellow background shows the library currently under build and an orange background indicates a library, where the current build time is greater than the estimated build time. See below for an explanation of estimated build times for deadlock detection.

A red text color is displayed for libraries which issued a warning during the build process.

The table can be sorted by any of the columns except the first one, which just shows the row number. For example, you may want to view the libraries sorted by library names instead of the build number. Selecting a table row scrolls to the beginning of the corresponding section in the text widget. The section is also marked with a yellow background.

By double clicking onto a table row, a simple editor window is opened showing the contents of the library specific build log file, see next figure for an example. Your favourite editor may be specified by setting the environment variable `EDITOR`.



```

Library Build Log: Tk.log (0 warnings)

> Start Build_Tk

~ /c/Users/anton
configure: loading site script /etc/config.site
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.exe
checking for suffix of executables... .exe
checking whether we are cross compiling... no
checking for suffix of object files... o
checking whether the compiler supports GNU C... yes
checking whether gcc accepts -g... yes
checking for gcc option to enable C11 features... none needed
checking for inline... inline
checking for stdio.h... yes
checking for stdlib.h... yes
checking for string.h... yes
checking for inttypes.h... yes
checking for stdint.h... yes
checking for strings.h... yes
checking for sys/stat.h... yes
checking for sys/types.h... yes
checking forunistd.h... yes
checking for ar... ar
checking for ranlib... ranlib
checking for windres... windres
checking whether make sets $(MAKE)... yes
checking how to build libraries... shared
checking for Tcl configuration... found /C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Bui
checking for existence of /C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Bui/Tcl/tclConf

```

Pressing the right mouse button opens a context menu with the following functionalities:

- Save library specific build or test time.
- Open library specific directories in an Explorer window.
- Open library specific Log, Setup or Build file.
- Open library specific DOS or MSYS shell window.

Pressing a key while the table has focus, selects the next library, which has this key as its first letter. Pressing other keys within the *Key Repeat Time* extends the search string similar to the behaviour of the Windows Explorer. The *Key Repeat Time* can be specified in the *Settings* menu.

Pressing the *Return* key has the same functionality as double clicking the selected table row.

Note the following features, which are only available in online mode:

- **BawtLogViewer** starts in *Auto Update* mode, where it reloads the log file every 3 seconds. The *Auto Update* mode is automatically switched off when the end of the build process is detected in the log file or it can be switched on or off by selecting the appropriate entry in the *File* menu.
- When reloading the log file, the table row order is always reset to the library build order.
- The accumulated time of the library currently being built is displayed in the status bar of the viewer window and in the corresponding table cell.
- Column *Stages* is not filled before the end of the build process, see next figure.

BAWT - Setup file C:/poSoft/BawtMine/Setup/DocSetup.bawt (vs2022 gcc)

File Settings Help

Setup contains 10 libraries

| #  | Build-# | Library Name   | User file | Version | Compiler | Exe. time | Est. time | Mod. time           | Update cause                        | Stages                                     | User config           |
|----|---------|----------------|-----------|---------|----------|-----------|-----------|---------------------|-------------------------------------|--------------------------------------------|-----------------------|
| 1  | 1       | InnoSetup      |           | 6.2.2   |          | 0.01      | 0.02      | 2025-10-02 22:43:14 | Build directory not existent        | Clean Extract Configure Compile Distribute |                       |
| 2  | 2       | Tcl            |           | 9.0.2   | gcc      | 4.58      | 4.00      | 2025-10-02 22:47:49 | Build directory not existent        | Clean Extract Configure Compile Distribute |                       |
| 3  | 3       | Tclapplescript |           | 2.2     |          |           |           |                     | Excluded from build (Darwin only)   | Darwin only                                |                       |
| 4  | 4       | tklib          | Yes       | 2.1     | gcc      | 0.63      | 0.46      | 2025-10-02 22:48:27 | Build directory not existent        | Clean Extract Configure Compile Distribute |                       |
| 5  | 5       | TclStubs       |           | 9.0.2   | vs2022   | 1.58      | 0.94      | 2025-10-02 22:50:02 | Build directory not existent        | Clean Extract Configure Compile Distribute |                       |
| 6  | 6       | Tk             |           | 9.0.2   | gcc      | 1.11      | 1.08      | 2025-10-02 22:51:08 | Build directory not existent        | Clean Extract Configure Compile Distribute |                       |
| 7  | 7       | TkStubs        |           | 9.0.2   | vs2022   | 0.67      | 0.29      | 2025-10-02 22:51:48 | Build directory not existent        | Clean Extract Configure Compile Distribute |                       |
| 8  | 8       | udp            |           | 1.0.12  | gcc      |           | 0.30      |                     | Excluded from build (Option NoTcl9) | Option NoTcl9                              |                       |
| 9  | 9       | rtxt           |           | 0.1.1   | vs2022   | 0.22      | 0.22      | 2025-10-02 22:52:01 | Build directory not existent        | Clean Extract Configure Compile Distribute |                       |
| 10 | 10      | SetupTcl       |           |         |          | 0.55      | 1.38      | 2025-10-02 22:52:34 | Build directory not existent        | Clean Extract Configure Compile Distribute | Tags=Doc Versions=9.0 |

Log file C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Logs/\_BawtBuild.log (0.24 seconds to read)

```

22:52:34 > MultifileCopy
Source directory: C:/Program Files/Microsoft Visual Studio/2022/Community/VC/Redist/MSVC/14.44.35112/x64/Microsoft.VC143.CRT
Target directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Development/bin
File pattern : *.dll
Number of copied files: 10
22:52:34 > MultifileCopy
Source directory: C:/Program Files/Microsoft Visual Studio/2022/Community/VC/Redist/MSVC/14.44.35112/x64/Microsoft.VC143.CRT
Target directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Distribution/bin
File pattern : *.dll
Number of copied files: 10
22:52:34 > End FinalizeStage
22:52:34 > Summary
Setup file : C:/poSoft/BawtMine/Setup/DocSetup.bawt
Build directory: C:/BawtBuilds/DocSetup/DocSetup-9.0.2/vs2022/x64/Release/Build
Architecture : x64
Compilers : vs2022 gcc
Global stages : Finalize
# : Library Name      Version      Build time      Stages
-----
1: InnoSetup          6.2.2        0.01 minutes    Clean Extract Configure Compile Distribute
2: Tcl                9.0.2        4.58 minutes    Clean Extract Configure Compile Distribute
3: Tclapplescript     2.2          Excluded        Darwin only
4: tklib              2.1          0.63 minutes    Clean Extract Configure Compile Distribute
5: TclStubs           9.0.2        1.58 minutes    Clean Extract Configure Compile Distribute
6: Tk                 9.0.2        1.11 minutes    Clean Extract Configure Compile Distribute
7: TkStubs            9.0.2        0.67 minutes    Clean Extract Configure Compile Distribute
8: udp                1.0.12       Excluded        Option NoTcl9
9: rtxt               0.1.1        0.22 minutes    Clean Extract Configure Compile Distribute
10: SetupTcl          0.55 minutes    Clean Extract Configure Compile Distribute
-----
Total: 9.35 minutes

```

Auto Update: Off

The program can be used to detect library build deadlocks by comparing the current build time against an estimated build time. To generate estimated build times, at least one BAWT build has to be performed. After loading the corresponding log files, the build times of this run can be saved in the settings file by selecting File menu entry Save build times.

These build times are then used as estimated build times in future BAWT builds to compare the current build time of a library against these estimated build times. If the current build time exceeds the estimated time by a specific threshold value (which can be specified in the Settings menu), both a visual warning (corresponding row background is set to orange) as well as an acoustic warning (beep) is issued. The acoustic warning can be disabled in the Settings menu.

Estimated build times, deadlock parameters and other values like window size and position are stored in the settings files `~/BawtLogViewer/BawtLogViewer.cfg`.

Warnings occurring during the build process of libraries are logged by the BAWT framework and can be inspected by selecting File menu entry View compiler warnings.



| BAWT - Compiler Warnings       |                |          |
|--------------------------------|----------------|----------|
| -1 means no log file available |                |          |
| #                              | Library Name   | Warnings |
| 1                              | Tcl            | 22       |
| 2                              | rtext          | 3        |
| 3                              | InnoSetup      | 0        |
| 4                              | tcllib         | 0        |
| 5                              | TclStubs       | 0        |
| 6                              | Tk             | 0        |
| 7                              | TkStubs        | 0        |
| 8                              | SetupTcl       | 0        |
| 9                              | Tclapplescript | -1       |
| 10                             | udp            | -1       |

The table can be sorted and searched using key presses as described for the main window. Double clicking a row or pressing the `Return` key opens a simple editor window showing the contents of the library specific build log file.

If warnings occurred during the build process, these are shown in a table in the upper part of the editor window. Clicking onto a row selects the corresponding message in the editor window, see next figure.

| Library Build Log: rtext.log (3 warnings) |      |                                                                                                                                           |
|-------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------|
| #                                         | Line | Messages                                                                                                                                  |
| 1                                         | 38   | C:\BawtBuilds\DocSetup\DocSetup-9.0.2\vs2022\x64\Release\Build\rtext\win\...\generic\tkText.c(528): warning C5287: Operanden sind unterse |
| 2                                         | 39   | C:\BawtBuilds\DocSetup\DocSetup-9.0.2\vs2022\x64\Release\Build\rtext\win\...\generic\tkText.c(541): warning C5287: Operanden sind unterse |
| 3                                         | 40   | C:\BawtBuilds\DocSetup\DocSetup-9.0.2\vs2022\x64\Release\Build\rtext\win\...\generic\tkText.c(542): warning C5287: Operanden sind unterse |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| C:\BawtBuilds\DocSetup\DocSetup-9.0.2\vs2022\x64\Logs\rtext.log                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |
| Copyright (C) Microsoft Corporation. All rights reserved.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |
| <pre> cl -nologo -c /DHAVE_CPUID=1 -W3 -wd4090 -wd4146 -wd4311 -wd4312 -FpC:\BawtBuilds\DocSetup\ tclrtext.c tkBitFields.c tkIntSet.c tkRangeList.c tkText.c C:\BawtBuilds\DocSetup\DocSetup-9.0.2\vs2022\x64\Release\Build\rtext\win\...\generic\tkText.c(528): w C:\BawtBuilds\DocSetup\DocSetup-9.0.2\vs2022\x64\Release\Build\rtext\win\...\generic\tkText.c(541): w C:\BawtBuilds\DocSetup\DocSetup-9.0.2\vs2022\x64\Release\Build\rtext\win\...\generic\tkText.c(542): w tkTextBTree.c tkTextDisp.c tkTextImage.c tkTextIndex.c tkTextLineBreak.c tkTextMark.c tkTextTag.c tkTextTagSet.c tkTextUndo.c tkTextWind.c </pre> |  |  |

The following glob-style patterns are used to detect errors and warnings in the log messages:

| #                        | gcc            | VisualStudio    | gcc-German     |
|--------------------------|----------------|-----------------|----------------|
| SetWarningDetectPatterns | "*: warning:*" | "*: warning*:*" | "*: Warnung:*" |
| SetErrorDetectPatterns   | "*: error:*"   | "*: error C*:*" | "*: Fehler:*"  |

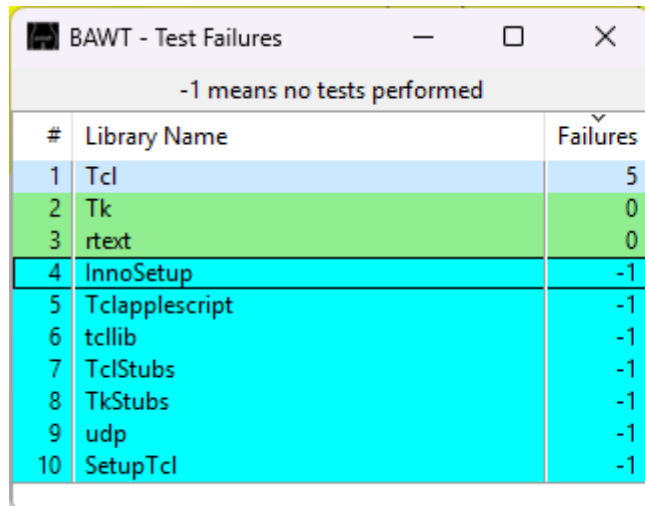
This list of patterns can be extended by editing the settings file `~/BawtLogViewer.cfg`.

```
# SetWarningDetectPatterns args
catch {::BawtLogViewer::SetWarningDetectPatterns {*: warning:*} {*: warning*:*} {*: Warnung:*}}

# SetErrorDetectPatterns args
catch {::BawtLogViewer::SetErrorDetectPatterns {*: error:*} {*: error C*:*} {*: Fehler:*}}
```

Failures occurring during the test process of libraries are logged by the BAWT framework and can be inspected by selecting `File` menu entry `View test failures`.

See the section regarding test procedures in chapter [3.3 Build Files](#) for more information about test execution.



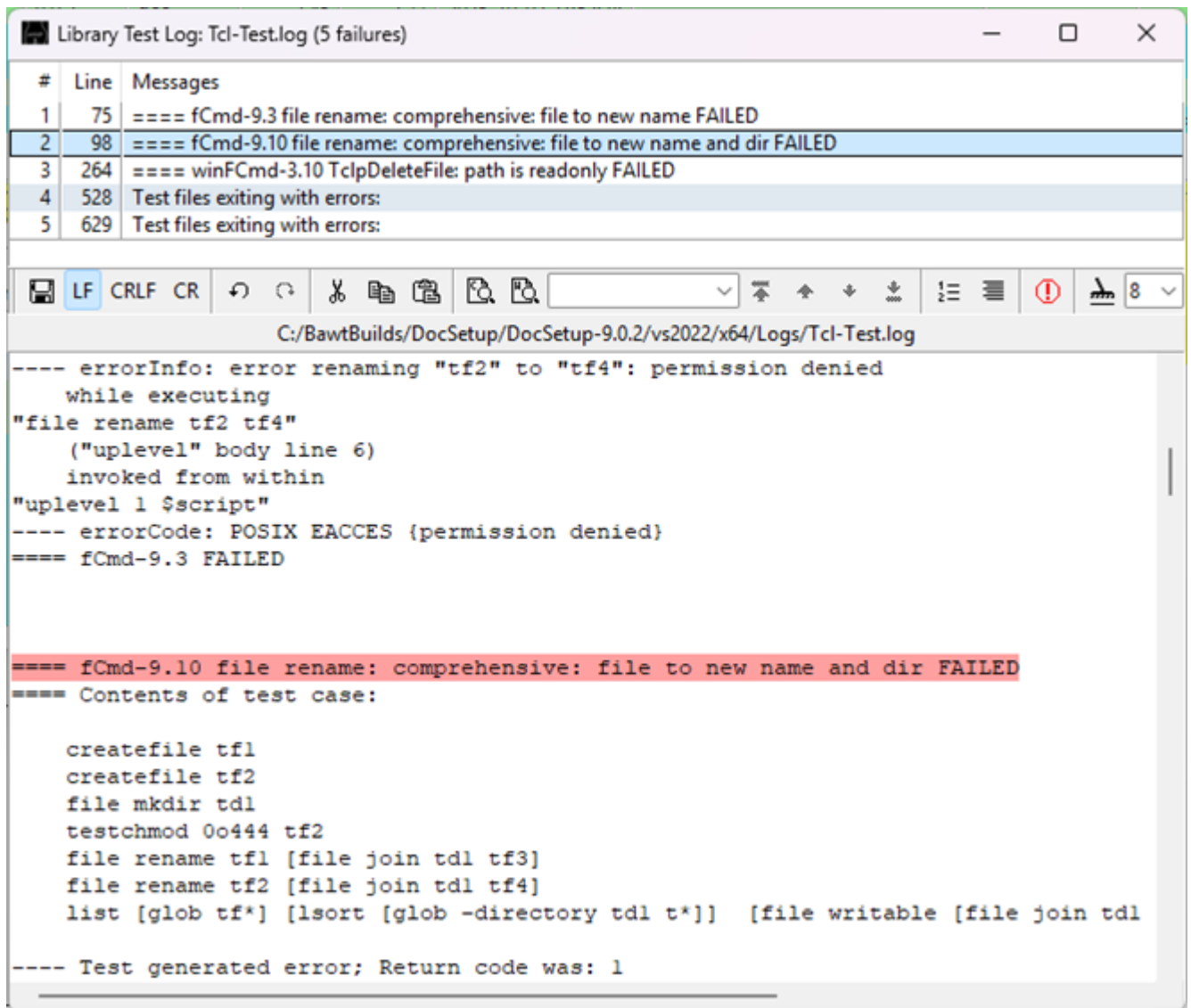
The screenshot shows a window titled "BAWT - Test Failures" with a table containing 10 rows. The first three rows (Tcl, Tk, rtext) have green backgrounds and 0 failures. The remaining seven rows (InnoSetup, Tclapplescript, tcllib, TclStubs, TkStubs, udp, SetupTcl) have blue backgrounds and -1 failure. A header row indicates that -1 means no tests were performed.

| #  | Library Name   | Failures |
|----|----------------|----------|
| 1  | Tcl            | 5        |
| 2  | Tk             | 0        |
| 3  | rtext          | 0        |
| 4  | InnoSetup      | -1       |
| 5  | Tclapplescript | -1       |
| 6  | tcllib         | -1       |
| 7  | TclStubs       | -1       |
| 8  | TkStubs        | -1       |
| 9  | udp            | -1       |
| 10 | SetupTcl       | -1       |

A green background indicates an executed test, while a blue background indicates, that the library does not have a test procedure. Column `Failures` shows the number of failures during test execution of a library.

The table can be sorted and searched using key presses as described for the main window. Double clicking a row or pressing the `Return` key opens a simple editor window showing the contents of the library specific test log file.

If failures occurred during the test process, these are shown in a table in the upper part of the editor window. Clicking onto a row selects the corresponding message in the editor window, see next figure.



Matching test failures in the test log files uses `tcltest` specific strings, as well as user defined glob-style patterns similar to detecting build warnings.

The following user defined glob-style patterns are used to detect failures in the test log messages.

```
# SetFailureDetectPatterns args
catch {::BawtLogViewer::SetFailureDetectPatterns
    Error:* ERROR:* Test*failed:* ErrorCode*}
```

This list of patterns can be extended by editing settings file `~/BawtLogViewer.cfg`.

## 7 Command Line Options

Calling the **BAWT** framework script with command line option `--help` prints the following help message:

```
Usage: Bawt.tcl [Options] SetupFile LibraryName [LibraryNameN]
```

Start the BAWT automatic library build process.

When using "all" as library name, all libraries specified in the setup file are built.

It is also possible to specify the numbers of the libraries as printed by option "--list" or specify a range of numbers (ex: 2-5).

Note, that at least either a list or build action option must be specified.

### 7.1 General Options

| Option                              | Description                                                                                                                                     |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--help</code>                 | Print this help message and exit.                                                                                                               |
| <code>--version</code>              | Print BAWT version and copyright and exit.<br>Use in combination with <code>--loglevel 0</code> to just print the version number.               |
| <code>--procs</code>                | Print all available procedures and exit.                                                                                                        |
| <code>--proc &lt;str&gt;</code>     | Print documentation of specified procedure and exit.                                                                                            |
| <code>--loglevel &lt;int&gt;</code> | Specify log message verbosity. Choices: 0 - 4. Default: 3.                                                                                      |
| <code>--nologtime</code>            | Do not write time strings with log messages. Default: Write time strings.<br>Use this option when comparing log files to have less differences. |
| <code>--logviewer</code>            | Start graphical log viewer program <b>BawtLogViewer</b> .<br>Only working, if log level is greater than 1. Default: No.                         |

### 7.2 List Action Options

| Option                      | Description                                                             |
|-----------------------------|-------------------------------------------------------------------------|
| <code>--list</code>         | Print all available library names and versions and exit.                |
| <code>--platforms</code>    | Print library names, versions and supported platforms.                  |
| <code>--wincompilers</code> | Print library names, versions and supported Windows compilers.          |
| <code>--authors</code>      | Print library names, versions and script authors.                       |
| <code>--homepages</code>    | Print library names, versions and homepages.                            |
| <code>--excludes</code>     | Print library names, versions and platform specific excluded libraries. |
| <code>--options</code>      | Print library names, versions and library build options.                |
| <code>--havetest</code>     | Print library names, versions and test procedure availability.          |
| <code>--dependencies</code> | Print library names, versions and dependencies.                         |
| <code>--dependency</code>   | Print dependencies of specified target libraries.                       |

*The list action options may be accumulated to print several library informations at once.*

### 7.3 Build Action Options

| Option       | Description                                                                                                  |
|--------------|--------------------------------------------------------------------------------------------------------------|
| --clean      | Clean library specific build and install directories.                                                        |
| --extract    | Extract library source from a ZIP file or a directory.                                                       |
|              |                                                                                                              |
| --configure  | Perform the configure stage of the build process.                                                            |
| --compile    | Perform the compile stage of the build process.                                                              |
| --distribute | Perform the distribution stage of the build process.                                                         |
|              |                                                                                                              |
| --finalize   | Generate environment file and call user supplied Finalize procedure.                                         |
| --complete   | Perform the following stages in order:<br>clean, extract, configure, compile, distribute, finalize.          |
|              |                                                                                                              |
| --update     | Perform necessary stages depending on modification times.<br>Note: Global stage finalize is always executed. |
| --simulate   | Simulate update action without actually building libraries.                                                  |
| --touch      | Set modification times of library build directories to current time.                                         |
|              |                                                                                                              |
| --test       | Perform library specific test scripts.                                                                       |

## 7.4 Build Configuration Options

| Option                   | Description                                                                                                                                                                                                            |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| --architecture <str>     | Build for specified processor architecture.<br>Choices: x86 for 32-bit, x64 for 64-bit.<br>Default: Architecture of the calling tclkit or tclsh.                                                                       |
| --compiler <str>         | Build with specified compiler version.<br>Choices: gcc vs2013 vs2015 vs2017 vs2019 vs2022 vs2026.<br>Specify primary and secondary compiler by adding a plus sign in between.<br>Example: gcc+vs2022.<br>Default: gcc. |
| --gccversion <str>       | Build with specified MinGW gcc version. Windows only.<br>Choices: 7.2.0 8.1.0 11.2.0 12.2.0 13.2.0 14.2.0 15.2.0.<br>Default: 15.2.0.                                                                                  |
| --msysversion <str>      | Build with specified MSYS version. Windows only.<br>Choices: 1 2.<br>Default: Version 2 if available, otherwise version 1.                                                                                             |
| --tclversion <str>       | Build Tcl, Tk and Tclkit for specified version.<br>Choices: 8.6.7 - 8.6.18, 9.0.1 - 9.0.4.<br>Default: 8.6.18.                                                                                                         |
| --tkversion <str>        | Build Tk and Tclkit for specified version.<br>Choices: 8.6.7 - 8.6.18, 9.0.1 - 9.0.4.<br>Default: 8.6.18.                                                                                                              |
| --imgversion <str>       | Build Img for specified version.<br>Choices: 1.4.13 - 1.4.17, 2.0.1 - 2.1.1.<br>Default: 2.1.1.                                                                                                                        |
| --tclsversion <str>      | Build tcltcl for specified version.<br>Choices: 1 2.<br>Default: Version 2.                                                                                                                                            |
| --osgversion <str>       | Build OpenSceneGraph for specified version.<br>Choices: 3.4.1 3.6.5.<br>Default: 3.6.5.                                                                                                                                |
| --libversion <lib> <str> | Build library for specified version.                                                                                                                                                                                   |

|                       |                                                                                                                                                                                                                                                                                 |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | Overwrites values specified in Setup file.<br>Default: As specified in Setup file.                                                                                                                                                                                              |
| --zipfile <lib> <str> | Build library from specified file or directory.<br>Overwrites values specified in Setup file.<br>Default: As specified in Setup file.                                                                                                                                           |
| --buildtype <str>     | Use specified build type.<br>Choices: Release Debug.<br>Default: Release or as specified in setup file.                                                                                                                                                                         |
| --zipkit              | Use zipkits instead of tclkits for Starpack generation.<br>Available for Tcl9 only.<br>Default: Use tclkits.                                                                                                                                                                    |
| --universal           | Enable universal binary builds.<br>Available for Darwin only.<br>Default: Not enabled.                                                                                                                                                                                          |
| --mindarwin <str>     | Specify Darwin minimum version to build for.<br>Default: 11.0 (Big Sur).                                                                                                                                                                                                        |
| --sanitizer           | Enable Address Sanitizer libasan.<br>Only valid with build type Debug.<br>Default: Not enabled.                                                                                                                                                                                 |
| --exclude <lib>       | Force exclusion of build for specified library name.                                                                                                                                                                                                                            |
|                       |                                                                                                                                                                                                                                                                                 |
| --wincc <lib> <str>   | Use specified Windows compiler, if supported by build script.<br>Choices: gcc vs.                                                                                                                                                                                               |
| --sdk <lib> <str>     | Use specified Microsoft SDK version.<br>To use the SDK version for all libraries, specify "all" as library name.                                                                                                                                                                |
| --copt <lib> <str>    | Specify library specific user configuration option.                                                                                                                                                                                                                             |
| --user <lib> <str>    | Specify library specific user build file.                                                                                                                                                                                                                                       |
|                       |                                                                                                                                                                                                                                                                                 |
| --url <str>           | Specify BAWT download server.<br>Default: <a href="https://www.tcl3d.org/bawt/download">https://www.tcl3d.org/bawt/download</a>                                                                                                                                                 |
| --cacert <str>        | Use specified certificate file as parameter to curl calls.<br>Default: None.                                                                                                                                                                                                    |
| --toolsdir <str>      | Specify directory containing MSYS/MinGW.<br>Default: [GetOutputToolsDir]                                                                                                                                                                                                        |
| --rootdir <str>       | Specify build output root directory.<br>Default: [GetOutputRootDir]                                                                                                                                                                                                             |
| --libdir <str>        | Add a directory containing library source and build files.<br>This option can be called multiple times and adds the new directory to the beginning of the directory list.<br>Default search list:<br>[file join [pwd] "InputLibs"]<br>[file join [GetInputRootDir] "InputLibs"] |
| --setupdir <str>      | Add a directory containing Setup files.<br>Default: [file join [GetInputRootDir] "Setup"].                                                                                                                                                                                      |
| --distdir <str>       | Specify distribution root directory.<br>Default: [file join [GetOutputTypeDir] "Distribution"]                                                                                                                                                                                  |
| --finalizefile <str>  | Specify file with user supplied Finalize procedure.<br>Default: None.                                                                                                                                                                                                           |
|                       |                                                                                                                                                                                                                                                                                 |
| --sort <str>          | Sort libraries according to specified sorting mode.<br>Choices: dependencies dictionary none.<br>Default: dependencies                                                                                                                                                          |
| --noversion           | Do not use version number for Tcl package directories.<br>Default: Library name and version number.                                                                                                                                                                             |
| --noexit              | Do not exit build process after fatal error, but try to continue.<br>Default: Exit build process after a fatal error.                                                                                                                                                           |

|                                                |                                                                                                                                                                                                              |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>--nosetupwarning</code>                  | Do not print warnings regarding multiple versions in Setup files.<br>Default: Print warnings.                                                                                                                |
| <code>--noimportlibs</code>                    | Do not create import libraries on Windows.<br>Default: Create import libraries.<br>Needs VisualStudio.                                                                                                       |
| <code>--noruntimelibs</code>                   | Do not copy VisualStudio runtime libraries.<br>Default: Copy runtime libraries.<br>Needs VisualStudio.                                                                                                       |
| <code>--nostrip</code>                         | Do not strip libraries in distribution directory.<br>Default: Strip libraries.                                                                                                                               |
| <code>--noonline</code>                        | Do not check or download from online repository.<br>Default: Use <a href="https://www.tcl3d.org/bawt/download">https://www.tcl3d.org/bawt/download</a>                                                       |
| <code>--norecursive</code>                     | Do not check recursive dependencies.<br>Default: Use recursive dependencies.                                                                                                                                 |
| <code>--nosubdirs</code>                       | Do not create compiler and architecture sub directories.<br>Default: Create compiler and architecture sub directories.                                                                                       |
| <code>--nouserbuilds</code>                    | Do not consider user build files.<br>Default: Consider user build files named <i>LibraryName_User.bawt</i> .                                                                                                 |
|                                                |                                                                                                                                                                                                              |
| <code>--iconfile &lt;str&gt;</code>            | Use specified icon file for tclkits and starpacks.<br>Default: Standard tclkit icon.<br>Windows only.                                                                                                        |
| <code>--resourcefile &lt;str&gt;</code>        | Use specified resource file for tclkits and starpacks.<br>Default: Standard tclkit resource file.<br>Windows only.                                                                                           |
| <code>--certfile &lt;str&gt;</code>            | Use specified certification file for code signing starpacks.<br>Default: No code signing.<br>Windows only.                                                                                                   |
| <code>--timestampurl &lt;str&gt;</code>        | Use specified timestamp server for code signing starpacks.<br>Default: <a href="http://timestamp.digicert.com">http://timestamp.digicert.com</a> .<br>Use empty string to add no timestamp.<br>Windows only. |
|                                                |                                                                                                                                                                                                              |
| <code>--numjobs &lt;int&gt;</code>             | Number of parallel compile jobs.<br>Default: 1                                                                                                                                                               |
| <code>--libjobs &lt;lib&gt; &lt;int&gt;</code> | Number of parallel compile jobs for specified library.<br>Default: 1                                                                                                                                         |
| <code>--timeout &lt;float&gt;</code>           | Number of seconds to try renaming or deleting directories.<br>Default: 30.0                                                                                                                                  |

## 8 Supported Libraries

### List of all libraries (using command line option [--platforms](#))

| #:  | Name              | Version  | Platforms |        |        |       |      |
|-----|-------------------|----------|-----------|--------|--------|-------|------|
| 1:  | apave             | 4.4.10   | Windows   | Linux  | Darwin | SunOS | IRIX |
| 2:  | argparse          | 0.62     | Windows   | Linux  | Darwin | SunOS | IRIX |
| 3:  | awthemes          | 10.4.0   | Windows   | Linux  | Darwin | SunOS | IRIX |
| 4:  | BawtLogViewer     | 3.3.0    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 5:  | Blender           | 3.0.0    | Windows   |        |        |       |      |
| 6:  | Boost             | 1.78.0   | Windows   | Linux  | Darwin | SunOS | IRIX |
| 7:  | BWidget           | 1.10.1   | Windows   | Linux  | Darwin | SunOS | IRIX |
| 8:  | Cal3D             | 0.120    | Windows   | Linux  |        |       |      |
| 9:  | Canvas3d          | 1.2.3    | Windows   | Linux  | IRIX   |       |      |
| 10: | cawt              | 3.1.1    | Windows   |        |        |       |      |
| 11: | cawtapp           | 3.1.1    | Windows   |        |        |       |      |
| 12: | ccl               | 4.0.6    | Windows   | Linux  |        |       |      |
| 13: | cffi              | 2.0.3    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 14: | cfitsio           | 4.1.0    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 15: | CMake             | 4.2.0    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 16: | critcl            | 3.3      | Windows   | Linux  | Darwin | SunOS | IRIX |
| 17: | curl              | 7.88.1   | Windows   | Linux  | Darwin | SunOS | IRIX |
| 18: | DiffUtil          | 0.4.3    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 19: | DirectXTex        | 2021_11  | Windows   |        |        |       |      |
| 20: | Doxygen           | 1.8.15   | Windows   |        |        |       |      |
| 21: | Eigen             | 3.3.9    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 22: | expect            | 6.0a1    | Linux     | Darwin | SunOS  | IRIX  |      |
| 23: | Ffidl             | 0.9.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 24: | ffmpeg            | 7.1.3    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 25: | fftw              | 3.3.9    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 26: | fitsTcl           | 2.5.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 27: | freeglut          | 3.2.2    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 28: | FreeType          | 2.13.3   | Windows   | Linux  | Darwin | SunOS | IRIX |
| 29: | FTGL              | 2.1.3    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 30: | gdal              | 2.4.4    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 31: | gdi               | 0.9.9.15 | Windows   |        |        |       |      |
| 32: | GeographicLib     | 1.52     | Windows   | Linux  | Darwin | SunOS | IRIX |
| 33: | GeographicLibData |          | Windows   | Linux  | Darwin | SunOS | IRIX |
| 34: | geos              | 3.7.2    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 35: | giflib            | 5.2.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 36: | Gl2ps             | 1.4.2    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 37: | GLEW              | 2.2.0    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 38: | glfw              | 3.3.8    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 39: | gorilla           | 1.6.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 40: | hdc               | 0.2.0.1  | Windows   |        |        |       |      |
| 41: | Img               | 2.1.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 42: | imgjp2            | 0.1.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 43: | imgtools          | 0.3.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 44: | InnoSetup         | 6.5.4    | Windows   |        |        |       |      |
| 45: | iocp              | 2.0.2    | Windows   |        |        |       |      |
| 46: | itk               | 4.2.5    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 47: | iwidgets          | 4.1.2    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 48: | jasper            | 2.0.25   | Windows   | Linux  | Darwin | SunOS | IRIX |
| 49: | jigsaw            | 2.0      | Windows   | Linux  | Darwin | SunOS | IRIX |
| 50: | JPEG              | 9.f      | Windows   | Linux  | Darwin | SunOS | IRIX |
| 51: | KDIS              | 2.9.0    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 52: | libffi            | 3.4.8    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 53: | libgd             | 2.3.2    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 54: | libressl          | 2.9.2    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 55: | libwebp           | 1.2.4    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 56: | libxml2           | 2.10.3   | Windows   | Linux  | Darwin | SunOS | IRIX |
| 57: | materialicons     | 0.2      | Windows   | Linux  | Darwin | SunOS | IRIX |
| 58: | mawt              | 0.5.0    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 59: | memchan           | 2.3.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 60: | mentry            | 4.5.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 61: | Mpexpr            | 1.2.1    | Windows   | Linux  | Darwin | SunOS | IRIX |
| 62: | mqtt              | 4.0      | Windows   | Linux  | Darwin | SunOS | IRIX |



|      |                    |          |         |       |        |       |      |
|------|--------------------|----------|---------|-------|--------|-------|------|
| 63:  | mupdf              | 1.26.0   | Windows | Linux | Darwin | SunOS | IRIX |
| 64:  | MuPDFWidget        | 2.4      | Windows | Linux | Darwin | SunOS | IRIX |
| 65:  | nacl               | 1.2      | Windows | Linux | Darwin | SunOS | IRIX |
| 66:  | nasm               | 2.16.3   | Windows |       |        |       |      |
| 67:  | nsf                | 2.4.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 68:  | OglInfo            | 1.0.3    | Windows | Linux | Darwin | SunOS | IRIX |
| 69:  | ooxml              | 1.13.1   | Windows | Linux | Darwin | SunOS | IRIX |
| 70:  | openjpeg           | 2.5.3    | Windows | Linux | Darwin | SunOS | IRIX |
| 71:  | OpenSceneGraph     | 3.6.5    | Windows | Linux | Darwin | SunOS | IRIX |
| 72:  | OpenSceneGraphData | 3.4.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 73:  | openssl            | 3.5.4    | Windows | Linux | Darwin | SunOS | IRIX |
| 74:  | oratcl             | 4.6.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 75:  | osgcal             | 0.2.1    | Windows | Linux |        |       |      |
| 76:  | osgearth           | 2.10.1   | Windows | Linux | Darwin | SunOS | IRIX |
| 77:  | pandoc             | 3.5      | Windows | Linux | Darwin | SunOS | IRIX |
| 78:  | parse_args         | 0.5.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 79:  | pawt               | 1.3.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 80:  | pdf4tcl            | 0.9.4    | Windows | Linux | Darwin | SunOS | IRIX |
| 81:  | pgintcl            | 3.5.2    | Windows | Linux | Darwin | SunOS | IRIX |
| 82:  | photoresize        | 0.2.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 83:  | pkgconfig          | 0.29.2   | Darwin  |       |        |       |      |
| 84:  | PNG                | 1.6.48   | Windows | Linux | Darwin | SunOS | IRIX |
| 85:  | poApps             | 3.3.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 86:  | poClipboardViewer  | 3.3.0    | Windows |       |        |       |      |
| 87:  | poFti              | 1.0.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 88:  | poImg              | 3.0.2    | Windows | Linux | Darwin | SunOS | IRIX |
| 89:  | poLibs             | 3.3.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 90:  | poMemory           | 1.0.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 91:  | printer            | 0.9.6.16 | Windows |       |        |       |      |
| 92:  | publisher          | 2.0      | Windows | Linux | Darwin | SunOS | IRIX |
| 93:  | puppyicons         | 0.1      | Windows | Linux | Darwin | SunOS | IRIX |
| 94:  | rbc                | 0.2.0    | Windows | Linux | IRIX   |       |      |
| 95:  | Redistributables   |          | Windows |       |        |       |      |
| 96:  | rl_json            | 0.16.0   | Windows | Linux | Darwin | SunOS | IRIX |
| 97:  | rtext              | 0.1.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 98:  | ruff               | 3.0.4    | Windows | Linux | Darwin | SunOS | IRIX |
| 99:  | scrollutil         | 2.10     | Windows | Linux | Darwin | SunOS | IRIX |
| 100: | SDL                | 2.26.2   | Windows | Linux | Darwin | SunOS | IRIX |
| 101: | SetupTcl           |          | Windows | Linux | Darwin | SunOS | IRIX |
| 102: | shellicon          | 0.2.0    | Windows |       |        |       |      |
| 103: | Snack              | 2.2.12   | Windows | Linux |        |       |      |
| 104: | sqlite3            | 3.51.3   | Windows | Linux | Darwin | IRIX  |      |
| 105: | SWIG               | 4.4.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 106: | tablelist          | 7.11     | Windows | Linux | Darwin | SunOS | IRIX |
| 107: | tbcload            | 2.0a0    | Windows | Linux | Darwin | SunOS | IRIX |
| 108: | Tcl                | 8.6.18   | Windows | Linux | Darwin | SunOS | IRIX |
| 109: | tcl3d              | 1.0.3    | Windows | Linux | Darwin | SunOS | IRIX |
| 110: | tcl9migrate        | 1.0      | Windows | Linux | Darwin | SunOS | IRIX |
| 111: | Tcladdressbook     | 1.2.4    | Darwin  |       |        |       |      |
| 112: | tclAE              | 2.0.7    | Darwin  |       |        |       |      |
| 113: | Tclapplescript     | 2.2      | Darwin  |       |        |       |      |
| 114: | tclargp            | 0.2      | Windows | Linux | Darwin | SunOS | IRIX |
| 115: | tclcompiler        | 2.0a0    | Windows | Linux | Darwin | SunOS | IRIX |
| 116: | tclcsv             | 2.4.3    | Windows | Linux | Darwin | SunOS | IRIX |
| 117: | tcldebugger        | 2.0.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 118: | tclfpdf            | 1.7.3    | Windows | Linux | Darwin | SunOS | IRIX |
| 119: | tclgd              | 1.4.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 120: | Tclkit             |          | Windows | Linux | Darwin | SunOS | IRIX |
| 121: | tcllib             | 2.1      | Windows | Linux | Darwin | SunOS | IRIX |
| 122: | tclMuPdf           | 2.5.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 123: | tclparser          | 1.9      | Windows | Linux | Darwin | SunOS | IRIX |
| 124: | tclssg             | 3.0.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 125: | TclStubs           | 8.6.18   | Windows |       |        |       |      |
| 126: | TclTkManual        |          | Windows | Linux | Darwin | SunOS | IRIX |
| 127: | tcltls             | 2.0.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 128: | tcluvvc            | 0.1      | Linux   |       |        |       |      |
| 129: | tclvfs             | 1.5.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 130: | tclws              | 3.5.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 131: | tclx               | 9.0.0    | Windows | Linux | Darwin | SunOS | IRIX |
| 132: | tdom               | 0.9.6    | Windows | Linux | Darwin | SunOS | IRIX |
| 133: | thtmlview          | 2.0.0    | Windows | Linux | Darwin | SunOS | IRIX |

|      |             |        |         |       |        |       |      |
|------|-------------|--------|---------|-------|--------|-------|------|
| 134: | TIFF        | 4.7.0  | Windows | Linux | Darwin | SunOS | IRIX |
| 135: | tinymce     | 9.0.0  | Windows | Linux | Darwin | SunOS | IRIX |
| 136: | Tix         | 8.4.4  | Windows | Linux | Darwin | SunOS | IRIX |
| 137: | Tk          | 8.6.18 | Windows | Linux | Darwin | SunOS | IRIX |
| 138: | tkchat      | 1.482  | Windows | Linux | Darwin | SunOS | IRIX |
| 139: | tkcon       | 2.8    | Windows | Linux | Darwin | SunOS | IRIX |
| 140: | tkdnd       | 2.9.5  | Windows | Linux | Darwin | SunOS | IRIX |
| 141: | Tkhtml      | 3.0.2  | Windows | Linux | Darwin | SunOS | IRIX |
| 142: | tklib       | 0.9    | Windows | Linux | Darwin | SunOS | IRIX |
| 143: | tko         | 0.4    | Windows | Linux | Darwin | SunOS | IRIX |
| 144: | tkpath      | 0.4.2  | Windows | Linux | Darwin | SunOS | IRIX |
| 145: | tkribbon    | 1.2    | Windows |       |        |       |      |
| 146: | tksqlite    | 0.5.14 | Windows | Linux | Darwin | SunOS | IRIX |
| 147: | TkStubs     | 8.6.18 | Windows |       |        |       |      |
| 148: | tksvg       | 0.16   | Windows | Linux | Darwin | SunOS | IRIX |
| 149: | Tktable     | 2.12.2 | Windows | Linux | Darwin | SunOS | IRIX |
| 150: | tkwintrack  | 2.1.1  | Windows | Linux |        |       |      |
| 151: | treectrl    | 2.5.2  | Windows | Linux | Darwin | SunOS | IRIX |
| 152: | Trf         | 2.1.4  | Windows | Linux | Darwin | SunOS | IRIX |
| 153: | trofs       | 0.4.9  | Windows | Linux | Darwin | SunOS | IRIX |
| 154: | tserialport | 1.2    | Windows | Linux | Darwin | SunOS | IRIX |
| 155: | tsw         | 1.4.2  | Windows | Linux | Darwin | SunOS | IRIX |
| 156: | twapi       | 5.2.0  | Windows |       |        |       |      |
| 157: | tzint       | 1.2    | Windows | Linux | Darwin | SunOS | IRIX |
| 158: | udp         | 1.0.13 | Windows | Linux | Darwin | SunOS | IRIX |
| 159: | ukaz        | 2.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 160: | vectcl      | 0.2.1  | Windows | Linux | Darwin | SunOS | IRIX |
| 161: | Vim         | 9.0.0  | Windows |       |        |       |      |
| 162: | vlerq       | 4.1    | Windows | Linux | Darwin | SunOS | IRIX |
| 163: | wcb         | 4.2    | Windows | Linux | Darwin | SunOS | IRIX |
| 164: | windetect   | 2.0.1  | Windows | Linux |        |       |      |
| 165: | winhelp     | 1.1.1  | Windows |       |        |       |      |
| 166: | Xerces      | 3.2.4  | Windows | Linux | Darwin | SunOS | IRIX |
| 167: | xz          | 5.4.1  | Windows | Linux | Darwin | SunOS | IRIX |
| 168: | yasm        | 1.3.0  | Windows |       |        |       |      |
| 169: | Zipkit      |        | Windows | Linux | Darwin | SunOS | IRIX |
| 170: | ZLib        | 1.3.1  | Windows | Linux | Darwin | SunOS | IRIX |

### List of all libraries (using command line option [--dependencies](#))

| #:    | Name          | Version | Dependencies                                       |
|-------|---------------|---------|----------------------------------------------------|
| ----- |               |         |                                                    |
| 1:    | apave         | 4.4.10  | Tk                                                 |
| 2:    | argparse      | 0.62    | Tcl                                                |
| 3:    | awthemes      | 10.4.0  | Tk                                                 |
| 4:    | BawtLogViewer | 3.3.0   | Tclkit tablelist tkdnd poLibs scrollutil Img rtext |
| 5:    | Blender       | 3.0.0   |                                                    |
| 6:    | Boost         | 1.78.0  |                                                    |
| 7:    | BWidget       | 1.10.1  | Tk                                                 |
| 8:    | Cal3D         | 0.120   | CMake freeglut                                     |
| 9:    | Canvas3d      | 1.2.3   | Tk                                                 |
| 10:   | cawt          | 3.1.1   | Tcl twapi tdom Img tablelist                       |
| 11:   | cawtapp       | 3.1.1   | Tclkit cawt Img tablelist tdom twapi               |
| 12:   | ccl           | 4.0.6   | CMake                                              |
| 13:   | cffi          | 2.0.3   | Tcl libffi                                         |
| 14:   | cfitsio       | 4.1.0   |                                                    |
| 15:   | CMake         | 4.2.0   |                                                    |
| 16:   | critcl        | 3.3     | Tcl                                                |
| 17:   | curl          | 7.88.1  | libressl                                           |
| 18:   | DiffUtil      | 0.4.3   | Tcl                                                |
| 19:   | DirectXTex    | 2021_11 |                                                    |
| 20:   | Doxygen       | 1.8.15  |                                                    |
| 21:   | Eigen         | 3.3.9   |                                                    |
| 22:   | expect        | 6.0a1   | Tcl                                                |
| 23:   | Ffidl         | 0.9.1   | Tcl libffi                                         |
| 24:   | ffmpeg        | 7.1.3   | SDL yasm                                           |
| 25:   | fftw          | 3.3.9   |                                                    |
| 26:   | fitsTcl       | 2.5.1   | Tcl cfitsio                                        |
| 27:   | freeglut      | 3.2.2   | CMake                                              |
| 28:   | Freetype      | 2.13.3  | PNG                                                |
| 29:   | FTGL          | 2.1.3   | CMake Freetype                                     |

|                                  |                    |          |                                                                 |
|----------------------------------|--------------------|----------|-----------------------------------------------------------------|
| 30:                              | gdal               | 2.4.4    | openjpeg                                                        |
| 31:                              | gdi                | 0.9.9.15 | CMake Tk TkStubs                                                |
| 32:                              | GeographicLib      | 1.52     | CMake                                                           |
| 33:                              | GeographicLibData  |          | GeographicLib                                                   |
| 34:                              | geos               | 3.7.2    | CMake                                                           |
| 35:                              | giflib             | 5.2.1    |                                                                 |
| 36:                              | GL2ps              | 1.4.2    | CMake freeglut PNG ZLib                                         |
| 37:                              | GLEW               | 2.2.0    | CMake                                                           |
| 38:                              | glfw               | 3.3.8    | CMake                                                           |
| 39:                              | gorilla            | 1.6.1    | Tcl Tclkit                                                      |
| 40:                              | hdc                | 0.2.0.1  | CMake Tk TkStubs                                                |
| 41:                              | Img                | 2.1.1    | Tk TkStubs tcllib                                               |
| 42:                              | imgj2p             | 0.1.1    | Tk openjpeg                                                     |
| 43:                              | imgtools           | 0.3.1    | Tcl Tk                                                          |
| 44:                              | InnoSetup          | 6.5.4    |                                                                 |
| 45:                              | iocp               | 2.0.2    | Tcl                                                             |
| 46:                              | itk                | 4.2.5    | Tk                                                              |
| 47:                              | iwidgets           | 4.1.2    | Tk itk                                                          |
| 48:                              | jasper             | 2.0.25   | CMake JPEG                                                      |
| 49:                              | jigsaw             | 2.0      | Tclkit puppyicons tcllib tklib Img                              |
| 50:                              | JPEG               | 9.f      |                                                                 |
| 51:                              | KDIS               | 2.9.0    | CMake                                                           |
| 52:                              | libffi             | 3.4.8    |                                                                 |
| 53:                              | libgd              | 2.3.2    | ZLib TIFF JPEG PNG libwebp Freetype                             |
| 54:                              | libressl           | 2.9.2    |                                                                 |
| 55:                              | libwebp            | 1.2.4    |                                                                 |
| 56:                              | libxml2            | 2.10.3   | CMake Zlib                                                      |
| 57:                              | materialicons      | 0.2      | Tk tdom tksvg                                                   |
| 58:                              | mawt               | 0.5.0    | Tk TkStubs SWIG CMake Img ffmpeg                                |
| 59:                              | memchan            | 2.3.1    | Tcl                                                             |
| 60:                              | mentry             | 4.5.1    | Tk wcb                                                          |
| 61:                              | Mpexpr             | 1.2.1    | Tcl                                                             |
| 62:                              | mqtt               | 4.0      | Tcl                                                             |
| 63:                              | mupdf              | 1.26.0   |                                                                 |
| 64:                              | MuPDFWidget        | 2.4      | Tk tclMuPdf                                                     |
| 65:                              | nacl               | 1.2      | Tcl                                                             |
| 66:                              | nasm               | 2.16.3   |                                                                 |
| 67:                              | nsf                | 2.4.0    | Tcl                                                             |
| 68:                              | OglInfo            | 1.0.3    | Tclkit tcl3d tablelist                                          |
| 69:                              | ooxml              | 1.13.1   | Tcl tclvfs tdom                                                 |
| 70:                              | openjpeg           | 2.5.3    | CMake                                                           |
| 71:                              | OpenSceneGraph     | 3.6.5    | CMake ZLib TIFF JPEG jasper giflib PNG curl Freetype ffmpeg     |
| 72:                              | OpenSceneGraphData | 3.4.0    | OpenSceneGraph                                                  |
| 73:                              | openssl            | 3.5.4    |                                                                 |
| 74:                              | oratcl             | 4.6.1    | Tcl                                                             |
| 75:                              | osgcal             | 0.2.1    | CMake Cal3D OpenSceneGraph                                      |
| 76:                              | osgearth           | 2.10.1   | CMake curl gdal geos OpenSceneGraph                             |
| 77:                              | pandoc             | 3.5      |                                                                 |
| 78:                              | parse_args         | 0.5.1    | Tcl                                                             |
| 79:                              | pawt               | 1.3.0    | Tcl fitstcl Img                                                 |
| 80:                              | pdf4tcl            | 0.9.4    | Tk                                                              |
| 81:                              | pgintcl            | 3.5.2    | Tcl                                                             |
| 82:                              | photoresize        | 0.2.1    | Tcl Tk                                                          |
| 83:                              | pkgconfig          | 0.29.2   |                                                                 |
| 84:                              | PNG                | 1.6.48   | CMake ZLib                                                      |
| 85:                              | poApps             | 3.3.0    | Tclkit tcllib tablelist Img tdom publisher tclMuPdf poFti poImg |
| poMemory cawt pawt fitsTcl twapi |                    |          | tkdnd tksvg scrollutil rtext                                    |
| 86:                              | poClipboardViewer  | 3.3.0    | Tclkit cawt tcllib tablelist Img poImg twapi tksvg scrollutil   |
| 87:                              | poFti              | 1.0.0    | Tk                                                              |
| 88:                              | poImg              | 3.0.2    | Tk                                                              |
| 89:                              | poLibs             | 3.3.0    | Tcl Tk                                                          |
| 90:                              | poMemory           | 1.0.1    | Tcl                                                             |
| 91:                              | printer            | 0.9.6.16 | CMake Tk TkStubs hdc                                            |
| 92:                              | publisher          | 2.0      | Tcl                                                             |
| 93:                              | puppyicons         | 0.1      | Tk tksvg                                                        |
| 94:                              | rbc                | 0.2.0    | Tk                                                              |
| 95:                              | Redistributables   |          |                                                                 |
| 96:                              | rl_json            | 0.16.0   | Tcl                                                             |
| 97:                              | rtext              | 0.1.1    | TclStubs TkStubs                                                |
| 98:                              | ruff               | 3.0.4    | Tcl                                                             |
| 99:                              | scrollutil         | 2.10     | Tk                                                              |
| 100:                             | SDL                | 2.26.2   | CMake                                                           |
| 101:                             | SetupTcl           |          | All                                                             |
| 102:                             | shellicon          | 0.2.0    | Tk TkStubs                                                      |
| 103:                             | Snack              | 2.2.12   | Tk TkStubs                                                      |
| 104:                             | sqlite3            | 3.51.3   |                                                                 |
| 105:                             | SWIG               | 4.4.0    |                                                                 |
| 106:                             | tablelist          | 7.11     | Tk                                                              |
| 107:                             | tbclload           | 2.0a0    | Tcl                                                             |
| 108:                             | Tcl                | 8.6.18   |                                                                 |

|      |                |        |                                                       |
|------|----------------|--------|-------------------------------------------------------|
| 109: | tcl3d          | 1.0.3  | Tk TkStubs SWIG CMake Freetype FTGL SDL OpenScenegrph |
| 110: | tcl9migrate    | 1.0    | Tcl                                                   |
| 111: | Tcladdressbook | 1.2.4  | Tcl                                                   |
| 112: | tclAE          | 2.0.7  | Tcl                                                   |
| 113: | Tclapplescript | 2.2    | Tcl                                                   |
| 114: | tclargp        | 0.2    | Tcl                                                   |
| 115: | tclcompiler    | 2.0a0  | Tcl                                                   |
| 116: | tclcsv         | 2.4.3  | Tcl                                                   |
| 117: | tcldebugger    | 2.0.1  | Tk Tclkit tcllib tclparser                            |
| 118: | tclfpdf        | 1.7.3  | Tk                                                    |
| 119: | tclgd          | 1.4.1  | Tcl libgd                                             |
| 120: | Tclkit         |        | Tcl Tk                                                |
| 121: | tcllib         | 2.1    | Tcl critcl Tclkit                                     |
| 122: | tclMuPdf       | 2.5.1  | Tk TkStubs CMake mupdf publisher                      |
| 123: | tclparser      | 1.9    | Tcl                                                   |
| 124: | tclssg         | 3.0.1  | Tcl Tclkit tcllib                                     |
| 125: | TclStubs       | 8.6.18 |                                                       |
| 126: | TclTkManual    |        | Tcl Tk                                                |
| 127: | tcltls         | 2.0.1  | Tcl openssl                                           |
| 128: | tcluvc         | 0.1    | Tcl Tk                                                |
| 129: | tclvfs         | 1.5.0  | Tcl                                                   |
| 130: | tclws          | 3.5.0  | Tcl tdom tcllib                                       |
| 131: | tclx           | 9.0.0  | Tcl                                                   |
| 132: | tdom           | 0.9.6  | Tcl                                                   |
| 133: | thtmlview      | 2.0.0  | Tk                                                    |
| 134: | TIFF           | 4.7.0  | JPEG ZLib xz                                          |
| 135: | tinyxml2       | 9.0.0  | CMake                                                 |
| 136: | Tix            | 8.4.4  | Tk                                                    |
| 137: | Tk             | 8.6.18 | Tcl                                                   |
| 138: | tkchat         | 1.482  | Tclkit                                                |
| 139: | tkcon          | 2.8    | Tk                                                    |
| 140: | tkdnd          | 2.9.5  | CMake Tk TkStubs                                      |
| 141: | Tkhtml         | 3.0.2  | Tcl Tk                                                |
| 142: | tklib          | 0.9    | Tk                                                    |
| 143: | tko            | 0.4    | Tk                                                    |
| 144: | tkpath         | 0.4.2  | Tk                                                    |
| 145: | tkribbon       | 1.2    | CMake Tk TkStubs                                      |
| 146: | tksqlite       | 0.5.14 | Tcl Tclkit tablelist Tktable treectrl Img             |
| 147: | TkStubs        | 8.6.18 | TclStubs                                              |
| 148: | tksvg          | 0.16   | Tk                                                    |
| 149: | Tktable        | 2.12.2 | Tk                                                    |
| 150: | tkwintrack     | 2.1.1  | Tk                                                    |
| 151: | treectrl       | 2.5.2  | Tk                                                    |
| 152: | Trf            | 2.1.4  | Tcl Zlib                                              |
| 153: | trofs          | 0.4.9  | Tk                                                    |
| 154: | tserialport    | 1.2    | Tcl                                                   |
| 155: | tsw            | 1.4.2  | Tk                                                    |
| 156: | twapi          | 5.2.0  | Tcl                                                   |
| 157: | tzint          | 1.2    | Tcl PNG                                               |
| 158: | udp            | 1.0.13 | Tcl                                                   |
| 159: | ukaz           | 2.1    | Tk                                                    |
| 160: | vectcl         | 0.2.1  | Tcl                                                   |
| 161: | Vim            | 9.0.0  |                                                       |
| 162: | vlerq          | 4.1    | Tcl                                                   |
| 163: | wcb            | 4.2    | Tk                                                    |
| 164: | windetect      | 2.0.1  | Tk                                                    |
| 165: | winhelp        | 1.1.1  | Tcl Tk                                                |
| 166: | Xerces         | 3.2.4  | CMake                                                 |
| 167: | xz             | 5.4.1  |                                                       |
| 168: | yasm           | 1.3.0  |                                                       |
| 169: | Zipkit         |        | Tcl Tk                                                |
| 170: | ZLib           | 1.3.1  |                                                       |

### List of all libraries (using command line option [--authors](#))

| #:    | Name          | Version | ScriptAuthor   |
|-------|---------------|---------|----------------|
| ----- |               |         |                |
| 1:    | apave         | 4.4.10  | Paul Obermeier |
| 2:    | argparse      | 0.62    | Paul Obermeier |
| 3:    | awthemes      | 10.4.0  | Paul Obermeier |
| 4:    | BawtLogViewer | 3.3.0   | Paul Obermeier |
| 5:    | Blender       | 3.0.0   | Paul Obermeier |
| 6:    | Boost         | 1.78.0  | Paul Obermeier |
| 7:    | BWidget       | 1.10.1  | Paul Obermeier |
| 8:    | Cal3D         | 0.120   | Paul Obermeier |
| 9:    | Canvas3d      | 1.2.3   | Paul Obermeier |

|     |                    |          |                   |
|-----|--------------------|----------|-------------------|
| 10: | cawt               | 3.1.1    | Paul Obermeier    |
| 11: | cawtapp            | 3.1.1    | Paul Obermeier    |
| 12: | ccl                | 4.0.6    | Paul Obermeier    |
| 13: | cffi               | 2.0.3    | Paul Obermeier    |
| 14: | cfitsio            | 4.1.0    | Paul Obermeier    |
| 15: | CMake              | 4.2.0    | Paul Obermeier    |
| 16: | critcl             | 3.3      | Paul Obermeier    |
| 17: | curl               | 7.88.1   | Paul Obermeier    |
| 18: | DiffUtil           | 0.4.3    | Paul Obermeier    |
| 19: | DirectXTex         | 2021_11  | Paul Obermeier    |
| 20: | Doxygen            | 1.8.15   | Paul Obermeier    |
| 21: | Eigen              | 3.3.9    | Paul Obermeier    |
| 22: | expect             | 6.0a1    | Paul Obermeier    |
| 23: | Ffidl              | 0.9.1    | Paul Obermeier    |
| 24: | ffmpeg             | 7.1.3    | Paul Obermeier    |
| 25: | fftw               | 3.3.9    | Paul Obermeier    |
| 26: | fitsTcl            | 2.5.1    | Paul Obermeier    |
| 27: | freeglut           | 3.2.2    | Paul Obermeier    |
| 28: | FreeType           | 2.13.3   | Paul Obermeier    |
| 29: | FTGL               | 2.1.3    | Paul Obermeier    |
| 30: | gdal               | 2.4.4    | Paul Obermeier    |
| 31: | gdi                | 0.9.9.15 | Paul Obermeier    |
| 32: | GeographicLib      | 1.52     | Paul Obermeier    |
| 33: | GeographicLibData  |          | Paul Obermeier    |
| 34: | geos               | 3.7.2    | Paul Obermeier    |
| 35: | giflib             | 5.2.1    | Paul Obermeier    |
| 36: | Gl2ps              | 1.4.2    | Paul Obermeier    |
| 37: | GLEW               | 2.2.0    | Paul Obermeier    |
| 38: | glfw               | 3.3.8    | Paul Obermeier    |
| 39: | gorilla            | 1.6.1    | Paul Obermeier    |
| 40: | hdc                | 0.2.0.1  | Paul Obermeier    |
| 41: | Img                | 2.1.1    | Paul Obermeier    |
| 42: | imgjp2             | 0.1.1    | Paul Obermeier    |
| 43: | imgtools           | 0.3.1    | Paul Obermeier    |
| 44: | InnoSetup          | 6.5.4    | Paul Obermeier    |
| 45: | iocp               | 2.0.2    | Paul Obermeier    |
| 46: | itk                | 4.2.5    | Paul Obermeier    |
| 47: | iwidgets           | 4.1.2    | Paul Obermeier    |
| 48: | jasper             | 2.0.25   | Paul Obermeier    |
| 49: | jigsaw             | 2.0      | Paul Obermeier    |
| 50: | JPEG               | 9.f      | Paul Obermeier    |
| 51: | KDIS               | 2.9.0    | Paul Obermeier    |
| 52: | libffi             | 3.4.8    | Paul Obermeier    |
| 53: | libgd              | 2.3.2    | Alexander Schoepe |
| 54: | libressl           | 2.9.2    | Paul Obermeier    |
| 55: | libwebp            | 1.2.4    | Paul Obermeier    |
| 56: | libxml2            | 2.10.3   | Paul Obermeier    |
| 57: | materialicons      | 0.2      | Paul Obermeier    |
| 58: | mawt               | 0.5.0    | Paul Obermeier    |
| 59: | memchan            | 2.3.1    | Alexander Schoepe |
| 60: | mentry             | 4.5.1    | Paul Obermeier    |
| 61: | Mpexpr             | 1.2.1    | Paul Obermeier    |
| 62: | mqtt               | 4.0      | Paul Obermeier    |
| 63: | mupdf              | 1.26.0   | Paul Obermeier    |
| 64: | MuPDFWidget        | 2.4      | Paul Obermeier    |
| 65: | nacl               | 1.2      | Paul Obermeier    |
| 66: | nasm               | 2.16.3   | Paul Obermeier    |
| 67: | nsf                | 2.4.0    | Paul Obermeier    |
| 68: | OglInfo            | 1.0.3    | Paul Obermeier    |
| 69: | ooxml              | 1.13.1   | Paul Obermeier    |
| 70: | openjpeg           | 2.5.3    | Paul Obermeier    |
| 71: | OpenSceneGraph     | 3.6.5    | Paul Obermeier    |
| 72: | OpenSceneGraphData | 3.4.0    | Paul Obermeier    |
| 73: | openssl            | 3.5.4    | Paul Obermeier    |
| 74: | oratcl             | 4.6.1    | Alexander Schoepe |
| 75: | osgcal             | 0.2.1    | Paul Obermeier    |
| 76: | osgearth           | 2.10.1   | Paul Obermeier    |
| 77: | pandoc             | 3.5      | Paul Obermeier    |
| 78: | parse_args         | 0.5.1    | Paul Obermeier    |
| 79: | pawt               | 1.3.0    | Paul Obermeier    |
| 80: | pdf4tcl            | 0.9.4    | Paul Obermeier    |

|      |                   |          |                   |
|------|-------------------|----------|-------------------|
| 81:  | pgintcl           | 3.5.2    | Paul Obermeier    |
| 82:  | photoresize       | 0.2.1    | Paul Obermeier    |
| 83:  | pkgconfig         | 0.29.2   | Paul Obermeier    |
| 84:  | PNG               | 1.6.48   | Paul Obermeier    |
| 85:  | poApps            | 3.3.0    | Paul Obermeier    |
| 86:  | poClipboardViewer | 3.3.0    | Paul Obermeier    |
| 87:  | poFti             | 1.0.0    | Paul Obermeier    |
| 88:  | poImg             | 3.0.2    | Paul Obermeier    |
| 89:  | poLibs            | 3.3.0    | Paul Obermeier    |
| 90:  | poMemory          | 1.0.1    | Paul Obermeier    |
| 91:  | printer           | 0.9.6.16 | Paul Obermeier    |
| 92:  | publisher         | 2.0      | Paul Obermeier    |
| 93:  | puppyicons        | 0.1      | Paul Obermeier    |
| 94:  | rbc               | 0.2.0    | Alexander Schoepe |
| 95:  | Redistributables  |          | Paul Obermeier    |
| 96:  | rl_json           | 0.16.0   | Paul Obermeier    |
| 97:  | rtext             | 0.1.1    | Paul Obermeier    |
| 98:  | ruff              | 3.0.4    | Paul Obermeier    |
| 99:  | scrollutil        | 2.10     | Paul Obermeier    |
| 100: | SDL               | 2.26.2   | Paul Obermeier    |
| 101: | SetupTcl          |          | Paul Obermeier    |
| 102: | shellicon         | 0.2.0    | Paul Obermeier    |
| 103: | Snack             | 2.2.12   | Paul Obermeier    |
| 104: | sqlite3           | 3.51.3   | Paul Obermeier    |
| 105: | SWIG              | 4.4.0    | Paul Obermeier    |
| 106: | tablelist         | 7.11     | Paul Obermeier    |
| 107: | tbclload          | 2.0a0    | Alexander Schoepe |
| 108: | Tcl               | 8.6.18   | Paul Obermeier    |
| 109: | tcl3d             | 1.0.3    | Paul Obermeier    |
| 110: | tcl9migrate       | 1.0      | Paul Obermeier    |
| 111: | Tcladdressbook    | 1.2.4    | Alexander Schoepe |
| 112: | tclAE             | 2.0.7    | Alexander Schoepe |
| 113: | Tclapplescript    | 2.2      | Alexander Schoepe |
| 114: | tclargp           | 0.2      | Paul Obermeier    |
| 115: | tclcompiler       | 2.0a0    | Alexander Schoepe |
| 116: | tclcsv            | 2.4.3    | Paul Obermeier    |
| 117: | tcldebugger       | 2.0.1    | Paul Obermeier    |
| 118: | tclfpdf           | 1.7.3    | Paul Obermeier    |
| 119: | tclgd             | 1.4.1    | Alexander Schoepe |
| 120: | Tclkit            |          | Paul Obermeier    |
| 121: | tcllib            | 2.1      | Paul Obermeier    |
| 122: | tclMuPdf          | 2.5.1    | Paul Obermeier    |
| 123: | tclparser         | 1.9      | Alexander Schoepe |
| 124: | tclssg            | 3.0.1    | Paul Obermeier    |
| 125: | TclStubs          | 8.6.18   | Paul Obermeier    |
| 126: | TclTkManual       |          | Paul Obermeier    |
| 127: | tcltls            | 2.0.1    | Paul Obermeier    |
| 128: | tcluvc            | 0.1      | Paul Obermeier    |
| 129: | tclvfs            | 1.5.0    | Paul Obermeier    |
| 130: | tclws             | 3.5.0    | Paul Obermeier    |
| 131: | tclx              | 9.0.0    | Paul Obermeier    |
| 132: | tdom              | 0.9.6    | Paul Obermeier    |
| 133: | thtmlview         | 2.0.0    | Paul Obermeier    |
| 134: | TIFF              | 4.7.0    | Paul Obermeier    |
| 135: | tinyxml2          | 9.0.0    | Paul Obermeier    |
| 136: | Tix               | 8.4.4    | Paul Obermeier    |
| 137: | Tk                | 8.6.18   | Paul Obermeier    |
| 138: | tkchat            | 1.482    | Paul Obermeier    |
| 139: | tkcon             | 2.8      | Paul Obermeier    |
| 140: | tkdnd             | 2.9.5    | Paul Obermeier    |
| 141: | Tkhtml            | 3.0.2    | Paul Obermeier    |
| 142: | tklib             | 0.9      | Paul Obermeier    |
| 143: | tko               | 0.4      | Paul Obermeier    |
| 144: | tkpath            | 0.4.2    | Paul Obermeier    |
| 145: | tkribbon          | 1.2      | Paul Obermeier    |
| 146: | tksqlite          | 0.5.14   | Paul Obermeier    |
| 147: | TkStubs           | 8.6.18   | Paul Obermeier    |
| 148: | tksvg             | 0.16     | Paul Obermeier    |
| 149: | Tktable           | 2.12.2   | Paul Obermeier    |
| 150: | tkwintrack        | 2.1.1    | Paul Obermeier    |
| 151: | treectrl          | 2.5.2    | Paul Obermeier    |

|      |             |        |                   |
|------|-------------|--------|-------------------|
| 152: | Trf         | 2.1.4  | Paul Obermeier    |
| 153: | trofs       | 0.4.9  | Paul Obermeier    |
| 154: | tserialport | 1.2    | Alexander Schoepe |
| 155: | tsw         | 1.4.2  | Paul Obermeier    |
| 156: | twapi       | 5.2.0  | Paul Obermeier    |
| 157: | tzint       | 1.2    | Alexander Schoepe |
| 158: | udp         | 1.0.13 | Paul Obermeier    |
| 159: | ukaz        | 2.1    | Paul Obermeier    |
| 160: | vectcl      | 0.2.1  | Paul Obermeier    |
| 161: | Vim         | 9.0.0  | Paul Obermeier    |
| 162: | vlerq       | 4.1    | Paul Obermeier    |
| 163: | wcb         | 4.2    | Paul Obermeier    |
| 164: | windetect   | 2.0.1  | Paul Obermeier    |
| 165: | winhelp     | 1.1.1  | Paul Obermeier    |
| 166: | Xerces      | 3.2.4  | Paul Obermeier    |
| 167: | xz          | 5.4.1  | Paul Obermeier    |
| 168: | yasm        | 1.3.0  | Paul Obermeier    |
| 169: | Zipkit      |        | Paul Obermeier    |
| 170: | ZLib        | 1.3.1  | Paul Obermeier    |

### List of all libraries (using command line option [--homepages](#))

| #:  | Name              | Version  | Homepage                                                                                                                                                      |
|-----|-------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| --- |                   |          |                                                                                                                                                               |
| 1:  | apave             | 4.4.10   | <a href="https://aplsimple.github.io/en/tcl/pave/index.html">https://aplsimple.github.io/en/tcl/pave/index.html</a>                                           |
| 2:  | argparse          | 0.62     | <a href="https://github.com/georgtree/argparse">https://github.com/georgtree/argparse</a>                                                                     |
| 3:  | awthemes          | 10.4.0   | <a href="https://sourceforge.net/projects/tcl-awthemes/">https://sourceforge.net/projects/tcl-awthemes/</a>                                                   |
| 4:  | BawtLogViewer     | 3.3.0    | <a href="https://www.tcl3d.org/bawt/">https://www.tcl3d.org/bawt/</a>                                                                                         |
| 5:  | Blender           | 3.0.0    | <a href="https://www.blender.org/">https://www.blender.org/</a>                                                                                               |
| 6:  | Boost             | 1.78.0   | <a href="https://www.boost.org/">https://www.boost.org/</a>                                                                                                   |
| 7:  | BWidget           | 1.10.1   | <a href="https://core.tcl-lang.org/bwidget/">https://core.tcl-lang.org/bwidget/</a>                                                                           |
| 8:  | Cal3D             | 0.120    | <a href="https://github.com/mp3butcher/Cal3D">https://github.com/mp3butcher/Cal3D</a>                                                                         |
| 9:  | Canvas3d          | 1.2.3    | <a href="http://3dcanvas.tcl-lang.org/">http://3dcanvas.tcl-lang.org/</a>                                                                                     |
| 10: | cawt              | 3.1.1    | <a href="https://www.tcl3d.org/cawt/">https://www.tcl3d.org/cawt/</a>                                                                                         |
| 11: | cawtapp           | 3.1.1    | <a href="https://www.tcl3d.org/cawt/">https://www.tcl3d.org/cawt/</a>                                                                                         |
| 12: | ccl               | 4.0.6    | <a href="https://sourceforge.net/projects/cigi/">https://sourceforge.net/projects/cigi/</a>                                                                   |
| 13: | cffi              | 2.0.3    | <a href="https://github.com/apnadkarni/tcl-cffi">https://github.com/apnadkarni/tcl-cffi</a>                                                                   |
| 14: | cfitsio           | 4.1.0    | <a href="https://heasarc.gsfc.nasa.gov/fitsio/">https://heasarc.gsfc.nasa.gov/fitsio/</a>                                                                     |
| 15: | CMake             | 4.2.0    | <a href="https://www.cmake.org/">https://www.cmake.org/</a>                                                                                                   |
| 16: | critcl            | 3.3      | <a href="https://github.com/andreas-kupries/critcl">https://github.com/andreas-kupries/critcl</a>                                                             |
| 17: | curl              | 7.88.1   | <a href="https://curl.haxx.se/libcurl/">https://curl.haxx.se/libcurl/</a>                                                                                     |
| 18: | DiffUtil          | 0.4.3    | <a href="https://github.com/pspjuth/DiffUtilTcl/">https://github.com/pspjuth/DiffUtilTcl/</a>                                                                 |
| 19: | DirectXTex        | 2021_11  | <a href="https://github.com/microsoft/DirectXTex/">https://github.com/microsoft/DirectXTex/</a>                                                               |
| 20: | Doxygen           | 1.8.15   | <a href="http://www.doxygen.org/">http://www.doxygen.org/</a>                                                                                                 |
| 21: | Eigen             | 3.3.9    | <a href="http://eigen.tuxfamily.org/">http://eigen.tuxfamily.org/</a>                                                                                         |
| 22: | expect            | 6.0a1    | <a href="https://github.com/tcltk-depot/expect">https://github.com/tcltk-depot/expect</a>                                                                     |
| 23: | Ffidl             | 0.9.1    | <a href="https://github.com/prs-de/ffidl">https://github.com/prs-de/ffidl</a>                                                                                 |
| 24: | ffmpeg            | 7.1.3    | <a href="https://www.ffmpeg.org/">https://www.ffmpeg.org/</a>                                                                                                 |
| 25: | fftw              | 3.3.9    | <a href="http://www.fftw.org/">http://www.fftw.org/</a>                                                                                                       |
| 26: | fitsTcl           | 2.5.1    | <a href="https://heasarc.gsfc.nasa.gov/docs/software/ftools/fv/fitsTcl_home.html">https://heasarc.gsfc.nasa.gov/docs/software/ftools/fv/fitsTcl_home.html</a> |
| 27: | freeglut          | 3.2.2    | <a href="https://github.com/freeglut/freeglut">https://github.com/freeglut/freeglut</a>                                                                       |
| 28: | FreeType          | 2.13.3   | <a href="http://www.freetype.org/">http://www.freetype.org/</a>                                                                                               |
| 29: | FTGL              | 2.1.3    | <a href="https://sourceforge.net/projects/ftgl/">https://sourceforge.net/projects/ftgl/</a>                                                                   |
| 30: | gdal              | 2.4.4    | <a href="https://www.gdal.org/">https://www.gdal.org/</a>                                                                                                     |
| 31: | gdi               | 0.9.9.15 | <a href="http://www.schwartzcomputer.com/tcl-tk/tcl-tk.html">http://www.schwartzcomputer.com/tcl-tk/tcl-tk.html</a>                                           |
| 32: | GeographicLib     | 1.52     | <a href="https://geographiclib.sourceforge.io/">https://geographiclib.sourceforge.io/</a>                                                                     |
| 33: | GeographicLibData |          | <a href="https://geographiclib.sourceforge.io/">https://geographiclib.sourceforge.io/</a>                                                                     |
| 34: | geos              | 3.7.2    | <a href="http://trac.osgeo.org/geos/">http://trac.osgeo.org/geos/</a>                                                                                         |
| 35: | giflib            | 5.2.1    | <a href="http://giflib.sourceforge.net/">http://giflib.sourceforge.net/</a>                                                                                   |
| 36: | Gl2ps             | 1.4.2    | <a href="http://www.geuz.org/gl2ps/">http://www.geuz.org/gl2ps/</a>                                                                                           |
| 37: | GLEW              | 2.2.0    | <a href="https://github.com/nigels-com/glew/">https://github.com/nigels-com/glew/</a>                                                                         |
| 38: | glfw              | 3.3.8    | <a href="https://www.glfw.org/">https://www.glfw.org/</a>                                                                                                     |
| 39: | gorilla           | 1.6.1    | <a href="https://github.com/zdia/gorilla/wiki">https://github.com/zdia/gorilla/wiki</a>                                                                       |
| 40: | hdc               | 0.2.0.1  | <a href="http://www.schwartzcomputer.com/tcl-tk/tcl-tk.html">http://www.schwartzcomputer.com/tcl-tk/tcl-tk.html</a>                                           |
| 41: | Img               | 2.1.1    | <a href="https://tkimg.sourceforge.net/">https://tkimg.sourceforge.net/</a>                                                                                   |
| 42: | imgjp2            | 0.1.1    | <a href="https://www.androwish.org/home/dir?name=jni/imgjp2">https://www.androwish.org/home/dir?name=jni/imgjp2</a>                                           |
| 43: | imgtools          | 0.3.1    | <a href="https://tkimgtools.sourceforge.net/">https://tkimgtools.sourceforge.net/</a>                                                                         |
| 44: | InnoSetup         | 6.5.4    | <a href="http://www.jrsoftware.org/isinfo.php">http://www.jrsoftware.org/isinfo.php</a>                                                                       |
| 45: | iocp              | 2.0.2    | <a href="https://github.com/apnadkarni/iocp/">https://github.com/apnadkarni/iocp/</a>                                                                         |
| 46: | itk               | 4.2.5    | <a href="https://core.tcl-lang.org/itk/">https://core.tcl-lang.org/itk/</a>                                                                                   |
| 47: | iwidgets          | 4.1.2    | <a href="https://sourceforge.net/projects/incrtcl/">https://sourceforge.net/projects/incrtcl/</a>                                                             |
| 48: | jasper            | 2.0.25   | <a href="https://github.com/jasper-software/jasper/">https://github.com/jasper-software/jasper/</a>                                                           |

|                                                                                                                                                                     |                    |          |                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49:                                                                                                                                                                 | jigsaw             | 2.0      | <a href="http://www.easton.me.uk/tcl/jigsaw/index.html">http://www.easton.me.uk/tcl/jigsaw/index.html</a>                                                       |
| 50:                                                                                                                                                                 | JPEG               | 9.f      | <a href="http://www.ijg.org/">http://www.ijg.org/</a>                                                                                                           |
| 51:                                                                                                                                                                 | KDIS               | 2.9.0    | <a href="https://sourceforge.net/projects/kdis/">https://sourceforge.net/projects/kdis/</a>                                                                     |
| 52:                                                                                                                                                                 | libffi             | 3.4.8    | <a href="https://github.com/libffi/libffi">https://github.com/libffi/libffi</a>                                                                                 |
| 53:                                                                                                                                                                 | libgd              | 2.3.2    | <a href="https://libgd.github.io">https://libgd.github.io</a>                                                                                                   |
| 54:                                                                                                                                                                 | libressl           | 2.9.2    | <a href="https://www.libressl.org/">https://www.libressl.org/</a>                                                                                               |
| 55:                                                                                                                                                                 | libwebp            | 1.2.4    | <a href="https://developers.google.com/speed/webp/">https://developers.google.com/speed/webp/</a>                                                               |
| 56:                                                                                                                                                                 | libxml2            | 2.10.3   | <a href="https://gitlab.gnome.org/GNOME/libxml2">https://gitlab.gnome.org/GNOME/libxml2</a>                                                                     |
| 57:                                                                                                                                                                 | materialicons      | 0.2      |                                                                                                                                                                 |
| <a href="https://www.androwish.org/home/dir?ci=tip&amp;name=assets/materialicons0.2">https://www.androwish.org/home/dir?ci=tip&amp;name=assets/materialicons0.2</a> |                    |          |                                                                                                                                                                 |
| 58:                                                                                                                                                                 | mawt               | 0.5.0    | <a href="https://www.tcl3d.org/mawt/">https://www.tcl3d.org/mawt/</a>                                                                                           |
| 59:                                                                                                                                                                 | memchan            | 2.3.1    | <a href="https://memchan.sourceforge.net/">https://memchan.sourceforge.net/</a>                                                                                 |
| 60:                                                                                                                                                                 | mentry             | 4.5.1    | <a href="http://www.nemethi.de/">http://www.nemethi.de/</a>                                                                                                     |
| 61:                                                                                                                                                                 | Mpexpr             | 1.2.1    | <a href="https://sourceforge.net/projects/mpexpr/">https://sourceforge.net/projects/mpexpr/</a>                                                                 |
| 62:                                                                                                                                                                 | mqtt               | 4.0      | <a href="https://chiselapp.com/user/schelte/repository/mqtt/home">https://chiselapp.com/user/schelte/repository/mqtt/home</a>                                   |
| 63:                                                                                                                                                                 | mupdf              | 1.26.0   | <a href="https://mupdf.com/">https://mupdf.com/</a>                                                                                                             |
| 64:                                                                                                                                                                 | MuPDFWidget        | 2.4      | <a href="https://sourceforge.net/projects/irrational-numbers/">https://sourceforge.net/projects/irrational-numbers/</a>                                         |
| 65:                                                                                                                                                                 | nacl               | 1.2      | <a href="https://tcl.sowaswie.de/repos/fossil/nacl/home">https://tcl.sowaswie.de/repos/fossil/nacl/home</a>                                                     |
| 66:                                                                                                                                                                 | nasm               | 2.16.3   | <a href="https://www.nasm.us/">https://www.nasm.us/</a>                                                                                                         |
| 67:                                                                                                                                                                 | nsf                | 2.4.0    | <a href="https://next-scripting.org">https://next-scripting.org</a>                                                                                             |
| 68:                                                                                                                                                                 | OglInfo            | 1.0.3    | <a href="https://www.tcl3d.org/">https://www.tcl3d.org/</a>                                                                                                     |
| 69:                                                                                                                                                                 | ooxml              | 1.13.1   | <a href="https://fossil.sowaswie.de/ooxml/home">https://fossil.sowaswie.de/ooxml/home</a>                                                                       |
| 70:                                                                                                                                                                 | openjpeg           | 2.5.3    | <a href="http://www.openjpeg.org/">http://www.openjpeg.org/</a>                                                                                                 |
| 71:                                                                                                                                                                 | OpenSceneGraph     | 3.6.5    | <a href="http://www.openscenegraph.org/">http://www.openscenegraph.org/</a>                                                                                     |
| 72:                                                                                                                                                                 | OpenSceneGraphData | 3.4.0    | <a href="http://www.openscenegraph.org/">http://www.openscenegraph.org/</a>                                                                                     |
| 73:                                                                                                                                                                 | openssl            | 3.5.4    | <a href="https://openssl-library.org/">https://openssl-library.org/</a>                                                                                         |
| 74:                                                                                                                                                                 | oratl              | 4.6.1    | <a href="https://github.com/sm-shaw/oratl">https://github.com/sm-shaw/oratl</a>                                                                                 |
| 75:                                                                                                                                                                 | osgcal             | 0.2.1    | <a href="https://sourceforge.net/projects/osgcal/">https://sourceforge.net/projects/osgcal/</a>                                                                 |
| 76:                                                                                                                                                                 | osgearth           | 2.10.1   | <a href="http://osgearth.org/">http://osgearth.org/</a>                                                                                                         |
| 77:                                                                                                                                                                 | pandoc             | 3.5      | <a href="https://pandoc.org/">https://pandoc.org/</a>                                                                                                           |
| 78:                                                                                                                                                                 | parse_args         | 0.5.1    | <a href="https://github.com/RubyLane/parse_args">https://github.com/RubyLane/parse_args</a>                                                                     |
| 79:                                                                                                                                                                 | pawt               | 1.3.0    | <a href="https://www.tcl3d.org/pawt/">https://www.tcl3d.org/pawt/</a>                                                                                           |
| 80:                                                                                                                                                                 | pdf4tcl            | 0.9.4    | <a href="https://sourceforge.net/projects/pdf4tcl/">https://sourceforge.net/projects/pdf4tcl/</a>                                                               |
| 81:                                                                                                                                                                 | pgintcl            | 3.5.2    | <a href="https://sourceforge.net/projects/pgintcl/">https://sourceforge.net/projects/pgintcl/</a>                                                               |
| 82:                                                                                                                                                                 | photoresize        | 0.2.1    | <a href="https://github.com/auriocus/PhotoResize">https://github.com/auriocus/PhotoResize</a>                                                                   |
| 83:                                                                                                                                                                 | pkgconfig          | 0.29.2   | <a href="https://www.freedesktop.org/wiki/Software/pkg-config/">https://www.freedesktop.org/wiki/Software/pkg-config/</a>                                       |
| 84:                                                                                                                                                                 | PNG                | 1.6.48   | <a href="http://www.libpng.org/pub/png/">http://www.libpng.org/pub/png/</a>                                                                                     |
| 85:                                                                                                                                                                 | poApps             | 3.3.0    | <a href="https://www.tcl3d.org/poApps/">https://www.tcl3d.org/poApps/</a>                                                                                       |
| 86:                                                                                                                                                                 | poClipboardViewer  | 3.3.0    | <a href="https://www.tcl3d.org/poApps/">https://www.tcl3d.org/poApps/</a>                                                                                       |
| 87:                                                                                                                                                                 | poFti              | 1.0.0    | <a href="https://www.tcl3d.org/poPkgs/poFti.html">https://www.tcl3d.org/poPkgs/poFti.html</a>                                                                   |
| 88:                                                                                                                                                                 | poImg              | 3.0.2    | <a href="https://www.tcl3d.org/poPkgs/poImg.html">https://www.tcl3d.org/poPkgs/poImg.html</a>                                                                   |
| 89:                                                                                                                                                                 | poLibs             | 3.3.0    | <a href="https://www.tcl3d.org/poApps/">https://www.tcl3d.org/poApps/</a>                                                                                       |
| 90:                                                                                                                                                                 | poMemory           | 1.0.1    | <a href="https://www.tcl3d.org/poPkgs/poMemory.html">https://www.tcl3d.org/poPkgs/poMemory.html</a>                                                             |
| 91:                                                                                                                                                                 | printer            | 0.9.6.16 | <a href="http://www.schwartzcomputer.com/tcl-tk/tcl-tk.html">http://www.schwartzcomputer.com/tcl-tk/tcl-tk.html</a>                                             |
| 92:                                                                                                                                                                 | publisher          | 2.0      | <a href="https://sourceforge.net/projects/irrational-numbers/">https://sourceforge.net/projects/irrational-numbers/</a>                                         |
| 93:                                                                                                                                                                 | puppyicons         | 0.1      | <a href="https://www.androwish.org/home/dir?ci=tip&amp;name=undroid/puppyicons0.1">https://www.androwish.org/home/dir?ci=tip&amp;name=undroid/puppyicons0.1</a> |
| 94:                                                                                                                                                                 | rbc                | 0.2.0    | <a href="https://www.sourceforge.net/projects/rbctoolkit/">https://www.sourceforge.net/projects/rbctoolkit/</a>                                                 |
| 95:                                                                                                                                                                 | Redistributables   |          | <a href="https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-">https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-</a>             |
| redist                                                                                                                                                              |                    |          |                                                                                                                                                                 |
| 96:                                                                                                                                                                 | rl_json            | 0.16.0   | <a href="https://github.com/RubyLane/rl_json">https://github.com/RubyLane/rl_json</a>                                                                           |
| 97:                                                                                                                                                                 | rtext              | 0.1.1    | <a href="https://chiselapp.com/user/fvogel/repository/rtext">https://chiselapp.com/user/fvogel/repository/rtext</a>                                             |
| 98:                                                                                                                                                                 | ruff               | 3.0.4    | <a href="https://ruff.magicsplat.com/">https://ruff.magicsplat.com/</a>                                                                                         |
| 99:                                                                                                                                                                 | scrollutil         | 2.10     | <a href="http://www.nemethi.de/">http://www.nemethi.de/</a>                                                                                                     |
| 100:                                                                                                                                                                | SDL                | 2.26.2   | <a href="https://www.libsdl.org/">https://www.libsdl.org/</a>                                                                                                   |
| 101:                                                                                                                                                                | SetupTcl           |          | <a href="https://www.tcl3d.org/bawt/">https://www.tcl3d.org/bawt/</a>                                                                                           |
| 102:                                                                                                                                                                | shellicon          | 0.2.0    | <a href="https://sourceforge.net/projects/shellicon/">https://sourceforge.net/projects/shellicon/</a>                                                           |
| 103:                                                                                                                                                                | Snack              | 2.2.12   | <a href="https://github.com/scottypitcher/tcl-snack">https://github.com/scottypitcher/tcl-snack</a>                                                             |
| 104:                                                                                                                                                                | sqlite3            | 3.51.3   | <a href="https://www.sqlite.org/">https://www.sqlite.org/</a>                                                                                                   |
| 105:                                                                                                                                                                | SWIG               | 4.4.0    | <a href="http://www.swig.org/">http://www.swig.org/</a>                                                                                                         |
| 106:                                                                                                                                                                | tablelist          | 7.11     | <a href="http://www.nemethi.de/">http://www.nemethi.de/</a>                                                                                                     |
| 107:                                                                                                                                                                | tbclload           | 2.0a0    | <a href="https://github.com/tcltk-depot/tbclload">https://github.com/tcltk-depot/tbclload</a>                                                                   |
| 108:                                                                                                                                                                | Tcl                | 8.6.18   | <a href="https://core.tcl-lang.org/tcl/">https://core.tcl-lang.org/tcl/</a>                                                                                     |
| 109:                                                                                                                                                                | tcl3d              | 1.0.3    | <a href="https://www.tcl3d.org/">https://www.tcl3d.org/</a>                                                                                                     |
| 110:                                                                                                                                                                | tcl9migrate        | 1.0      | <a href="https://github.com/apnadkarni/tcl9-migrate">https://github.com/apnadkarni/tcl9-migrate</a>                                                             |
| 111:                                                                                                                                                                | Tcladdressbook     | 1.2.4    | <a href="https://sourceforge.net/projects/tcladdressbook/">https://sourceforge.net/projects/tcladdressbook/</a>                                                 |
| 112:                                                                                                                                                                | tclAE              | 2.0.7    | <a href="https://sourceforge.net/projects/tclae/">https://sourceforge.net/projects/tclae/</a>                                                                   |
| 113:                                                                                                                                                                | Tclapplescript     | 2.2      | <a href="https://sourceforge.net/projects/tclapplescript/">https://sourceforge.net/projects/tclapplescript/</a>                                                 |
| 114:                                                                                                                                                                | tclargp            | 0.2      | <a href="https://wiki.tcl-lang.org/page/argp">https://wiki.tcl-lang.org/page/argp</a>                                                                           |
| 115:                                                                                                                                                                | tclcompiler        | 2.0a0    | <a href="https://github.com/tcltk-depot/tclcompiler">https://github.com/tcltk-depot/tclcompiler</a>                                                             |
| 116:                                                                                                                                                                | tclcsv             | 2.4.3    | <a href="https://sourceforge.net/projects/tclcsv">https://sourceforge.net/projects/tclcsv</a>                                                                   |
| 117:                                                                                                                                                                | tcldebugger        | 2.0.1    | <a href="https://github.com/tcltk-depot/tcl-debugger">https://github.com/tcltk-depot/tcl-debugger</a>                                                           |
| 118:                                                                                                                                                                | tclfpdf            | 1.7.3    | <a href="https://github.com/lamuzzachiodi/tclfpdf">https://github.com/lamuzzachiodi/tclfpdf</a>                                                                 |
| 119:                                                                                                                                                                | tclgd              | 1.4.1    | <a href="https://github.com/flightaware/tcl.gd">https://github.com/flightaware/tcl.gd</a>                                                                       |
| 120:                                                                                                                                                                | Tclkit             |          | <a href="https://sourceforge.net/projects/kbskit/">https://sourceforge.net/projects/kbskit/</a>                                                                 |
| 121:                                                                                                                                                                | tcllib             | 2.1      | <a href="https://core.tcl-lang.org/tcllib">https://core.tcl-lang.org/tcllib</a>                                                                                 |
| 122:                                                                                                                                                                | tclMuPdf           | 2.5.1    | <a href="https://sourceforge.net/projects/irrational-numbers/">https://sourceforge.net/projects/irrational-numbers/</a>                                         |
| 123:                                                                                                                                                                | tclparser          | 1.9      | <a href="https://github.com/tcltk-depot/tcl-parser">https://github.com/tcltk-depot/tcl-parser</a>                                                               |
| 124:                                                                                                                                                                | tclssg             | 3.0.1    | <a href="https://github.com/tclssg/tclssg">https://github.com/tclssg/tclssg</a>                                                                                 |
| 125:                                                                                                                                                                | TclStubs           | 8.6.18   | <a href="https://core.tcl-lang.org/tcl/">https://core.tcl-lang.org/tcl/</a>                                                                                     |
| 126:                                                                                                                                                                | TclTkManual        |          | <a href="http://www.tcl-lang.org">http://www.tcl-lang.org</a>                                                                                                   |



|      |             |        |                                                                                                                                           |
|------|-------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 127: | tcltls      | 2.0.1  | <a href="http://core.tcl-lang.org/tcltls/">http://core.tcl-lang.org/tcltls/</a>                                                           |
| 128: | tcluv       | 0.1    | <a href="https://www.androwish.org/home/dir?ci=tip&amp;name=jni/tcluv">https://www.androwish.org/home/dir?ci=tip&amp;name=jni/tcluv</a>   |
| 129: | tclvfs      | 1.5.0  | <a href="https://core.tcl-lang.org/tclvfs/">https://core.tcl-lang.org/tclvfs/</a>                                                         |
| 130: | tclws       | 3.5.0  | <a href="https://core.tcl-lang.org/tclws/">https://core.tcl-lang.org/tclws/</a>                                                           |
| 131: | tclx        | 9.0.0  | <a href="https://github.com/tcltk-depot/tclx">https://github.com/tcltk-depot/tclx</a>                                                     |
| 132: | tdom        | 0.9.6  | <a href="http://tdom.org/">http://tdom.org/</a>                                                                                           |
| 133: | thtmlview   | 2.0.0  | <a href="https://github.com/mittelmark/thtmlview/">https://github.com/mittelmark/thtmlview/</a>                                           |
| 134: | TIFF        | 4.7.0  | <a href="http://www.simplesystems.org/libtiff/">http://www.simplesystems.org/libtiff/</a>                                                 |
| 135: | tinyxml2    | 9.0.0  | <a href="https://github.com/leethomason/tinyxml2">https://github.com/leethomason/tinyxml2</a>                                             |
| 136: | Tix         | 8.4.4  | <a href="https://tix.sourceforge.net/">https://tix.sourceforge.net/</a>                                                                   |
| 137: | Tk          | 8.6.18 | <a href="https://core.tcl-lang.org/tk/">https://core.tcl-lang.org/tk/</a>                                                                 |
| 138: | tkchat      | 1.482  | <a href="http://tkchat.tcl-lang.org/">http://tkchat.tcl-lang.org/</a>                                                                     |
| 139: | tkcon       | 2.8    | <a href="https://github.com/bohagan1/TkCon/">https://github.com/bohagan1/TkCon/</a>                                                       |
| 140: | tkdnd       | 2.9.5  | <a href="https://github.com/petasis/tkdnd">https://github.com/petasis/tkdnd</a>                                                           |
| 141: | Tkhtml      | 3.0.2  | <a href="https://github.com/olebole/tkhtml3">https://github.com/olebole/tkhtml3</a>                                                       |
| 142: | tklib       | 0.9    | <a href="https://core.tcl-lang.org/tklib">https://core.tcl-lang.org/tklib</a>                                                             |
| 143: | tko         | 0.4    | <a href="https://chiselapp.com/user/rene/repository/tko/index">https://chiselapp.com/user/rene/repository/tko/index</a>                   |
| 144: | tkpath      | 0.4.2  | <a href="https://github.com/tcltk-depot/tkpath">https://github.com/tcltk-depot/tkpath</a>                                                 |
| 145: | tkribbon    | 1.2    | <a href="https://github.com/petasis/tkribbon">https://github.com/petasis/tkribbon</a>                                                     |
| 146: | tksqlite    | 0.5.14 | <a href="http://reddog.s35.xrea.com/wiki/TkSQLite.html">http://reddog.s35.xrea.com/wiki/TkSQLite.html</a>                                 |
| 147: | TkStubs     | 8.6.18 | <a href="https://core.tcl-lang.org/tk/">https://core.tcl-lang.org/tk/</a>                                                                 |
| 148: | tksvg       | 0.16   | <a href="https://github.com/tcltk-depot/tksvg">https://github.com/tcltk-depot/tksvg</a>                                                   |
| 149: | Tktable     | 2.12.2 | <a href="https://github.com/bohagan1/TkTable/">https://github.com/bohagan1/TkTable/</a>                                                   |
| 150: | tkwintrack  | 2.1.1  | <a href="https://sourceforge.net/projects/tkwintrack/">https://sourceforge.net/projects/tkwintrack/</a>                                   |
| 151: | treectrl    | 2.5.2  | <a href="https://github.com/tcltk-depot/tktreectrl">https://github.com/tcltk-depot/tktreectrl</a>                                         |
| 152: | Trf         | 2.1.4  | <a href="https://tcltrf.sourceforge.net/">https://tcltrf.sourceforge.net/</a>                                                             |
| 153: | trofs       | 0.4.9  | <a href="https://math.nist.gov/~DPorter/tcltk/trofs/">https://math.nist.gov/~DPorter/tcltk/trofs/</a>                                     |
| 154: | tserialport | 1.2    | <a href="https://fossil.sowaswie.de/tserialport">https://fossil.sowaswie.de/tserialport</a>                                               |
| 155: | tsw         | 1.4.2  | <a href="http://www.nemethi.de/">http://www.nemethi.de/</a>                                                                               |
| 156: | twapi       | 5.2.0  | <a href="https://github.com/apnadkarni/twapi">https://github.com/apnadkarni/twapi</a>                                                     |
| 157: | tzint       | 1.2    | <a href="https://fossil.sowaswie.de/tzint/">https://fossil.sowaswie.de/tzint/</a>                                                         |
| 158: | udp         | 1.0.13 | <a href="https://core.tcl-lang.org/tcludp/">https://core.tcl-lang.org/tcludp/</a>                                                         |
| 159: | ukaz        | 2.1    | <a href="https://github.com/auriocus/ukaz">https://github.com/auriocus/ukaz</a>                                                           |
| 160: | vectcl      | 0.2.1  | <a href="https://github.com/auriocus/VecTcl/">https://github.com/auriocus/VecTcl/</a>                                                     |
| 161: | Vim         | 9.0.0  | <a href="https://www.vim.org/">https://www.vim.org/</a>                                                                                   |
| 162: | vlerq       | 4.1    | <a href="https://www.equi4.com/vlerq-org/">https://www.equi4.com/vlerq-org/</a>                                                           |
| 163: | wcb         | 4.2    | <a href="http://www.nemethi.de/">http://www.nemethi.de/</a>                                                                               |
| 164: | windetect   | 2.0.1  | <a href="https://sourceforge.net/projects/tkwintrack/">https://sourceforge.net/projects/tkwintrack/</a>                                   |
| 165: | winhelp     | 1.1.1  | <a href="https://www.androwish.org/index.html/dir?name=undroid/winhelp">https://www.androwish.org/index.html/dir?name=undroid/winhelp</a> |
| 166: | Xerces      | 3.2.4  | <a href="http://xerces.apache.org/">http://xerces.apache.org/</a>                                                                         |
| 167: | xz          | 5.4.1  | <a href="https://sourceforge.net/projects/lzmautils/">https://sourceforge.net/projects/lzmautils/</a>                                     |
| 168: | yasm        | 1.3.0  | <a href="https://github.com/yasm/yasm/">https://github.com/yasm/yasm/</a>                                                                 |
| 169: | Zipkit      |        | <a href="https://core.tcl-lang.org/tcl/">https://core.tcl-lang.org/tcl/</a>                                                               |
| 170: | ZLib        | 1.3.1  | <a href="http://www.zlib.net/">http://www.zlib.net/</a>                                                                                   |

## 9 MSYS / MinGW Information

This chapter describes the development environments `MSYS` and `MinGW`. These packages provide an environment using the GNU compiler collection (`gcc`) to build typical Open Source projects like **Tcl/Tk** under Windows.

### 9.1 Introduction

#### **MSYS**

*MSYS, a contraction of "Minimal SYStem", is a Bourne Shell command line interpreter system. Offered as an alternative to Microsoft's `cmd.exe`, this provides a general purpose command line environment, which is particularly suited to use with MinGW, for porting of many Open Source applications to the MS-Windows platform.*

MSYS is a collection of Unix tools for Windows. It contains all tools which are needed for the typical build process using the `configure / make` toolset.

Examples: `autogen`, `cp`, `rm`, `mv`, `mkdir`, `m4`, `make`

MSYS is available as 32-bit version only. This version can be used in conjunction with both the 32-bit and 64-bit version of `MinGW`.

#### **MSYS2**

MSYS2 is a newer version of MSYS.  
It is available from <https://www.msys2.org/>.

#### **MinGW**

Short description from the homepage of MinGW-w64: <https://sourceforge.net/projects/mingw-w64/>

*MinGW, a contraction of "Minimalist GNU for Windows", is a minimalist development environment for native Microsoft Windows applications.*

*MinGW provides a complete Open Source programming tool set which is suitable for the development of native MS-Windows applications, and which do not depend on any 3rd-party C-Runtime DLLs. (It does depend on a number of DLLs provided by Microsoft themselves, as components of the operating system; most notable among these is `MSVCRT.DLL`, the Microsoft C runtime library. Additionally, threaded applications must ship with a freely distributable thread support DLL, provided as part of MinGW itself).*

*MinGW compilers provide access to the functionality of the Microsoft C runtime and some language-specific runtimes. MinGW, being Minimalist, does not, and never will, attempt to provide a POSIX runtime environment for POSIX application deployment on MS-Windows.*

MinGW provides the GNU Compiler Collection `gcc` for Windows. The SourceForge project `MinGW-w64` supplies 32-bit and 64-bit versions of `gcc`.

The `MinGW-w64` project also supplies an extended version of `MSYS` (see chapter [9.3 Installation of MSYS2](#) below for details).

## 9.2 Installation of MSYS

The following instructions were used to create the BAWT MSYS/MinGW distributions for gcc versions 4.9.2, 5.2.0, 7.2.0 and 8.1.0.

### 9.2.1 Download MSYS

Entry page:

<https://sourceforge.net/projects/mingwbuidls/files/external-binary-packages/>

File: *msys+7za+wget+svn+git+mercurial+cvs-rev13.7z*

Link:

<https://sourceforge.net/projects/mingwbuidls/files/external-binary-packages/msys%2B7za%2Bwget%2Bsvn%2Bgit%2Bmercurial%2Bcvs-rev13.7z/download>

### 9.2.2 Download MinGW

Entry page for 32-bit version:

<https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/>

Entry page for 64-bit version:

<https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win64/Personal%20Builds/mingw-builds/>

#### **32-bit gcc 4.9.2**

File: *i686-4.9.2-release-posix-dwarf-rt\_v4-rev4.7z*

Link:

[https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/4.9.2/threads-posix/dwarf/i686-4.9.2-release-posix-dwarf-rt\\_v4-rev4.7z/download](https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/4.9.2/threads-posix/dwarf/i686-4.9.2-release-posix-dwarf-rt_v4-rev4.7z/download)

#### **32-bit gcc 5.2.0**

File: *i686-5.2.0-release-posix-dwarf-rt\_v4-rev0.7z*

Link:

[https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/5.2.0/threads-posix/dwarf/i686-5.2.0-release-posix-dwarf-rt\\_v4-rev0.7z/download](https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/5.2.0/threads-posix/dwarf/i686-5.2.0-release-posix-dwarf-rt_v4-rev0.7z/download)

#### **32-bit gcc 7.2.0**

File: *i686-7.2.0-release-posix-dwarf-rt\_v5-rev1.7z*

Link:

[https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/7.2.0/threads-posix/dwarf/i686-7.2.0-release-posix-dwarf-rt\\_v5-rev1.7z/download](https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/7.2.0/threads-posix/dwarf/i686-7.2.0-release-posix-dwarf-rt_v5-rev1.7z/download)

#### **32-bit gcc 8.1.0**

File: *i686-8.1.0-release-posix-dwarf-rt\_v6-rev0.7z*

Link:

[https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/8.1.0/threads-posix/dwarf/i686-8.1.0-release-posix-dwarf-rt\\_v6-rev0.7z/download](https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win32/Personal%20Builds/mingw-builds/8.1.0/threads-posix/dwarf/i686-8.1.0-release-posix-dwarf-rt_v6-rev0.7z/download)

### **64-bit gcc 4.9.2**

File: x86\_64-4.9.2-release-posix-seh-rt\_v4-rev4.7z

Link:

[https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win64/Personal%20Builds/mingw-builds/4.9.2/threads-posix/seh/x86\\_64-4.9.2-release-posix-seh-rt\\_v4-rev4.7z/download](https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win64/Personal%20Builds/mingw-builds/4.9.2/threads-posix/seh/x86_64-4.9.2-release-posix-seh-rt_v4-rev4.7z/download)

### **64-bit gcc 5.2.0**

File: x86\_64-5.2.0-release-posix-seh-rt\_v4-rev0.7z

Link:

[https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win64/Personal%20Builds/mingw-builds/5.2.0/threads-posix/seh/x86\\_64-5.2.0-release-posix-seh-rt\\_v4-rev0.7z/download](https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win64/Personal%20Builds/mingw-builds/5.2.0/threads-posix/seh/x86_64-5.2.0-release-posix-seh-rt_v4-rev0.7z/download)

### **64-bit gcc 7.2.0**

File: x86\_64-7.2.0-release-posix-seh-rt\_v5-rev1.7z

Link:

[https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win64/Personal%20Builds/mingw-builds/7.2.0/threads-posix/seh/x86\\_64-7.2.0-release-posix-seh-rt\\_v5-rev1.7z/download](https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win64/Personal%20Builds/mingw-builds/7.2.0/threads-posix/seh/x86_64-7.2.0-release-posix-seh-rt_v5-rev1.7z/download)

### **64-bit gcc 8.1.0**

File: x86\_64-8.1.0-release-posix-seh-rt\_v6-rev0.7z

Link:

[https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win64/Personal%20Builds/mingw-builds/8.1.0/threads-posix/seh/x86\\_64-8.1.0-release-posix-seh-rt\\_v6-rev0.7z/download](https://sourceforge.net/projects/mingw-w64/files/Toolchains%20targetting%20Win64/Personal%20Builds/mingw-builds/8.1.0/threads-posix/seh/x86_64-8.1.0-release-posix-seh-rt_v6-rev0.7z/download)

## **9.2.3 Configuration**

The following instructions use the 32-bit version of gcc 4.9.2. Installation is done on drive C: Adapt file and directory names accordingly, when using other versions.

- Create directory C:\MinGW-gcc4.9.2-32
- Extract downloaded MinGW file in directory C:\MinGW-gcc4.9.2-32
- Extract downloaded MSYS file in directory C:\MinGW-gcc4.9.2-32

Your directory structure should now look as follows:

| Dieser PC > OS (C:) > MinGW-gcc4.9.2-32 >                                                 |                  |             |
|-------------------------------------------------------------------------------------------|------------------|-------------|
| <input type="checkbox"/> Name                                                             | Änderungsdatum   | Typ         |
|  mingw32 | 06.11.2015 16:49 | Dateiordner |
|  msys    | 06.11.2015 17:00 | Dateiordner |

Insert the next two lines into file `C:\MinGW-gcc4.9.2-32\msys\etc\fstab`

```
# Win32_Path      Mount_Point
C:/MinGW-gcc4.9.2-32/mingw32  /mingw
```

Start the MSYS Shell by double-clicking onto file `C:\MinGW-gcc4.9.2-32\msys\msys.bat`

You may create a shortcut of `msys.bat` on your desktop for easier access.

## 9.3 Installation of MSYS2

The following instructions were used to create the BAWT MSYS/MinGW distributions for gcc versions 11.2.0, 12.2.0, 13.2.0, 14.2.0 and 15.2.0.

Download the newest MSYS2 32-bit installer.

Change the gcc versions as appropriate.

### 9.3.1 MSYS2/MinGW 64-bit

- Execute the installer program and install into ex. `C:\gcc13.2.0_x86_64-w64-mingw32`
- After installation perform the following commands to update the packages and add additional packages needed for BAWT.

```
> pacman -Syu
```

- Run "MSYS2 MSYS" from Start menu.
- Update the rest of the base packages:

```
> pacman -Su
```

- Install additional tools:

```
> pacman -S --needed base-devel
> pacman -S zip
```

- Install compiler for 64-bit:

```
> pacman -S --needed mingw-w64-x86_64-toolchain
```

- Select the following packages:  
`mingw-w64-x86_64-binutils`  
`mingw-w64-x86_64-gcc`  
`mingw-w64-x86_64-make`  
`mingw-w64-x86_64-pkgconf`  
`mingw-w64-x86_64-tools-git`
- Quit MSYS shell.

- Make adjustments for BAWT usage:  
Remove file InstallationLog.txt.  
Remove directories mingw32 and installerResources.  
Create directory msys32 and move all files and directories except mingw64 into msys32.  
Remove subdirectory "User" from msys32/home.
- Create 7z file of `C:\gcc13.2.0_x86_64-w64-mingw32` using Ultra compression.

### 9.3.2 MSYS2/MinGW 32-bit

- Execute the installer program and install into ex. `C:\gcc13.2.0_i686-w64-mingw32`
- After installation perform the following commands to update the packages and add additional packages needed for BAWT.

```
> pacman -Syu
```

- Run "MSYS2 MSYS" from Start menu.
- Update the rest of the base packages:

```
> pacman -Su
```

- Install additional tools:

```
> pacman -S --needed base-devel
> pacman -S zip
```

- Install compiler for 32-bit:

```
> pacman -S --needed mingw-w64-i686-toolchain
```

- Select the following packages:  
mingw-w64-i686-binutils  
mingw-w64-i686-gcc  
mingw-w64-i686-make  
mingw-w64-i686-pkgconf  
mingw-w64-i686-tools-git
- Quit MSYS shell.
- Make adjustments for BAWT usage:  
Remove file InstallationLog.txt.  
Remove directories mingw64 and installerResources.  
Create directory msys32 and move all files and directories except mingw32 into msys32.  
Remove subdirectory "User" from msys32/home.
- Create 7z file of `C:\gcc13.2.0_i686-w64-mingw32` using Ultra compression.

## 9.4 Further Informations

Source: <https://sourceforge.net/p/mingw-w64/wiki2/MSYS/>

### 9.4.1 What is MSYS

MSYS is a Minimal SYStem, providing several crucial unix utilities under a compatibility layer (the msys-1.0.dll file). MSYS should provide everything to make compilation of common GNU software.

#### **MSYS provided by the mingw-w64/w32 project**

This package is not more than a collection of the 50+ packages provided by mingw.org. It was created as a (huge) convenience to our users, to let them be productive instead of downloading every part separately. The accompanying sources are also provided and can be found in the same download section as mentioned above.

This package is 32-bit, but will run flawlessly on x64 Windows. There will never be a 64-bit native MSYS (is there any need?) because the only compiler capable of building MSYS applications is the outdated gcc 3.4.4, which does not support x64 native Windows targets.

### 9.4.2 Where to get MSYS

There are three places you can get MSYS:

- The [MinGW project](#), with separate packages of all official MSYS packages. Takes a long time to download and install everything.
- The all-in-one package on the [MinGW-w64 download page](#). It is updated on request (see third option for very up to date collection)
- [MinGW-builds](#) provides an ultra-inclusive MSYS package with a bunch of additional useful stuff.

### 9.4.3 How to use MSYS

Installing MSYS is quite easy.

- You'll need to download the above package.
- Unzip it somewhere, for example C:\msys so that C:\msys\bin contains (among others) bash.exe.
- Doubleclick (or make a handy shortcut and run that) on C:\msys\msys.bat.
- Type sh /postinstall/pi.sh
- Answer the friendly questions and you're all set up.

#### **Mingw-w64/w32 specifics**

When running an autotools configure script, these options will come in handy:

- for a 64-bit build: `--host=x86_64-w64-mingw32`
- for a 32-bit build: `--host=i686-w64-mingw32`

If you are experiencing problems, you can also set `--build` to the same value. Some configure scripts also use `--target` instead of `--host`. Use `configure --help` to get all possible options.

#### **--host, --target, and --build explained**

`--host` specifies on what platform/architecture the compiled program is going to run. `--target` specifies the platform/architecture that the program should be configured for and will be compiled for. This should only have effect when building cross-compilers. `--build` specifies the platform/architecture the build process is going to be executed.

## 10 Release history

The following table gives an overview of the release history of **BAWT**. For detailed release information see the [BAWT homepage](#).

| Version | Date       | Release notes                                                                                    |
|---------|------------|--------------------------------------------------------------------------------------------------|
| 0.1.0   | 2016-06-24 | First version introduced at EuroTcl 2016 in Eindhoven.                                           |
| 0.2.0   | 2016-08-27 | Improved build actions. New and updated libraries.                                               |
| 0.3.0   | 2016-10-23 | Improved build actions. New and updated libraries.                                               |
| 0.4.0   | 2016-12-28 | Improved build actions. New and updated libraries.                                               |
| 0.5.0   | 2017-03-19 | Improved build actions. New and updated libraries.                                               |
| 0.6.0   | 2017-07-20 | Improved build actions. New and updated libraries.                                               |
| 0.7.0   | 2017-08-26 | Improved build actions. New and updated libraries.                                               |
| 0.7.1   | 2017-09-12 | Support for Tcl/Tk 8.7.                                                                          |
| 0.7.2   | 2017-09-24 | Support for Visual Studio 2017.                                                                  |
| 0.7.3   | 2018-01-04 | Tcl/Tk 8.6.8. New and updated libraries.                                                         |
| 0.8.0   | 2018-07-04 | Support for nested Setup files. New and updated libraries.                                       |
| 0.9.0   | 2018-12-28 | Tcl/Tk 8.6.9. New and updated libraries.                                                         |
| 0.9.1   | 2019-03-09 | Better support for Debug build mode. New and updated libraries.                                  |
| 1.0.0   | 2019-06-23 | Several incompatible changes. Support for Visual Studio 2019.                                    |
| 1.1.0   | 2019-12-28 | Tcl/Tk 8.6.10. Improved MinGW support for several libraries. New and updated libraries.          |
| 1.1.1   | 2020-01-12 | Improved handling of C++ based Tcl extensions.                                                   |
| 1.1.2   | 2020-02-16 | Improved BawtLogViewer. New and updated libraries.                                               |
| 1.1.3   | 2020-03-15 | Improved Linux build. Updated libraries.                                                         |
| 1.1.4   | 2020-05-02 | Improved MinGW support for several libraries. New and updated libraries.                         |
| 1.2.0   | 2020-06-09 | Additional MSYS2 support. New and updated libraries.                                             |
| 1.2.1   | 2020-09-05 | Support for Tcl/Tk 8.7a4. New and updated libraries.                                             |
| 1.3.0   | 2021-01-08 | Support for Tcl/Tk 8.6.11. Improved support for Tcl/Tk 8.7.a4. New and updated libraries.        |
| 2.0.0   | 2021-08-22 | Support for primary and secondary compiler on Windows. Tcl/Tk 8.7.a5. New and updated libraries. |
| 2.1.0   | 2021-12-28 | Support for Tcl/Tk 8.6.12. New and updated libraries.                                            |
| 2.2.0   | 2022-04-15 | Support for MinGW gcc 11. New and updated libraries.                                             |
| 2.2.1   | 2022-07-17 | Maintenance release. New and updated libraries.                                                  |
| 2.3.0   | 2022-12-18 | Support for Tcl/Tk 8.6.13 and Apple Silicon (ARM). New and updated libraries.                    |
| 2.3.1   | 2023-01-19 | Maintenance release. New and updated libraries.                                                  |
| 3.0.0   | 2024-12-28 | Major release. Support for Tcl/Tk 9, Linux ARM and RISC-V. New and updated libraries.            |
| 3.0.1   | 2024-12-31 | Patch release. Prefer BAWT supplied zip program on Windows.                                      |
| 3.1.0   | 2025-08-24 | Maintenance release. Support for Tcl/Tk 8.6.17 and 9.0.2.                                        |
| 3.2.0   | 2025-12-14 | Maintenance release. Support for Tcl/Tk 9.0.3, OpenIndiana, VS2026 and gcc 15.                   |
| 3.3.0   | 2026-07-11 | Maintenance release. Support for Tcl/Tk 8.6.18 and 9.0.4. Support for IRIX.                      |