

Think Class Library 2.0 CodeWarrior Port Package

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Note

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About the TCL Port Package

Introduction

This document describes the TCL 2.0 CodeWarrior Port Package, a set of files which will enable you to compile the Think Class Library version 2.0 with the Metrowerks CodeWarrior 68K and PowerPC compilers. Read this document carefully **before** using the package.

This package will be updated regularly as new versions of the Metrowerks compilers become available and as new bug fixes or features are incorporated. The most recent version should always be available for FTP on the site `daemon.ncsa.uiuc.edu` in the directory `/pub/TCL/contributors/Eric_Scoute`. Notification of these updates will be posted to the Internet newsgroup `comp.sys.mac.oop.tcl`.

Note

Additional information may be contained in a file named `*README.extra` in the root folder of the package. ▲

Package Requirements

To make effective use of the CodeWarrior Port Package, you need the following items:

- Symantec C++ for Macintosh, version 7.0.
- Metrowerks CodeWarrior Bronze, Silver, or Gold, DR/2 or newer.
- At least 30MB disk space available on your hard drive.
- A 680x0 Macintosh with at least 8MB of RAM, or a PowerPC Macintosh with at least 16MB of RAM.
- An unmodified copy of the Think Class Library, version 2.0.

The following items **will not** be useful:

- Think C or Symantec C++, version 6.0 or earlier.
- Think Class Library, version 1.1.3 or earlier. (If you are using TCL 1.1.3, you may wish to investigate the PTR-TCL package provided by Jon Wätte on common FTP sites.)
- The free updater provided by Symantec to upgrade Symantec C++ from version 6.0 to version 7.0. The updater does not include the TCL version 2.0.

- Symantec's PowerPC Cross Development Kit. The port package will not work properly with the TCL version 2.0.1 included with the CDK, nor with the updated TCL 2.0.2.

Overview

Using the TCL CodeWarrior Port Package entails the following steps:

- Converting the Think Class Library to a form usable by the Metrowerks compilers.
- Converting your source code to a form usable by the Metrowerks compilers.

The following chapters of this document describe these steps in detail. You should also review the chapter entitled, "Using the Modified TCL," which describes the differences between the standard TCL used for the Symantec compiler and the modified TCL used for the Metrowerks compilers.

For More Information

If you have questions about using the TCL CodeWarrior Port Package, or about the TCL 2.0 in general, you may contact me at the following addresses:

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Note

These addresses are valid through the end of **July 1994** only. After that time, I will be moving to Urbana, Illinois (University of Illinois). I do not yet have new addresses to provide. ▲

I also maintain an unofficial list of bugs found in the TCL 2.0 which is posted regularly on the Internet newsgroup `comp.sys.mac.oop.tcl`. If you discover a bug in the TCL (whether or not it is related to the CodeWarrior port), please send me an e-mail message describing the nature of the problem so that I may include it in the bug list (and correct it in the CodeWarrior port).

Please note that this package is provided **free of charge**. Although I am generally available (and interested) to talk about this package and any related topic, I may from time to time be unable to respond to requests for support of the package due to other commitments.

Creating the Modified TCL Source Code

In this stage, you will create a second copy of the Think Class Library source code on your hard drive. You should keep two copies of the TCL source code on your drive: the original source for use when compiling with Symantec's compiler, and the modified source for use with CodeWarrior. (The TCL source and precompiled headers take approximately 6MB.)

▲ WARNING

It is absolutely important that you begin with the **unmodified** source code from the TCL 2.0 (provided on the Symantec C++ 7.0 master disks). **DO NOT** use the updated TCL (version 2.0.1) which was provided with Symantec's PowerPC Cross Development Kit or the updated version 2.0.2. If you have updated beyond version 2.0 or if you have modified the TCL yourself, make a copy of your changes and reinstall the TCL from your Symantec C++ 7.0 master disks. ▲

Converting the updated TCL requires the following steps:

- Make a copy of the Think Class Library 2.0 folder. Place this folder **outside** the CodeWarrior compiler folder (and outside the Symantec C++ folder as well.)
- Open the MultiDiff application. Select "Apply Diff..." from the File menu. A standard open box will appear. Select the file `*TCL source.diff`. You will be prompted for the top folder to apply the patches to. Select the folder which contains the copy of the TCL you just made. Note that the changes are made **in place**; thus it is important to make a copy of the TCL prior to applying the patches.
- Wait. There is no way to stop the patcher once it's running. It will take several minutes to make the changes. (On a Centris 610 it takes about 7 minutes.)
- Copy the header file `THINK.h` from your Symantec C++ folder to your CodeWarrior folder. If you maintain separate folders for 68K and PPC compilers, copy the header to both folders. (`THINK.h` can be found in the path `:Symantec C++ for Macintosh:Mac #includes:THINK #includes`.)
- You may want to use the MultiDiff application to patch one or more the demonstration programs provided with the TCL. Project files for some of the demo programs are included (with binaries removed).

Note that all of the source files in the modified TCL folder will have their creator changed from Symantec C++ to Metrowerks C++/PPC.

Creating the Precompiled Headers

You will need to precompile new header files for use with the CodeWarrior compilers. Doing so involves the following steps:

- Open the CodeWarrior project file `CW TCLHeaders68K.pj`.
- If you are using CodeWarrior DR/2, look for the line that reads:

```
#define TCL_CW_VERSION 3
```

Change the 3 to a 2. If you are using a newer version of CodeWarrior, see the comments in the source code to see if newer versions are supported.
- Open the Preferences... dialog, Access Paths panel. Add an access path to the folder where you placed the modified TCL source.
- Precompile the header file. It should take about two minutes. When it is complete, save the file as `CW TCLHeaders68K` (preferably in the same folder as your TCL source).

Repeat the same steps for the PowerPC compiler, substituting `PPC` for `68K` in the filenames listed above. The precompiled header files should take slightly more than 600K each on your hard drive.

Creating a Project File

You will find it easiest to start from the project files for the Art Class demo which was included with the port package. These projects loosely follow the segmentation in the sample TCL project files provided by Symantec. The first segment contains source files specific to the demonstration application. Remove these files and insert your own source files.

Building a New Project File

If you choose to create your own project file, you will need to be aware of a few considerations. The virtual function tables generated by the TCL tend to be rather large. For small TCL projects, you will be able to compile “as is.” If you have more than a few of your own classes, you will need to turn on “Far virtual function tables” in the Preferences Language panel.

To create the list of source files, you may simply include all of the files in the modified TCL source directory. Please note the following differences between the CodeWarrior projects and Symantec C++ projects:

Removed Source Files

```
CList.cpp  
CList_CView.cpp  
CPtrArray.cp  
CPtrArray_CChore.cpp  
CPtrArray_CDirector.cpp  
CPtrArray_CView.cpp  
CSaver.cpp  
CStack.cp  
CStream_CBitmap.cpp  
CStream_CCollaborator.cpp  
CStream_CEnvirons.cpp  
CStream_CPaneBorder.cpp  
PutObject1.cpp  
BRLib.π
```

Added Source Files

BRClInf.cpp
BRPriStr.cpp
CList.CView.cp
CList.CWindow.cp
CPtrArray.CChore.cp
CPtrArray.CCollaborator.cp
CPtrArray.CDirector.cp
CPtrArray.CGroupButton.cp
CStream.extras.cp
UDebugging.cp (from Metrowerks PowerPlant)
UExceptions.cp (from Metrowerks PowerPlant)

Resource File Management

CodeWarrior's development environment does not include resource file management like that in Symantec C++. I have found it simplest to rely on Symantec C++ to perform resource management. CodeWarrior will resolve aliases when looking for the <projectname>.rsrc file; therefore you can alias your Symantec C++ resource file and give it the name of the CodeWarrior resource file.

Changes in Coding Technique

This section describes some of the differences between the Symantec C++ version of the TCL and the modified TCL for CodeWarrior. The compatibility issues you will face fall primarily into two categories: C++ templates and exception handling.

C++ Templates

As of the current release (DR/3), CodeWarrior does not support C++ templates. As it turns out, the TCL 2.0 makes fairly light use of templates – only the classes CStream, CPtrArray, CList, CPtrArrayIterator, and CSaver are templated classes. At present, the port package provides macros to replace the templates for all of these classes **except CSaver**. (This will be added in an update to be released in the near future.)

Two macros are defined for each templated class: one to declare the class (placed in a header file) and a second to define it (placed in a source file). These macros are triggered by a macro defined in the CW HeadersTCL.h file: (When CodeWarrior supports templates, you may comment out this line.)

```
#define TCL_NO_TEMPLATES
```


In general, the template workaround works as follows: A class defined as `template<class T> class CTemplate<T>` is instead declared as `class CTemplate_T`.

The macros to declare the templated classes (used in header files) are:

```
CList           CW_Decl_List(T)
CPtrArray      CW_Decl_PtrArray(T)
CPtrArrayIterator CW_Decl_PtrArrayIterator(T)
CSaver         (not yet implemented)
CStream        CW_Decl_StreamCalls(T)
```

The macros to define the templated class (used in source files) are:

```
CList           CW_Inst_List(T)
CPtrArray      CW_Inst_PtrArray(T)
CPtrArrayIterator CW_Inst_PtrArrayIterator(T)
CSaver         (not yet implemented)
CStream        CW_Inst_StreamCalls(T)
```

As a practical example of how to use the substituted template class, examine the list of collaborators maintained by `CCollaborator`. In `CCollaborator.h` the following lines have been added (flagged by `•• CW TCL` comments):

```
#ifndef TCL_NO_TEMPLATES                // •• CW TCL
#define CCollaboratorList CPtrArray_CCollaborator
#endif                                  // •• CW TCL

class CCollaboratorList;
```

The original source code merely forward referenced a class named `CCollaboratorList`. This class was defined in `CCollaborator.cp` as a subclass of `CPtrArray<CCollaborator>`. In the code above, `CCollaboratorList` is `#defined` to have the same name as the macro template class – this class is then forward referenced by the same line of code as the original code used.

Here's the modified declaration from `CCollaborator.cp`:

```
#ifndef TCL_NO_TEMPLATES                // •• CW TCL
CW_Decl_PtrArray(CCollaborator)        // •• CW TCL
CW_Inst_PtrArray(CCollaborator)        // •• CW TCL
#else                                  // •• CW TCL
struct CCollaboratorList : CPtrArray<CCollaborator>
{
};
#endif                                  // •• CW TCL
```

The macros here both define and instantiate the stand-in template class `CPtrArray_CCollaborator`.

Note

If you have defined your own templated classes, you will need to write your own macros to replace them. Examine the modified header file `CPtrArray.h` for an example of how to accomplish this. ▲

Exception Handling

The Bedrock Exception Library which was added to the TCL in version 2.0 seems to be somewhat buggy, especially on the PowerPC. For this reason, I have chosen to replace the BEL with the exception library which comes with PowerPlant on DR/3 and later. This change is triggered by a macro defined in the `CW HeadersTCL.h` file:

```
#if TCL_CW_VERSION>2
#define TCL_USE_PP_EXCEPTIONS
#endif
```

If you wish to retain the BEL in place of the PowerPlant library, you may comment out this macro.

You may continue to use all of the macros defined for the TCL without changing your source code, with the following restrictions:

- You may not use the typed exception handling which was added in the TCL 2.0. The macros `catch_`, `catch_reference_`, and `catch_no_instance_` are not permitted. You must use `catch_all_` instead.
- You may not reference the global variables `gAskFailure`, `gBreakFailure`, `_gTCLBreakCatch`, `_gTCLBreakFailure`, or `_gTCLBreakAssert`. These variables do not exist in this implementation. The macros which access these variables are implemented.
- The PowerPlant header `<UException.h>` must be installed in the CodeWarrior compiler folder. The file `<UException.cp>` must be added to the project.
- If the `__TCL_DEBUG__` macro is defined, the PowerPlant header `<UDebugging.h>` must also be installed in the CodeWarrior compiler folder. The file `<UDebugging.cp>` must be added to the project.
- Your source may not use the `throw_(exception)` macro. Error reporting must take place through the standard `Fail_____` routines. The `throw_same_()` macro is permitted.

Note

The run-time type identification (RTTI) mechanism of the BEL is still used in the port package. ▲

Proposed Changes

This port package should be fairly useful as it stands, yet it is by no means complete. I hope to implement the following changes in the near future:

- Implement support for Visual Architect.
- Implement macro template replacements for the `CSaver<>` class.
- Incorporate bug fixes collected from the TCL 2.0 bug list.

Acknowledgments

A special thanks to Jon Wätte who provided the MultiDiff application and inspired (challenged?) me to attempt this port, and to the several employees at Metrowerks who have supported this effort (especially Jonathon Hess).