Freescale Semiconductor
Application Note

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Using the CodeWarrior Diff Tool

1. Introduction

CodeWarrior for Microcontrollers v10.x leverages the features of the Eclipse framework and thereby provides a sophisticated and visually clear, graphical "diff" tool for comparing differences between revisions of source code files. This document explores the use of the diff tool available in CodeWarrior.

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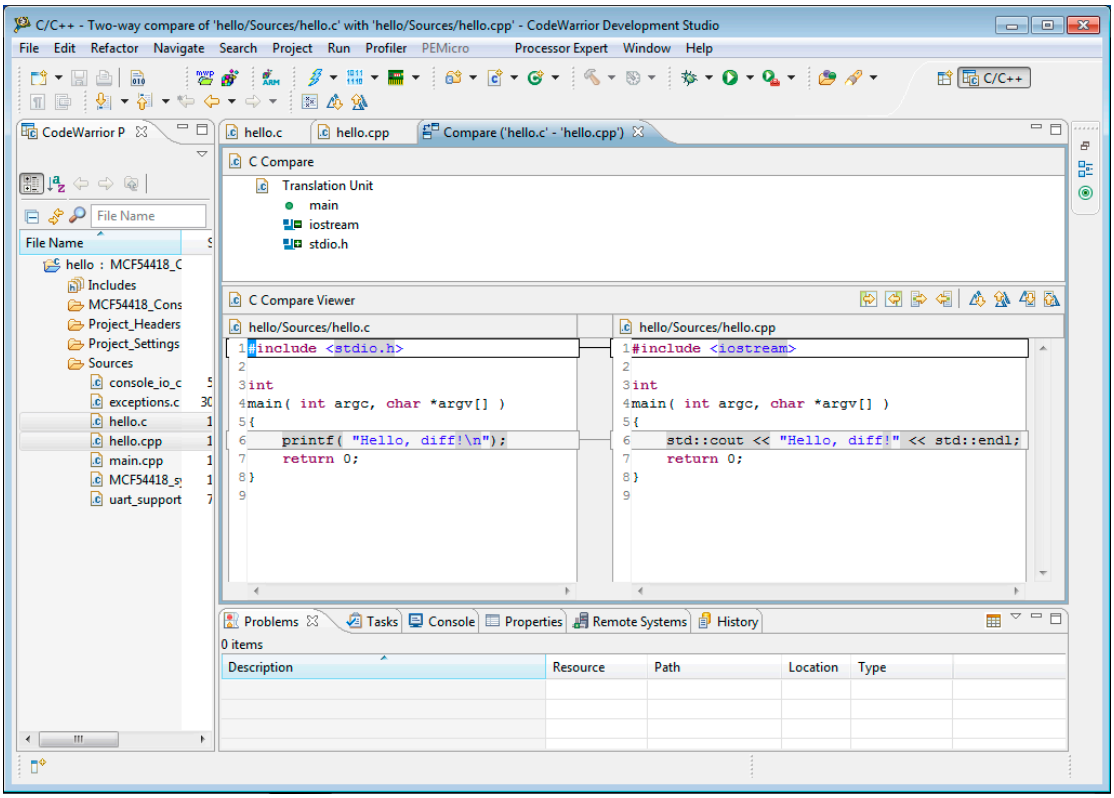
2. Comparing Files

The simplest case to use the CodeWarrior diff tool is to compare any two files in a project.
To compare files:

1. Select any two files in the CodeWarrior Project Explorer view. You can use Ctrl-click or Shift-click to select the files,
2. Right-click on one of the files and select **Compare With > Each Other** from the context menu.

Figure 1. Comparison of two files in a project



Notice in the trivial example in Figure 1 above hello.c and hello.cpp are (faintly) selected. The differences include:

- Code outline view which can also be used to limit the scope of what is displayed in the differences below it.
- Compare viewer or the comparison window at the bottom that contains the two files side-by-side with the line-oriented differences highlighted by outline and the specific differences with a background highlight.

The icons at the top right of the source comparison are tool buttons are helpful for managing a merge. For more information on managing merge refer to the topic Merge in the document.

NOTE: It is possible to edit the files in the comparison window like any other text editor window; this provides an opportunity for very specific edits during a merge.

The **Next/Previous Difference/Change** buttons at the top right of the comparison window help navigate through the comparison. In this context, a difference is one or more contiguous lines of changes while a change is a specific change within the different lines. Using these buttons to navigate a comparison similar to the example above clarifies the terminology.

For example, to start with the comparison in Figure 1 above, click on the **Next Difference** button and proceed from highlighting line 1 to line 6.

Starting again at the top, the **Next Change** button highlights "`stdio.h`" and "`iostream`" on line 1, all of line 6, "`printf`" and "`std::cout <<`", "`!\n`" and "`!`", and "`);`" and "`<< std::endl;`" on line 6 in that order.

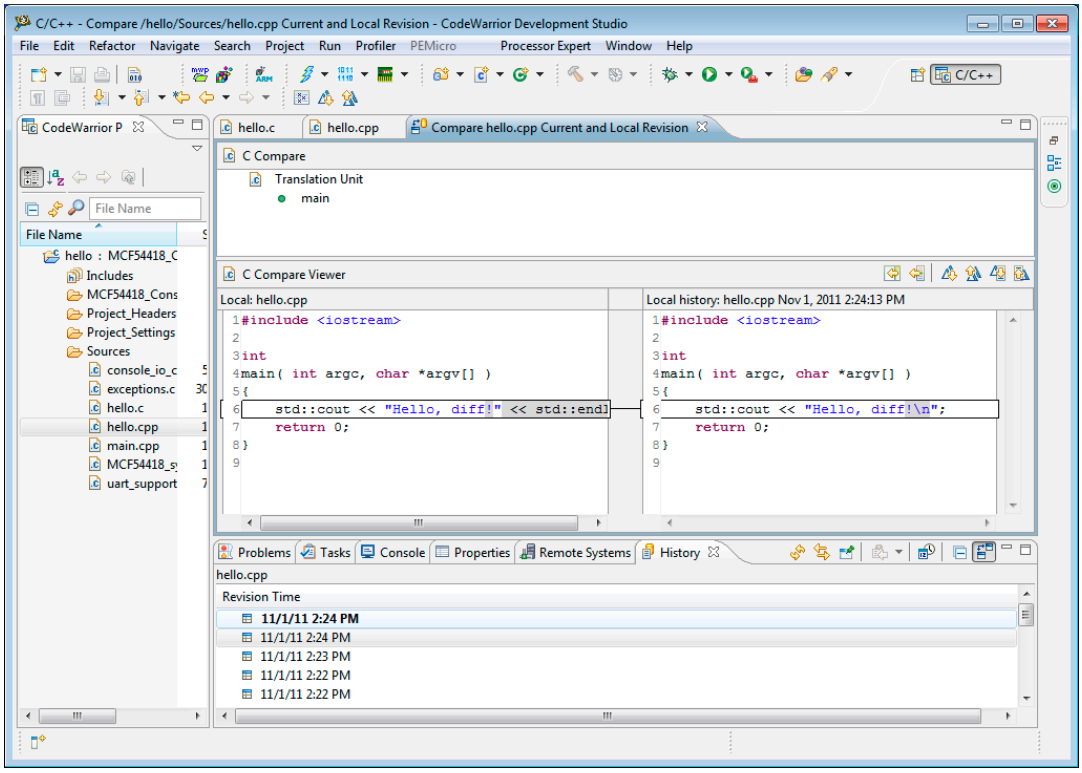
3. Comparing File Edits

A feature of the CodeWarrior text editor is that it automatically saves previous revisions of file edits. The saved file history can be used to compare to (or restore) previous edits.

For example, starting with `hello.c` in the previous example perform the following steps to port the C program to C++ and compare each edit along the way.

1. Copy hello.c to a new file.
2. Begin editing the file and change "`stdio.h`" in the first line to "`iostream`" and save the file.
3. Change "`printf`" to "`std::cout`".
4. Remove the closing parenthesis on line 6.
5. Remove the "`\n`" from the string and append "`std::endl;`" to the `std::cout` stream.

Figure 2. Comparing changes between edits of the same file



6. Once you have ported the C code to C++, right-click on `hello.cpp` in the project pane to bring up the context menu.

7. Select **Compare With > Local History**…. This creates a **History** tab in the bottom pane with dated revisions of the edits performed on hello.cpp.
8. Double-click or right-click > **Compare with Each Other** to view a comparison of revisions.

4. Comparison within Version Control Systems

Among many other advantages of using a version control system on a project, the CodeWarrior graphical diff tool can be used to compare specific versions of files stored in the repository.

CodeWarrior is packaged with support for Concurrent Versions System (CVS). However, specifically addressing using CVS or other version control systems (e.g. Git, Mercurial, Monotone, and Subversion) is beyond the scope of this Application Note. It also does not address network issues such as firewalls or proxy servers.

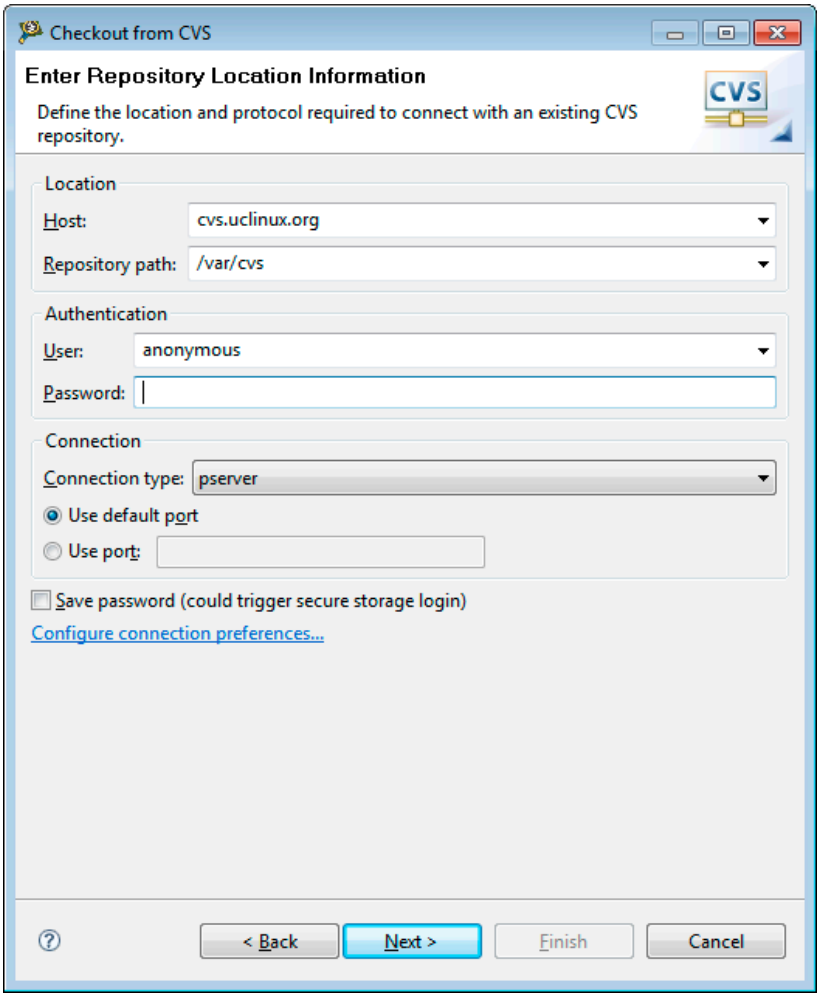
Please refer to the Eclipse CVS FAQ at http://wiki.eclipse.org/index.php/CVS_FAQ for the specifics of using Eclipse/CodeWarrior with CVS.

Various CodeWarrior project files are added to the version control system repository as new projects are created. For simplicity, this example leverages the widely available, read-only, anonymous CVS repository of the uClinux project, http://cvs.uclinux.org/cvs_anon.html.

The example configuration was created with **File > Import…, CVS > Projects from CVS**. Fill in the following fields in the **Enter Repository Location Information** dialog box.

- Host: cvs.uclinux.org
- Repository path: /var/cvs,
- User: anonymous,
- Password: <*blank*>
- Connection type: pserver
- Port: Default port.
- Click **Next**.

Figure 3. Configuring a CVS repository



If the network connection to the CVS server at cvs.uclinux.org succeeds, a list of modules will appear in the **Select Module** dialog box. From this point it is possible to browse all the existing modules in the cvs.uclinux.org:/var/cvs repository. This example uses the uClibc CVS module.

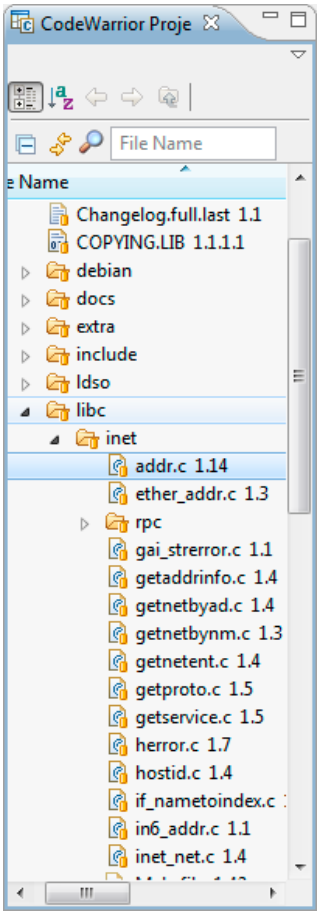
A complete CodeWarrior project and all its specific files are ideally saved in version control so you would need to check out as a project in the workspace. This example, however, will create a CodeWarrior project from the general uClibc source. Beginning in the **Select Module** dialog referenced above:

1. Select the **uClibc** module.
2. Click **Next**.
3. Select **Check out as a project configured using the New Project Wizard**.
4. Click **Finish**. This action launches the New Project wizard.
5. Select **General > Project**, in the New Project wizard.
6. Type the project a name and click the **Finish** button. At this point you should have a new project

in CodeWarrior created from the uClibc source repository.

7. Begin browsing the source code, opening libc/inet as shown in Figure 4.
8. Notice the CVS revision numbers after the file names.
9. Right-click on libc/inet/addr.c to bring up the context menu.
10. Select **Compare With > Another Branch or Version…**.
11. The above description checks out the HEAD (a.k.a. trunk) of the repository, so comparing with that would not yield differences. Select **Versions > uClibc_0_9_12**.

Figure 4. Browsing CodeWarrior project files managed in a CVS respository



The history browser (**Compare With > History…**) allows comparison to arbitrary versions and lists tags, commit times, authors and commit comments.

1. Double-click on the **History** tab in the view at the bottom of the workspace to maximize the window.
2. Right-click on a specific revision in the history browser to bring up the context menu. Select **Compare Current with <*version*>** to compare the currently checked-out revision with an arbitrary version.

3. Select two specific revisions with ctrl-click and right-click to bring up the context menu. Select **Compare with Each Other** to compare the two regardless of which revision is checked out.

The non-trivial comparisons above expose another feature. The boxes on the right of the comparison window and scroll bar correspond to differences between the two revisions. The boxes are scaled to the scroll bar. Sliding the scroll bar to align with them displays the associated changes in the *C Compare Viewer*. It is also possible to click a box to jump directly to the associated change.

The real power of comparing within a version control system, however, is realized in directory trees and entire projects. Tags in the project (should) select a complete set of changes such as a project release. For example:

1. Right-click on the libc directory in the uClibc project view.
2. Select **Compare With > Another Branch or Version…**.
3. Select **Versions > uClibc_0_9_22** and click **OK**. This opens the "Team Synchronizing" perspective. Click **Yes** if asked to confirm opening the perspective. The user is presented with the complete list of files.
4. Double-click any file to display the comparison with the **uClibc_0_9_22** revision selected on the libc directory previously.

5. Merge

Often in a project with more than a single contributor, developers are required to merge changes from the team into their code base (e.g. on a branch) and to merge their own changes back to the main line of development. The CodeWarrior graphical comparison utility explored above provides a visual means to accomplish this regular task.

Using the above example of uClibc, release the code on the HEAD in the project with a branch. The branch in this example CVS repository is older than that compared, thus this example merges the latest changes to a fictitious development branch.

1. Right-click on the project and select **Replace With > Another Branch or Version > Branches > uC-libc** from the context menu and click **OK**.
2. Once the source tree update completes, right-click on the project and select **Compare With > Another Branch or Version…** then select **HEAD** and click **OK**.

   The **Team Synchronizing** perspective appears.
3. Locate libc/inet/addr.c again and double-click it (or right-click) and select **Open In Compare Editor**.
4. Use the previously ignored **Copy Current Change…** buttons in the **C Compare Viewer** view.
5. Navigate up and down using the previously discussed **Next/Previous Difference/Change** buttons.

6. Merge changes using the **Copy All Non-Conflicting Changes from Right to Left** and **Copy Current Change from Right to Left** buttons.
7. It is also possible to edit the left (local) side directly by typing directly at the keyboard.

Typing directly will not affect the uClibc repository with the merge description above and your own exercises. The uClibc repository is read-only.

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