

SimDiff-ClearCase Integration Guide

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Introduction

This document is a guide on how to integrate IBM Rational ClearCase with EnSoft's SimDiff.

About ClearCase

ClearCase is a revision control system that can store many kinds of data files, including Simulink model files (.mdl or .slx files).

About SimDiff

SimDiff is a comparison and merge tool for Simulink model files.

About SimDiff Type Manager

The SimDiff Type Manager is an executable program that translates arguments and return codes between ClearCase and SimDiff. It is not a fully implemented ClearCase type manager, in that it only can handle the *xcompare* and *xmerge* operations. However, it is possible to “mix and match” type managers during configuration, so that another type manager is called for the operations that are not supported by the SimDiff Type Manager.

Overview

In the world of ClearCase, every object (including files) stored in the versioned object database (or VOB), is assigned a type. This can be one of the built-in ClearCase types, or a customized type definition. Each type defines the name of a “type manager” to use for handling various operations, including comparison and merge operations. Type managers are executable programs that can accept and process such operations as command-line arguments.

SimDiff integrates with ClearCase through such a type manager, called the SimDiff Type Manager. When configured properly, ClearCase will invoke SimDiff for interactive comparison and merge of Simulink model files.

The high-level steps to a successful integration between SimDiff and ClearCase are:

1. ClearCase VOBs that include Simulink model files are configured to define a Simulink file object type, and to apply that type to Simulink model files within the VOB.
2. Client machines with SimDiff installed should install and configure the SimDiff Type Manager.
3. All ClearCase client machines that access VOBs with the Simulink file type - *even those without SimDiff installed* - must be configured to map the Simulink file type to a type manager on their system. Client machines without SimDiff map to the `binary_delta` type manager, while those with SimDiff map instead to the SimDiff Type Manager.
4. Client machines may be configured to automatically assign the Simulink file type to files with a Simulink extension (.mdl and .slx) when they are first added to a VOB. This configuration is recommended, but not required.

Configuration Details

Client Configuration

All ClearCase clients that will access VOBs with Simulink model files should be configured to properly manage the Simulink model file type. Clients with SimDiff installed should additionally be configured to use the SimDiff Type Manager for *xcompare* and *xmerge* operations.

Install the SimDiff Type Manager

First, if the client machine has SimDiff installed, install and configure the SimDiff Type Manager for ClearCase.

1. Unzip the file `simdiffccmgr.zip` to a location of your choice.
2. Double-click `simdiffccmgr.exe` to open the configuration dialog.
3. Configure the SimDiff Type Manager to use an installation of SimDiff on your machine, then press *OK* to save the configuration.

Refer to the SimDiff Type Manager documentation for more information. This documentation is included in `simdiffccmgr.zip`.

Modify the map configuration file

Next, modify the `map` client configuration file to add type manager rules for the Simulink file element type.

1. Locate the `map` file on your system. It is located in the `lib/mgrs` directory beneath the ClearCase installation directory.
2. Open the `map` file in a text editor of your choice.
3. Create a new rule set called `simulink_mgr` by copying the rule set for `binary_delta`.
4. If SimDiff is installed on the machine, modify the *xcompare* and *xmerge* rule entries to point to `simdiffccmgr.exe`. The file path can be either a full file path, or a path that is relative to the `map` file.
5. Save the file and close the editor.

Here is how the `map` file should look after modifications:

```
[...]
binary_delta      construct_version    ..\..\bin\bdtm.exe
binary_delta      create_branch       ..\..\bin\bdtm.exe
binary_delta      create_element      ..\..\bin\bdtm.exe
binary_delta      create_version      ..\..\bin\bdtm.exe
binary_delta      delete_branches_versions ..\..\bin\bdtm.exe
binary_delta      compare             ..\..\bin\cleardiff.exe
binary_delta      xcompare            ..\..\bin\cleardiffmrg.exe
binary_delta      merge               ..\..\bin\cleardiffmrg.exe
binary_delta      xmerge              ..\..\bin\cleardiffmrg.exe
binary_delta      annotate             ..\..\bin\bdtm.exe
binary_delta      get_cont_info       ..\..\bin\bdtm.exe
simulink_mgr      construct_version    ..\..\bin\bdtm.exe
simulink_mgr      create_branch       ..\..\bin\bdtm.exe
simulink_mgr      create_element      ..\..\bin\bdtm.exe
simulink_mgr      create_version      ..\..\bin\bdtm.exe
simulink_mgr      delete_branches_versions ..\..\bin\bdtm.exe
simulink_mgr      compare             ..\..\bin\cleardiff.exe
simulink_mgr      xcompare            C:\<...>\simdiffccmgr.exe
simulink_mgr      merge               ..\..\bin\cleardiff.exe
simulink_mgr      xmerge              C:\<...>\simdiffccmgr.exe
simulink_mgr      annotate             ..\..\bin\bdtm.exe
simulink_mgr      get_cont_info       ..\..\bin\bdtm.exe
[...]
```

Modify the **MAGIC** configuration file

Finally, modify the `MAGIC` client configuration file to cause the client to auto-assign the Simulink element file type to files with a Simulink model file extension (`.mdl` or `.slx`) when they are first added to a `VOB`. This step is not required, but is recommended.

1. Locate the directory `config/magic` directory beneath the ClearCase installation directory.
2. Create a new file `simulink.magic` and open it in a text editor of your choice.
3. Add the following lines to `simulink.magic`, then save and close it:

```
#
# This is a custom 'magic' file for Simulink model files.
#
simulink file : -name "*. [Mm][Dd][Ll]" ;
simulink file : -name "*. [Ss][Ll][Xx]" ;
```

4. Open `default.magic` in a text editor of your choice.
5. Comment out any rules that conflict with the rules defined in `simulink.magic`. This is necessary because ClearCase only uses the first rule it finds that matches. The most common conflict is the rule for `rose_model`, which also uses the `.mdl` extension. Rules can be commented out by adding a hash mark (`#`) at the beginning of the line.
6. Save and close `default.magic`.

VOB Configuration

This configuration should be performed for each VOB or VOB group that contains Simulink model files.

Create the Simulink file element type

First, create a Simulink file element type on the VOB (or VOB group).

1. Open a *cleartool* command interface
2. Change to a VOB context using the `cd` command (e.g. `cd M:\myView\myVob`)
3. Use the `mkeltype` command to create a Simulink element type. Recommended settings:

- Type name: `simulink`
- Supertype: `binary_delta_file`
- Type manager name: `simulink_mgr`

It is recommended to use a binary-based type such as `binary_delta_file` for the supertype, and not a text-based type. While `.mdl` files do appear to be a text-based format when opened in a text editor, attribute values are still stored as inescaped binary data. If ClearCase is instructed to treat the data as text, the data may be corrupted during checkin or checkout, due to the auto-conversion of newline characters (LF <-> CRLF).

Retype existing Simulink files

Note - this step must be performed from a client machine with a properly configured `map` file. See the Client Configuration section for `map` file configuration details.

Next, retype existing Simulink file objects in the VOB to the Simulink element type. Typically, Simulink files can be identified by their file extension (`.mdl` or `.slx`).

1. Open a *cleartool* command interface
2. Change to a VOB context using the `cd` command (e.g. `cd M:\myView\myVob`)
3. Run this command to find all files with extension `.mdl`:

```
find -all -name "*. [Mm] [Dd] [Ll]" -print
```

4. Retype existing Simulink model files using one of the following strategies:
 - a. Retype files one at a time using the `chtype` command on files that are known to be Simulink model files. This is recommended when there may be non-Simulink files in the repository that also use the `.mdl` file extension.
 - b. Retype all `.mdl` files at once using the `find` command with the `-exec` option. This command runs a `chtype` command on every file found in step 3:

```
find -all -name "*. [Mm] [Dd] [Ll]" -exec `cleartool chtype -force -c "Auto-retype Simulink model files" simulink "%CLEARCASE_PN%"`
```

Note 1 - the quotation mark syntax changes depending on cleartool mode. The listed

command is for interactive mode; please see the `find` command documentation for single-command mode syntax.

Note 2 - `%CLEARCASE_PN%` is a special environment variable provided by ClearCase at runtime, and does not need to be set beforehand. See the `find` command documentation for more information.

5. Run steps (3-5) again for the `.slx` file extension

Additional Documentation

Additional information about cleartool:

http://publib.boulder.ibm.com/infocenter/cchelp/v8r0m0/topic/com.ibm.rational.clearcase.cc_ref.doc/topics/cleartool.htm

Additional information about type managers:

http://publib.boulder.ibm.com/infocenter/cchelp/v8r0m0/index.jsp?topic=%2Fcom.ibm.rational.clearcase.cc_ref.doc%2Ftopics%2Fcleartool.htm

Additional information about MAGIC files:

http://publib.boulder.ibm.com/infocenter/cchelp/v8r0m0/topic/com.ibm.rational.clearcase.cc_ref.doc/topics/cc.magic.htm