CODESCROLL
CONTROLLER TESTER

Suresoft

CODESCROLL CONTROLLER TESTER MANUAL

Software for safe world

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CODESCROLL
CONTROLLER TESTER

User Manual

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Suresofttech

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Table of Contents

1. Before Starting

Purpose of Document

This document provides the information on how to use the CodeScroll Controller Tester Product.

2. Overview

Introduction

Controller Tester is a test automation solution for unit and integration tests of software developed and executed in various environments.

Toolchain supported in Controller Tester

Controller Tester supports about 100 toolchain. For more information, please contact the Technical support contact at the bottom of this document Troubleshooting page.

Features

Controller Tester is a source code-based software test automation tool for unit and integration tests and the major features are as follows.

Test design

1. Automatically create tests and test data
2. Intuitive test design interface
3. Ability to import test data in various format
4. Ability to design of integration test for complex nested structures

Achieving coverage goals

1. Supports statement, branch, MC/DC and function call coverage
2. Provides guides to achieve the goal of MC/DC
3. Checks the coverage results by linking the control flow graph with the source code
4. The coverage goal can be achieved quickly by testing only uncovered section after measuring the system coverage (QualityScroll COVER product).

Others

1. Supports the simulation and the actual target environment tests
2. Links with DevOps(issue management + continuous integration + configuration management) tools
3. Shares project settings with CodeScroll product family: By carrying out the project settings only once, coding rule inspection + runtime error detection + unit/integration test can be possible.
4. Reports in various formats
5. Interaction with requirements management tools to support traceability of requirements to tests and results

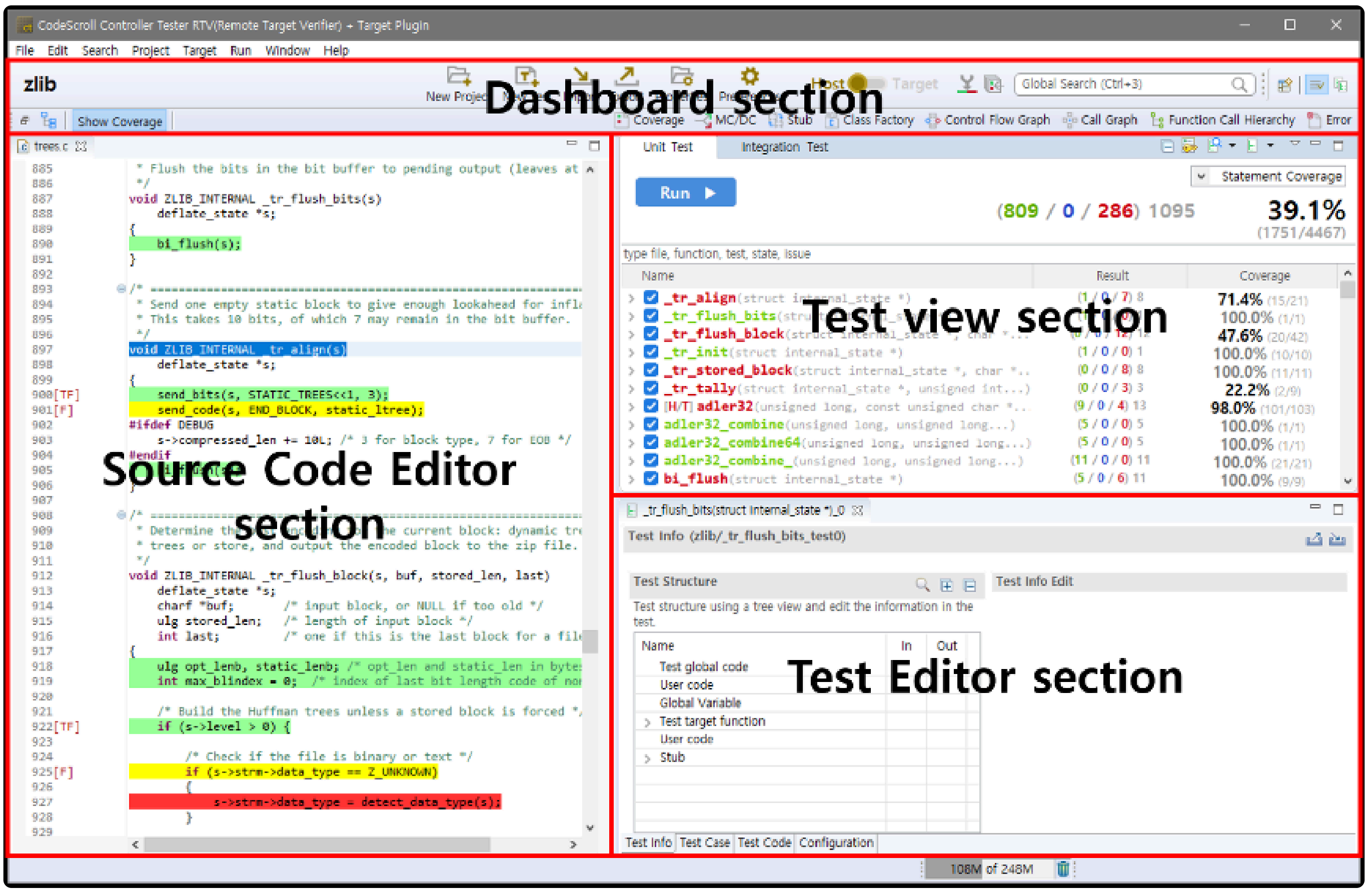
Standard certification

1. IEC 61508-3 (Electrical/Electronic)
2. ISO 26262-8 (Automotive)
3. IEC 60880 (Nuclear)

4. IEC 62279 / EN 50128 (Railway)
5. DO-178C / DO-330 (Aviation)
6. IEC 62304 (Medical device)

Overall screen of Controller Tester

It provides high DOF (degrees of freedom) windows made by Eclipse RCP. User can set them in [Window] menu and each view.



```
 * Flush the bits in the bit buffer to pending output (leaves at
 */
void ZLIB_INTERNAL _tr_flush_bits(s)
    deflate_state *s;
{
    bi_flush(s);
}

/* ===========================================================================
 * Send one empty static block to give enough lookahead for infl
 * This takes 10 bits, of which 7 may remain in the bit buffer.
 */
void ZLIB_INTERNAL _tr_align(s)
    deflate_state *s;
{
    send_bits(s, STATIC_TREES<<1, 3);
    send_code(s, END_BLOCK, static_ltree);
#ifdef DEBUG
    s->compressed_len += 10L; /* 3 for block type, 7 for EOB */
#endif
    bi_flush(s);
}

/* ===========================================================================
 * Determine the best encoding for the current block: dynamic tr
 * trees or store, and output the encoded block to the zip file.
 */
void ZLIB_INTERNAL _tr_flush_block(s, buf, stored_len, last)
    deflate_state *s;
    charf *buf;       /* input block, or NULL if too old */
    ulg stored_len;   /* length of input block */
    int last;         /* one if this is the last block for a file
{
    ulg opt_lenb, static_lenb; /* opt_len and static_len in byte
    int max_blindex = 0;  /* index of last bit length code of nor

    /* Build the Huffman trees unless a stored block is forced */
    if (s->level > 0) {

        /* Check if the file is binary or text */
        if (s->strm->data_type == Z_UNKNOWN)
        {
            s->strm->data_type = detect_data_type(s);
        }
```

(809 / 0 / 286) 1095 39.1% (1751/4467)

type file, function, test, state, Issue

Name	Result	Coverage
✓ _tr_align(struct internal_state *)	(1 / 0 / 7) 8	71.4% (15/21)
✓ _tr_flush_bits(struct internal_state *)	[illegible]	100.0% (1/1)
✓ _tr_flush_block(struct internal_state *, char *...	(0 / 0 / 12) 12	47.6% (20/42)
✓ _tr_init(struct internal_state *)	(1 / 0 / 0) 1	100.0% (10/10)
✓ _tr_stored_block(struct internal_state *, char *..	(0 / 0 / 8) 8	100.0% (11/11)
✓ _tr_tally(struct internal_state *, unsigned int...)	(0 / 0 / 3) 3	22.2% (2/9)
✓ [H/T] adler32(unsigned long, const unsigned char *...	(9 / 0 / 4) 13	98.0% (101/103)
✓ adler32_combine(unsigned long, unsigned long...)	(5 / 0 / 0) 5	100.0% (1/1)
✓ adler32_combine64(unsigned long, unsigned long...)	(5 / 0 / 0) 5	100.0% (1/1)
✓ adler32_combine_(unsigned long, unsigned long...)	(11 / 0 / 0) 11	100.0% (21/21)
✓ bi_flush(struct internal_state *)	(5 / 0 / 6) 11	100.0% (9/9)

Test Info (zlib/_tr_flush_bits_test0)

Test Structure

Test structure using a tree view and edit the information in the test.

Test Info Edit

Name	In	Out
Test global code		
User code		
Global Variable		
Test target function		
User code		
Stub		

3. Install

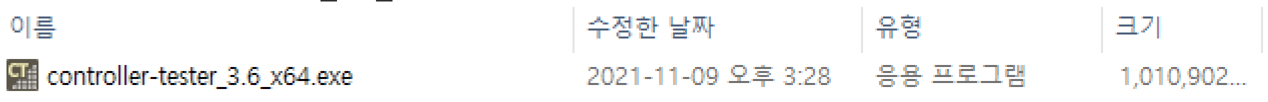
Installation requirements

OS	Microsoft Windows 7/10 (64bit)
RAM	512MB or more
HDD	Free space about 1GB (GCC Compiler installed) (When carrying out tests actually, HDD usage may be increased due to the test results.)

Install Controller Tester for Windows

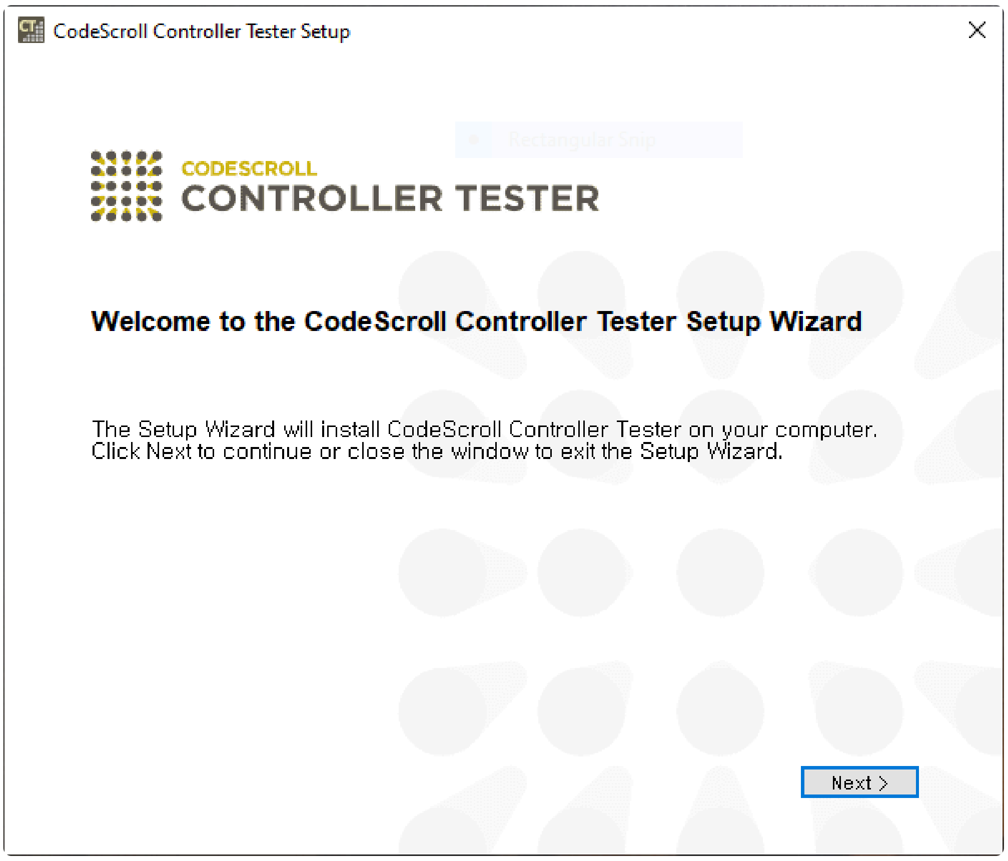
By using the install package, you can install Controller Tester as follows:

1. Execute controller-tester_3.x_xxx.exe file.



이름	수정한 날짜	유형	크기
controller-tester_3.6_x64.exe	2021-11-09 오후 3:28	응용 프로그램	1,010,902...

2. Click [Next] after the installation wizard runs and gathers installation information.



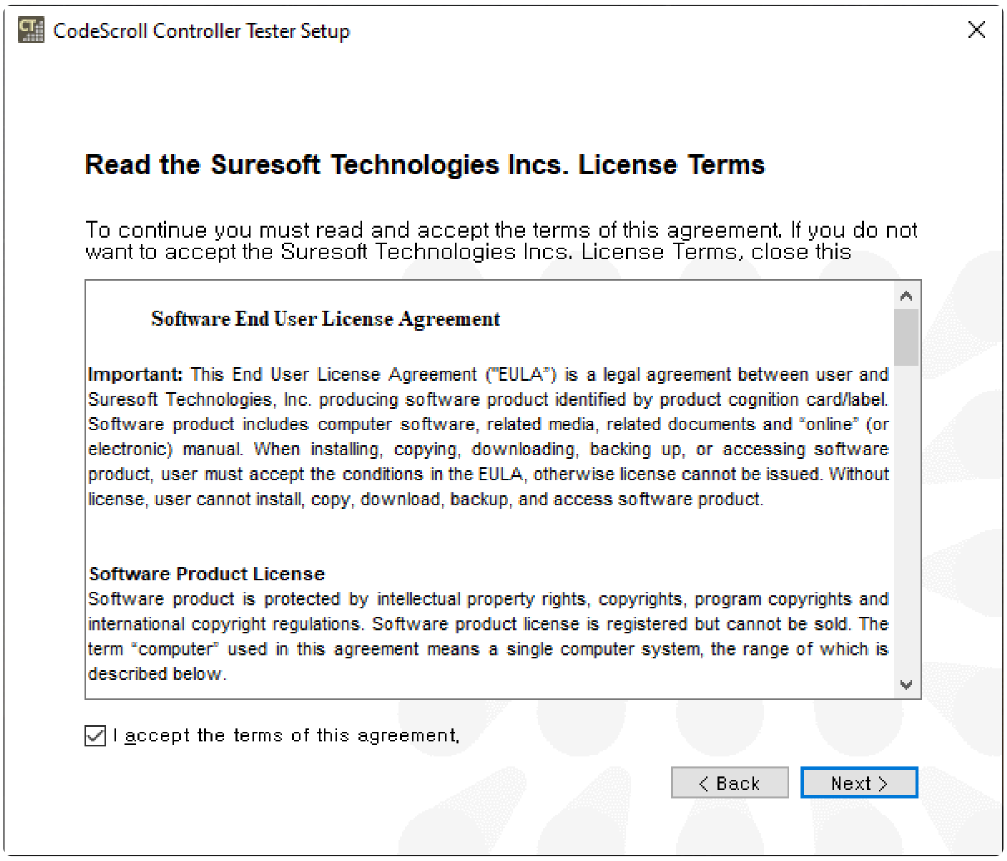
CodeScroll Controller Tester Setup

CODESCROLL CONTROLLER TESTER

Welcome to the CodeScroll Controller Tester Setup Wizard

The Setup Wizard will install CodeScroll Controller Tester on your computer.
Click Next to continue or close the window to exit the Setup Wizard.

3. Accept the end-user license and click [Next].



CodeScroll Controller Tester Setup

Read the Suresoft Technologies Incs. License Terms

To continue you must read and accept the terms of this agreement. If you do not want to accept the Suresoft Technologies Incs. License Terms, close this

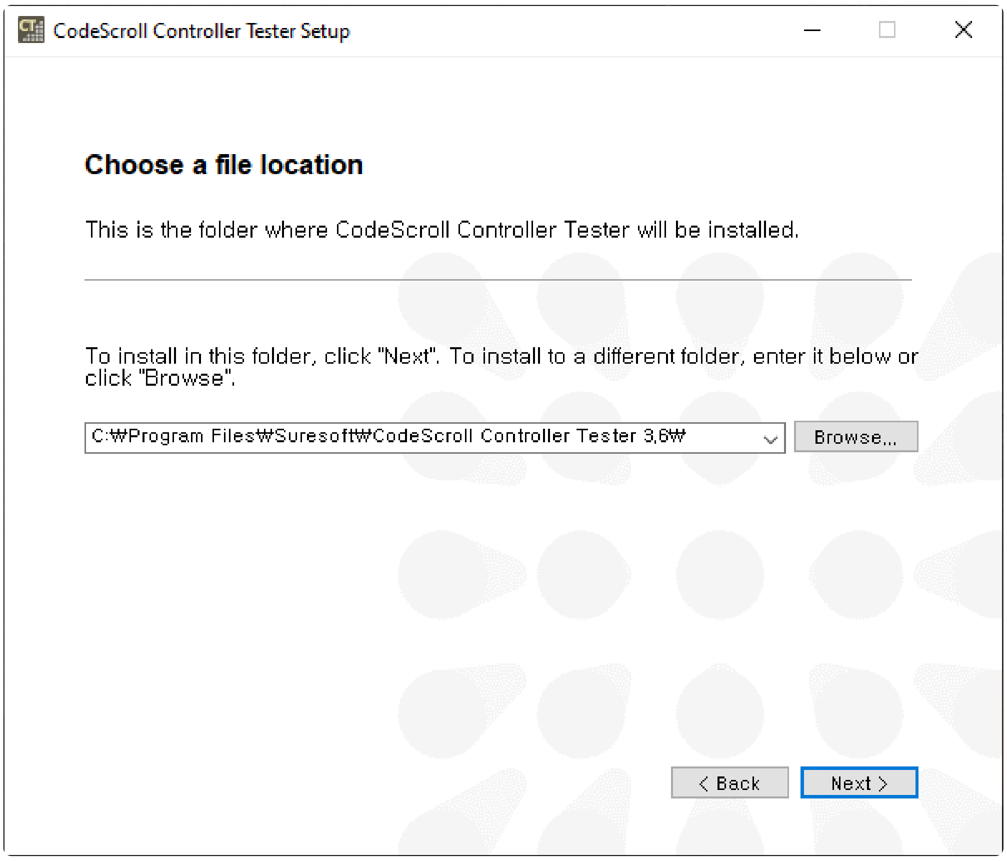
Software End User License Agreement

Important: This End User License Agreement ("EULA") is a legal agreement between user and Suresoft Technologies, Inc. producing software product identified by product cognition card/label. Software product includes computer software, related media, related documents and "online" (or electronic) manual. When installing, copying, downloading, backing up, or accessing software product, user must accept the conditions in the EULA, otherwise license cannot be issued. Without license, user cannot install, copy, download, backup, and access software product.

Software Product License
Software product is protected by intellectual property rights, copyrights, program copyrights and international copyright regulations. Software product license is registered but cannot be sold. The term "computer" used in this agreement means a single computer system, the range of which is described below.

☑ I accept the terms of this agreement.

4. Set the path to install Controller Tester and click [Next].



CodeScroll Controller Tester Setup

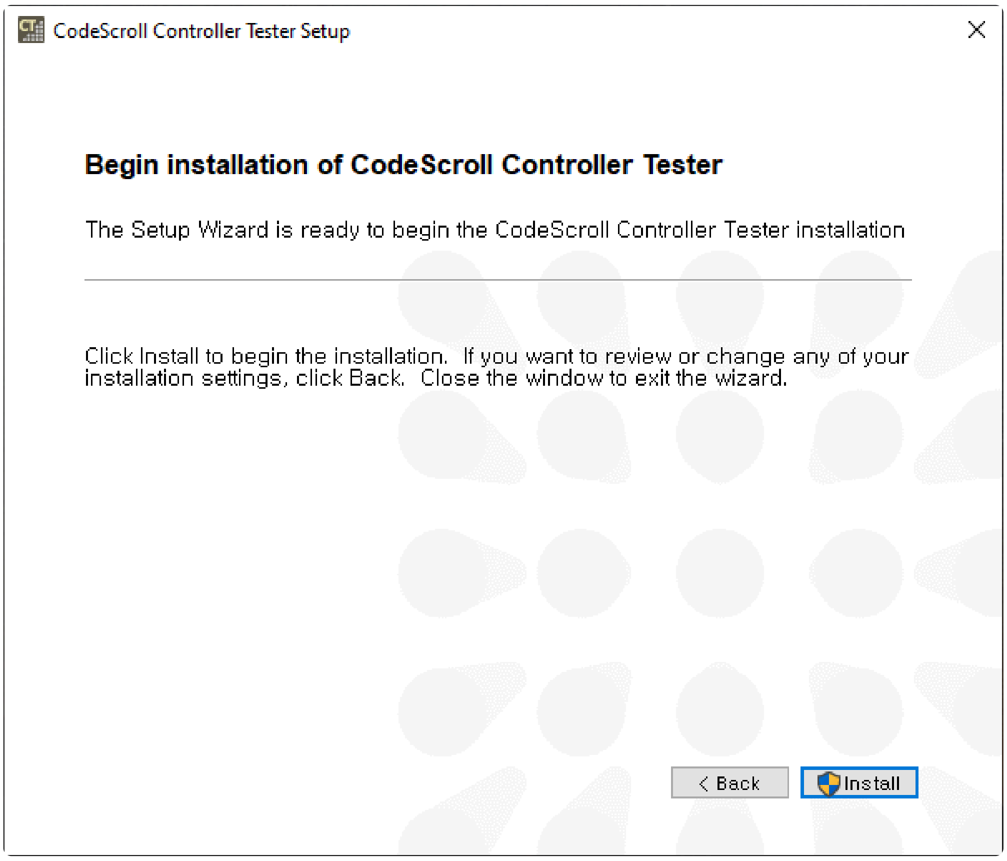
Choose a file location

This is the folder where CodeScroll Controller Tester will be installed.

To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".

C:₩Program Files₩Suresoft₩CodeScroll Controller Tester 3.6₩

5. All required information for the installation has been collected. Click [Install].

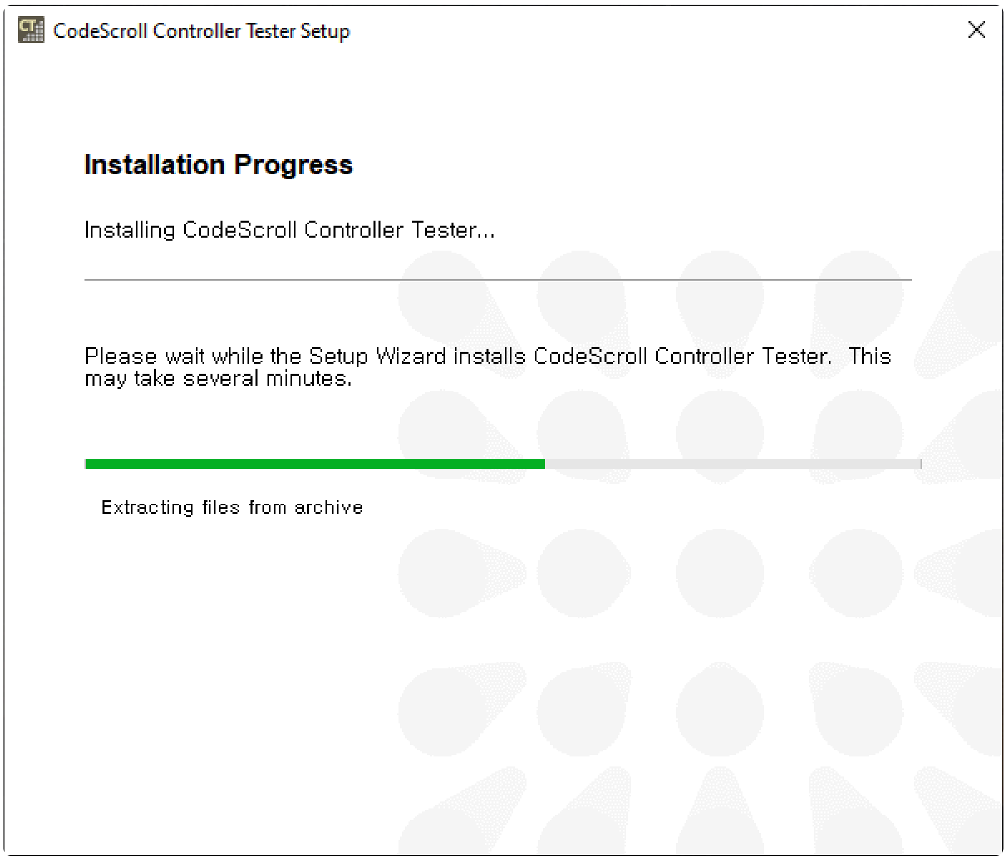

CodeScroll Controller Tester Setup

Begin installation of CodeScroll Controller Tester

The Setup Wizard is ready to begin the CodeScroll Controller Tester installation

Click Install to begin the installation. If you want to review or change any of your installation settings, click Back. Close the window to exit the wizard.

6. Install Controller Tester.


CodeScroll Controller Tester Setup

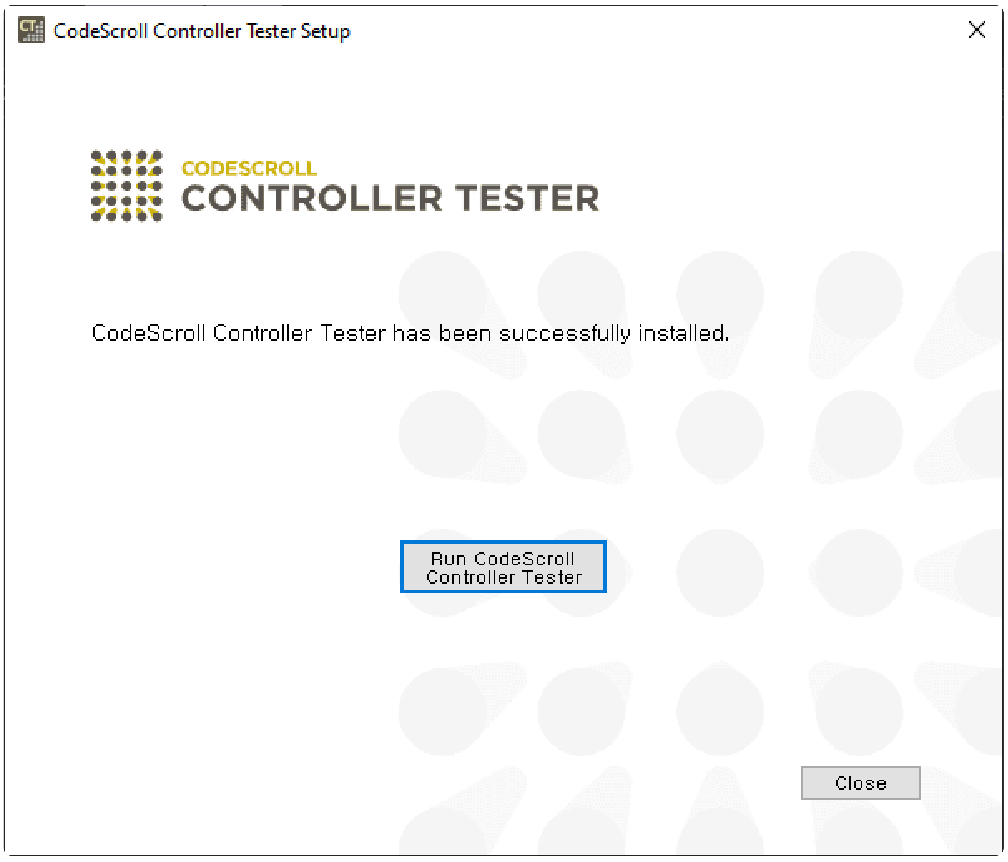
Installation Progress

Installing CodeScroll Controller Tester...

Please wait while the Setup Wizard installs CodeScroll Controller Tester. This may take several minutes.

Extracting files from archive

7. Click [Run CodeScroll Controller Tester] to run Controller Tester immediately after installation is complete, and click [Finish] to end the installation.


CodeScroll Controller Tester Setup

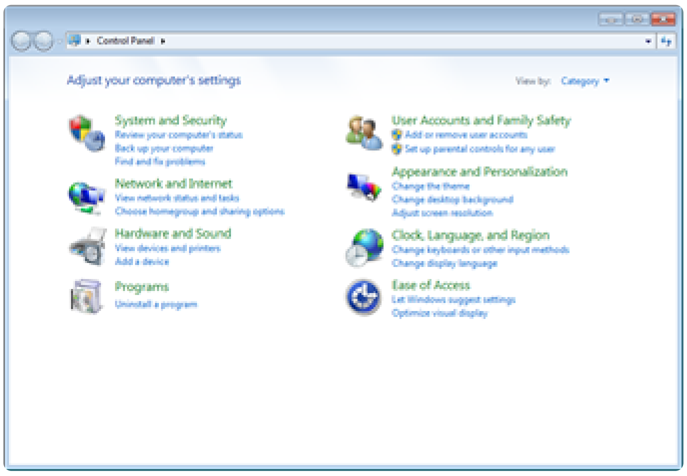
CodeScroll Controller Tester has been successfully installed.

4. Uninstall

Uninstall Controller Tester

How to uninstall Controller Tester is as follows.

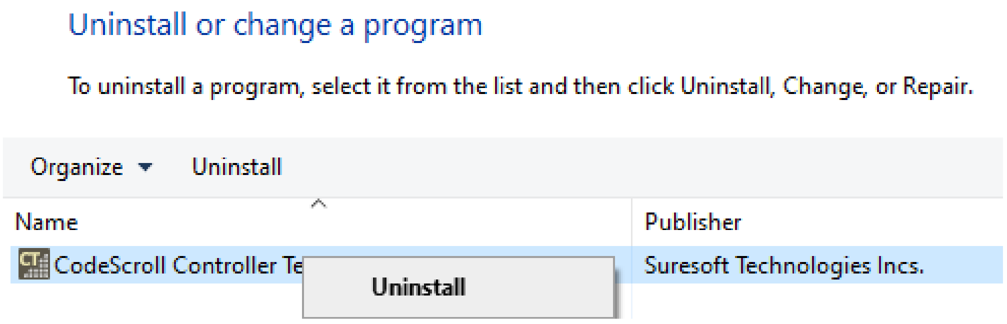
1. Uninstall using [Control Panel] > [Uninstall a program]


Control Panel
Adjust your computer's settings
View by: Category
System and Security
Review your computer's status
Back up your computer
Find and fix problems
Network and Internet
View network status and tasks
Choose homegroup and sharing options
Hardware and Sound
View devices and printers
Add a device
Programs
Uninstall a program
User Accounts and Family Safety
Add or remove user accounts
Set up parental controls for any user
Appearance and Personalization
Change the theme
Change desktop background
Adjust screen resolution
Clock, Language, and Region
Change keyboards or other input methods
Change display language
Ease of Access
Let Windows suggest settings
Optimize visual display

✻ “Uninstall Controller Tester” removes the files necessary to operate the Controller Tester. The workspaces set by users are not removed.

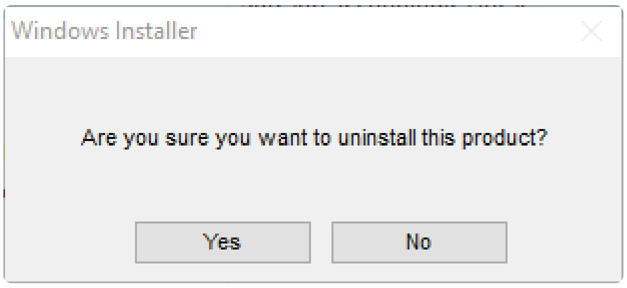
The procedures for [Uninstall a program]

1. Click [Control Panel] > [Uninstall a program].


Uninstall or change a program

To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.

2. Click [Yes] to uninstall CodeScroll Controller Tester

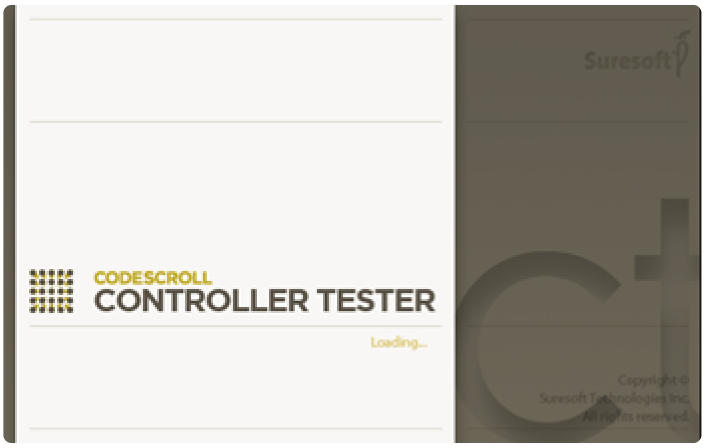

Windows Installer

Are you sure you want to uninstall this product?

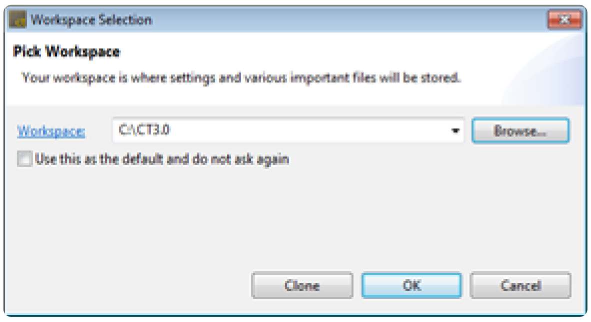
3. All the necessary information for uninstalling has been collected. When the Controller Tester is successfully uninstalled, the window closes.

5. Run

Select the shortcut icon or [Start] -> [All programs] -> [CodeScroll Controller Tester 3.x] -> [CodeScroll Controller Tester 3.x].



Select the workspace (working space) following the splash screen of the Controller Tester. You can select either the already existed directory or enter a new directory as the workspace path. You can also use the currently selected workspace as the default so that you do not need to reselect the workspace the next time you run again. When the path has been set, click the [OK] button.



Workspace Selection

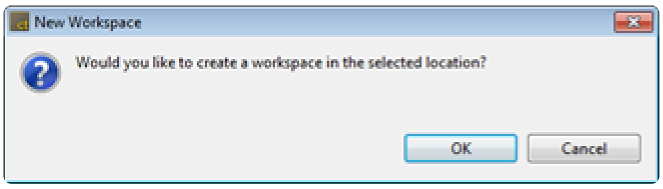
Pick Workspace

Your workspace is where settings and various important files will be stored.

Workspace: C:\CT3.0

Use this as the default and do not ask again

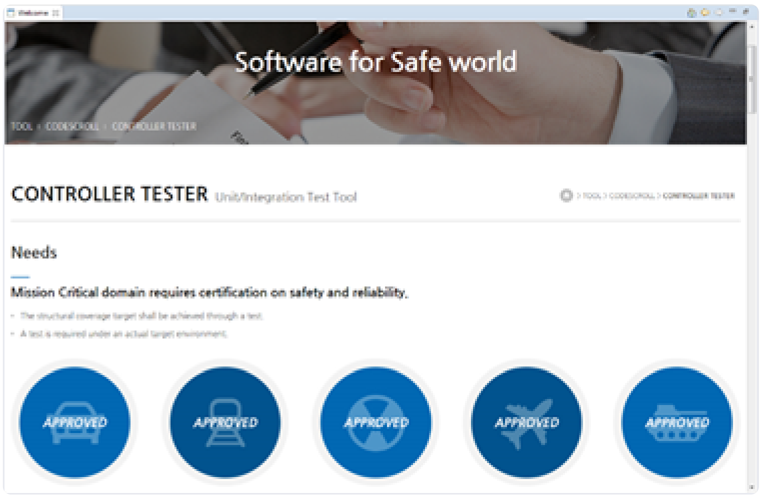
If the selected directory does not exist, confirm the user whether to create the directory.



New Workspace

Would you like to create a workspace in the selected location?

Create a directory in the workspace you have set and the welcome page of the tool and [Create a Project] wizard is displayed. The welcome page is displayed only when creating a workspace newly, and is not displayed when selecting the workspace created previously.



CONTROLLER TESTER Unit/Integration Test Tool

Needs

Mission Critical domain requires certification on safety and reliability.

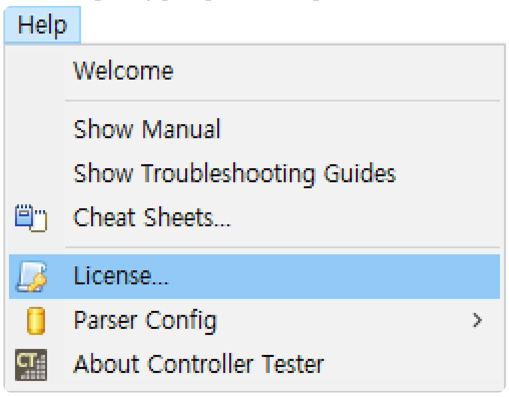
- The structural coverage target shall be achieved through a test.
- A test is required under an actual target environment.

Close the welcome page and the product screen is displayed.

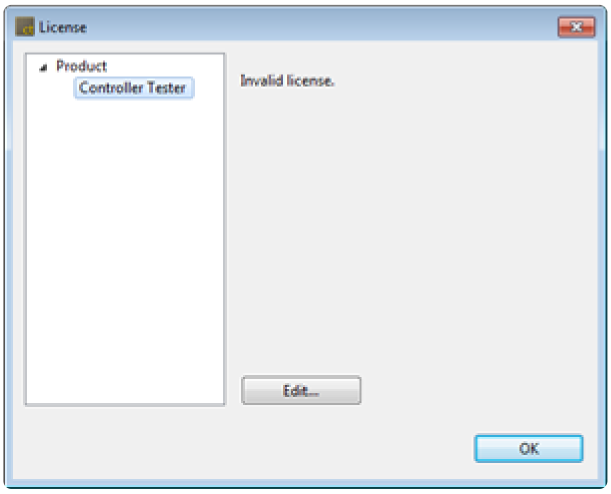
6. Set License

To use Controller Tester, you must register the license first. The procedures for registering the license are as follows.

1. Select [Help] > [License] in Menu.

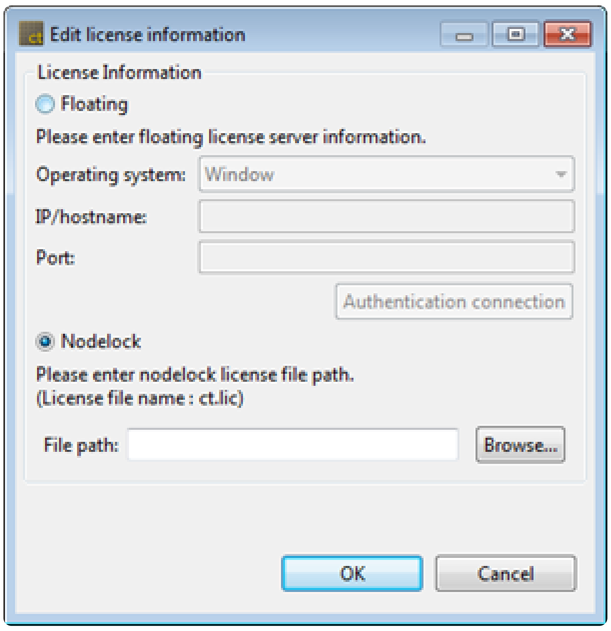


2. Select [Product] > [Controller Tester] and click [Edit].



Invalid license.

3. Enter the provided license in [Editing License Information] and click [OK] button to register the license.



Please enter floating license server information.

Operating system: Window

IP/hostname:

Port:

Please enter nodelock license file path.
(License file name : ct.lic)

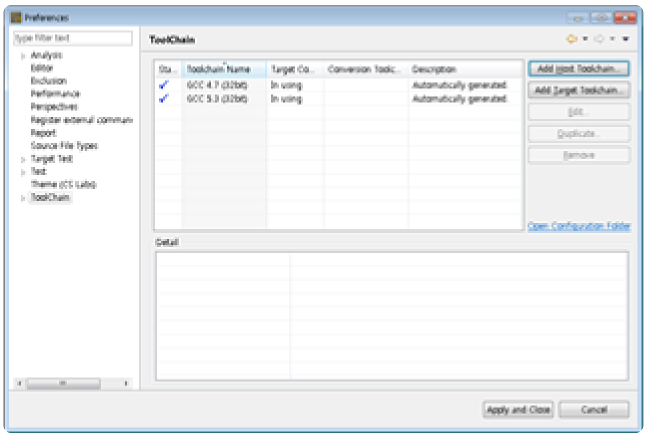
File path:

- Floating: Register it through the license server. Enter the server information (operating system, IP, port) and click [Authentication connection] button.
- Nodelock: Register the license file provided.

7. Set a Toolchain (Analyzer)

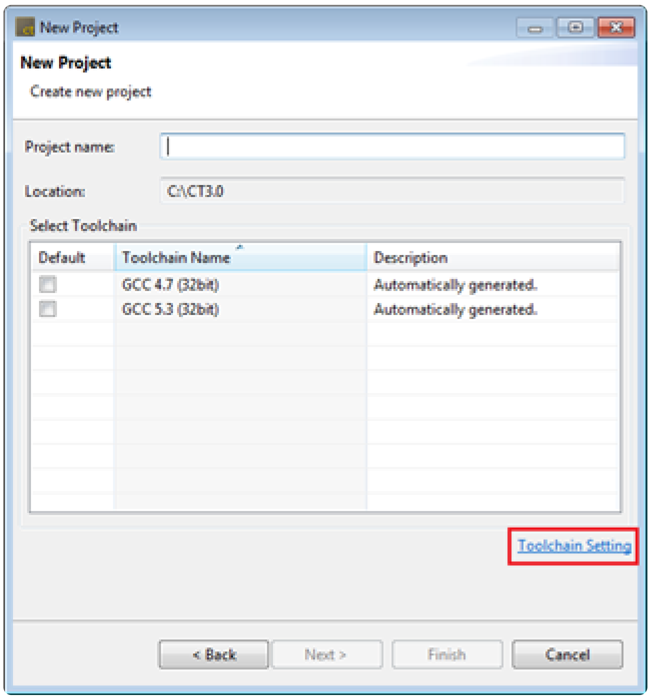
To perform the test using Controller Tester, the toolchain setting is required.
To create a project, you must have a toolchain(compiler information) of the sources to test.

The toolchain can be set in [Window] -> [Preferences] -> [Toolchain].



Sta...	Toolchain Name	Target Co...	Conversion Toolc...	Description
✓	GCC 4.7 (32bit)	In using		Automatically generated.
✓	GCC 5.3 (32bit)	In using		Automatically generated.

And it can also be set through [Toolchain setting] in Create a source file C/C++ project wizard or in Create a C/C++ Project from Embedded wizard.



Project name:

Location: C:\CT3.0

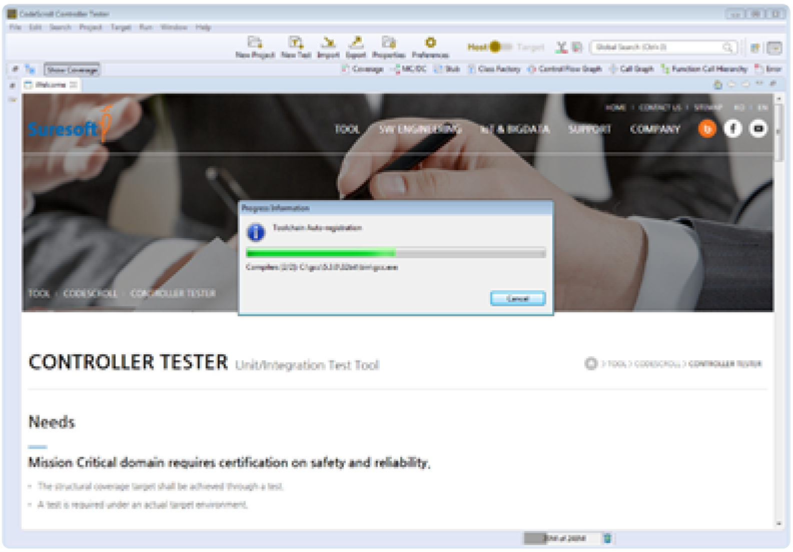
Default	Toolchain Name	Description
☐	GCC 4.7 (32bit)	Automatically generated.
☐	GCC 5.3 (32bit)	Automatically generated.

The functions related to the toolchain setting provided by Controller Tester are as follows.

- Add a Toolchain
- Edit a toolchain
- Duplicate a toolchain
- Remove a toolchain
- Export a toolchain
- Import a Toolchain

7.1. Auto-registration of Toolchain

When executing the Controller Tester, it extracts the information of Visual Studio compiler installed in user PC and the information GCC compiler installed along with the Controller Tester and registers the toolchain automatically (the registered toolchain is not registered again.).

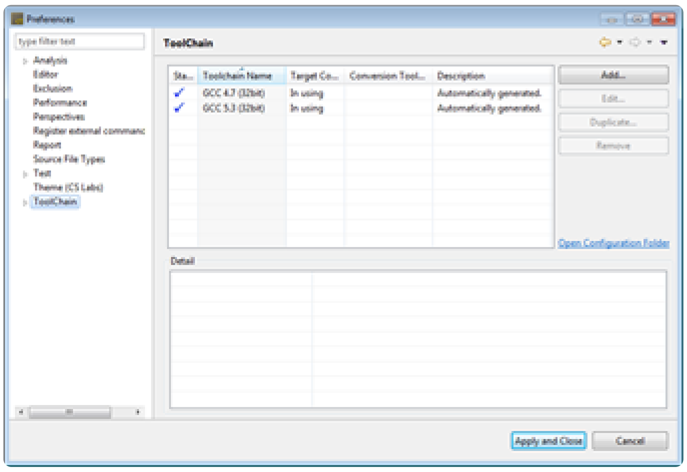

Progress Information

Toolchain Auto-registration

Complete (2/2): C:\gcc\5.3.0\32bit\bin\gcc.exe

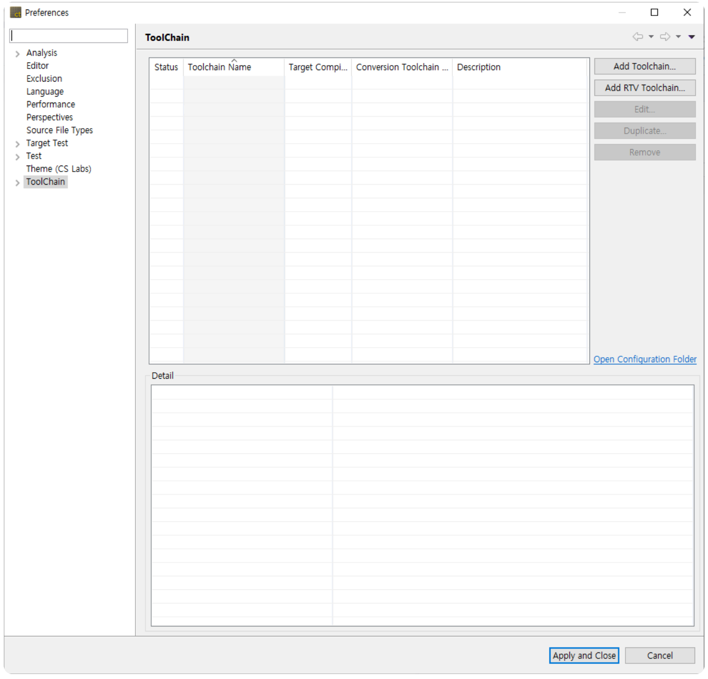
Cancel
CONTROLLER TESTER Unit/Integration Test Tool
Needs
Mission Critical domain requires certification on safety and reliability.

The auto-registered toolchain can be checked in [Window] -> [Preferences] -> [Toolchain] window, and it displays the message “Automatically generated.” in the description.

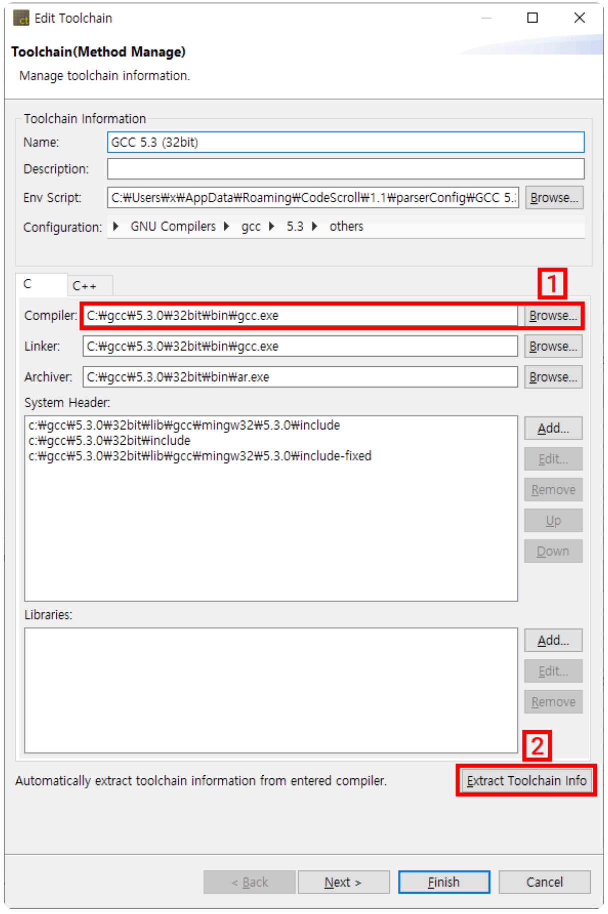

Sta...	Toolchain Name	Target Co...	Conversion Tool...	Description
✓	GCC 4.7 (32bit)	In using		Automatically generated.
✓	GCC 5.3 (32bit)	In using		Automatically generated.

7.2. Add a Toolchain

1. In [Window] -> [Preferences] -> [Toolchain] window, click the [Add Toolchain] button.



2. In [Add a toolchain] window, enter the toolchain information.

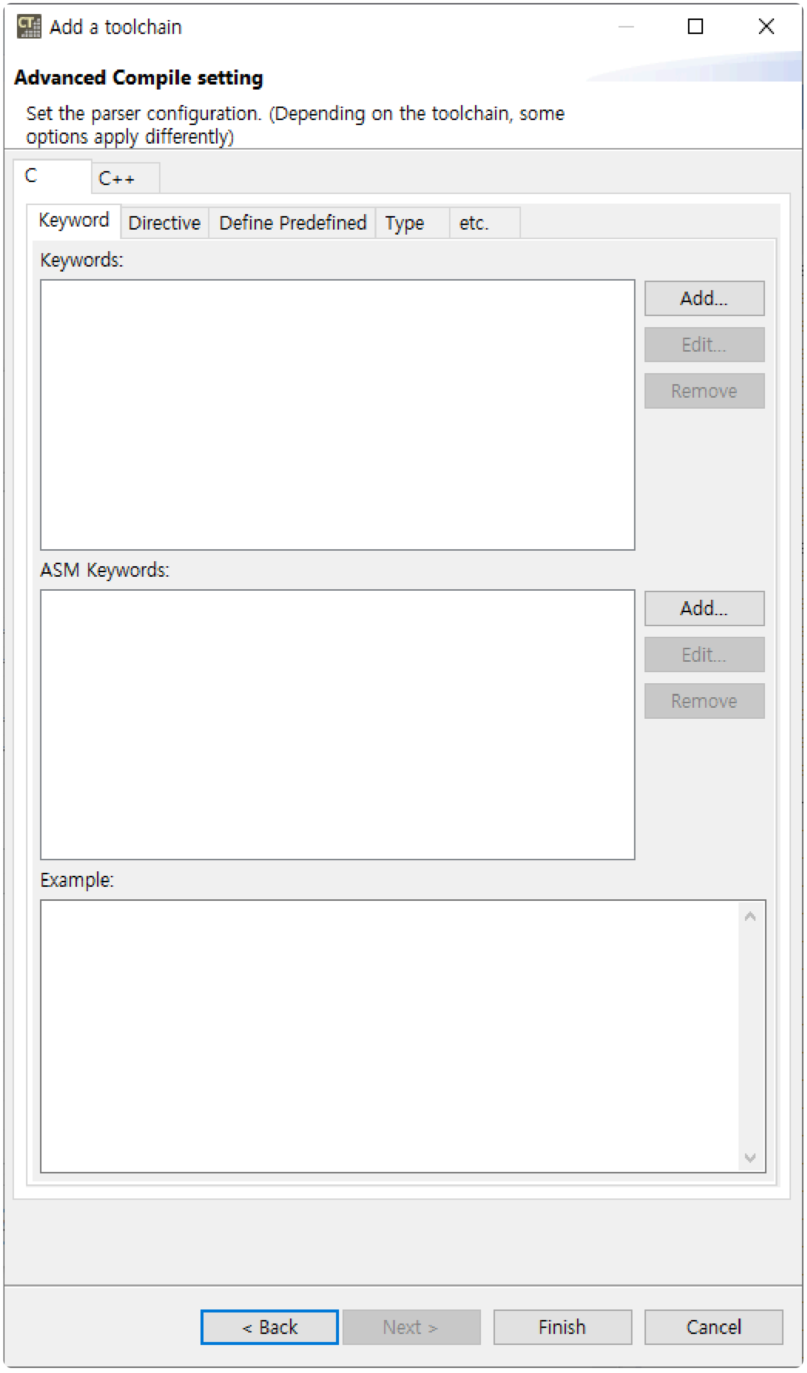


Name: GCC 5.3 (32bit)
Description:
Env Script: C:₩Users₩x₩AppData₩Roaming₩CodeScroll₩1.1₩parserConfig₩GCC 5.
Configuration: GNU Compilers ▸ gcc ▸ 5.3 ▸ others
Compiler: C:₩gcc₩5.3.0₩32bit₩bin₩gcc.exe
Linker: C:₩gcc₩5.3.0₩32bit₩bin₩gcc.exe
Archiver: C:₩gcc₩5.3.0₩32bit₩bin₩ar.exe
System Header:
c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include
c:₩gcc₩5.3.0₩32bit₩include
c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include-fixed
Libraries:

- When you click [Extract toolchain Info]2 button after [Compiler]1, the toolchain information is extracted automatically from the compiler entered.
- In [Compiler]1, enter the compiler path.
    - Ex:

  - If it is based on Visual Studio:
    C:\program Files (x86)\Microsoft Visual Studio 10.0\VS\bin\cl.exe
  - If it is based on GCC:
    C:\MinGW\bin\gcc.exe
  - CodeWarrior 5.x or higher for Freeescale HC (s) 12:
    C:\Program Files (x86)\Freescale\CWS12v5.1\Prog\chc12.exe

3. In [Name], enter the name of toolchain to be created.
4. In [Description], enter the description of toolchain to be created.
5. The entry information of [Env Script], [Configuration] and [C/C++] is set automatically by extracting the information from the compiler or can be entered directly by user.
6. After entering the toolchain information, click the [Next] or [Finish] button.


Add a toolchain

Advanced Compile setting

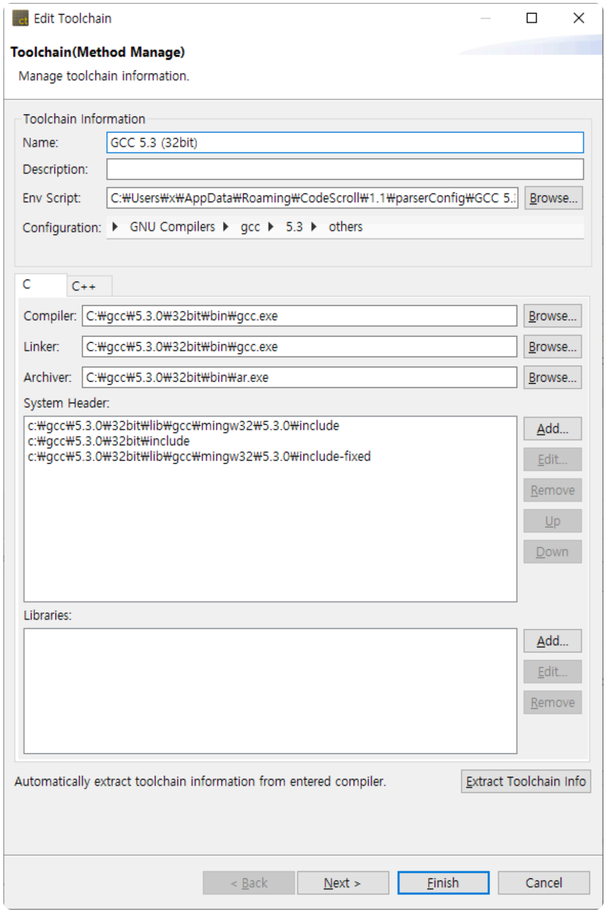
Set the parser configuration. (Depending on the toolchain, some options apply differently)

7. In [Advanced Compile setting] window displayed when clicking the [Next] button, the detailed items related to the configurations selected in the [Configuration] are shown. Each item can be changed by the user. The application of the changed items can be checked in [Example].

For the detailed setting procedure for the other toolchain detail, please contact the Technical support contact at the bottom of this document Troubleshooting page.

7.3. Edit a Toolchain

1. Select the toolchain to be edited and click the [Edit] button.



Edit Toolchain

Toolchain(Method Manage)

Manage toolchain information.

Toolchain Information

Name:	GCC 5.3 (32bit)
Description:	
Env Script:	C:₩Users₩x₩AppData₩Roaming₩CodeScroll₩1.1₩parserConfig₩GCC 5.
Configuration:	GNU Compilers ▸ gcc ▸ 5.3 ▸ others

C | C++

Compiler:	C:₩gcc₩5.3.0₩32bit₩bin₩gcc.exe
Linker:	C:₩gcc₩5.3.0₩32bit₩bin₩gcc.exe
Archiver:	C:₩gcc₩5.3.0₩32bit₩bin₩ar.exe

System Header:

```
c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include
c:₩gcc₩5.3.0₩32bit₩include
c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include-fixed
```

Libraries:

Automatically extract toolchain information from entered compiler.

2. Edit the information of toolchain.
3. Click the [Finish] button.

7.4. Duplicate a Toolchain

1. Select the toolchain to be copied and click the [Duplicate] button.
   (It can copy only a toolchain which a compiler is not entered.)
2. Edit the toolchain information that you want to change.
3. Click the [Finish] button.

7.5. Remove a Toolchain

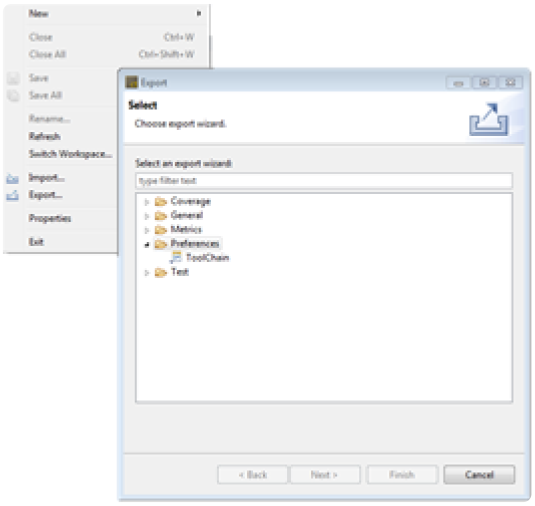
Select the toolchain to remove and click the [Remove] button.

! If there is a project using the toolchain you want to remove, the project will not work properly.

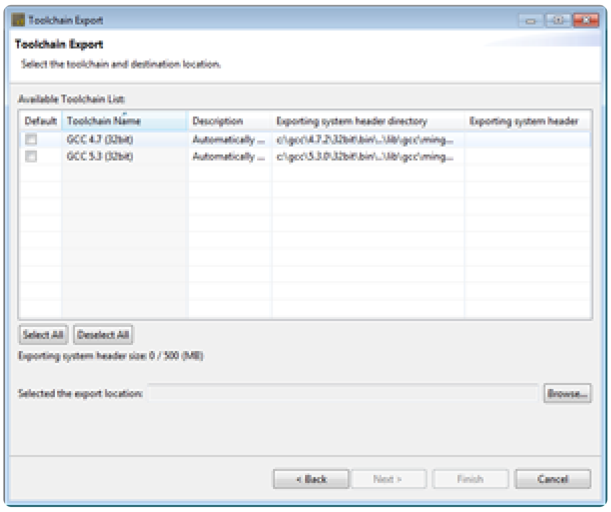
7.6. Export a Toolchain

The toolchain information can be exported via ‘Export’ function.

1. Click [File] > [Export] in menu and select [Toolchain] in [Preferences].



2. Select the toolchain to be exported and click [Browse] button to specify the path to be exported. If you set the system header file in the toolchain settings, a checkbox will be displayed in the [Exporting system header] column, where you can choose whether to export or not.



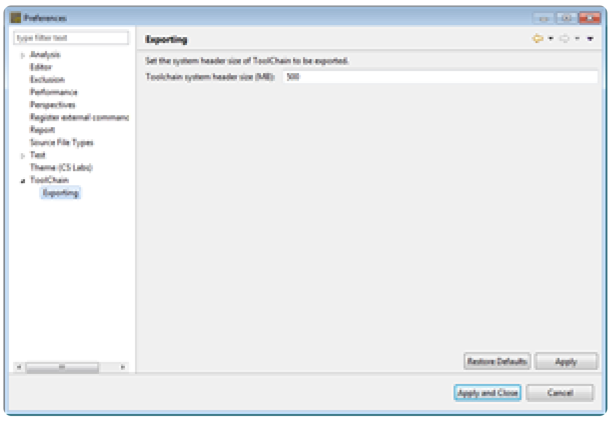
Available Toolchain List:

Default	Toolchain Name	Description	Exporting system header directory	Exporting system header
☐	GCC 4.7 (32bit)	Automatically ...	c:\gcc\4.7.2\32bit\bin\..\lib\gcc\ming...	
☐	GCC 5.3 (32bit)	Automatically ...	c:\gcc\5.3.0\32bit\bin\..\lib\gcc\ming...	

Exporting system header size: 0 / 500 (MB)

Selected the export location:

3. Click [Window] > [Preferences] > [Toolchain] > [Exporting] in menu to set the system header size to be exported. If the size of the system header is larger than the set value, the system header cannot be exported.



Exporting

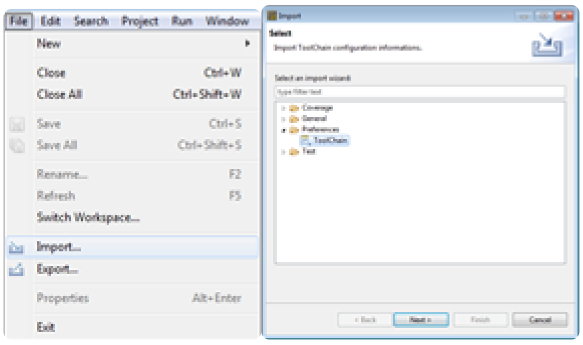
Set the system header size of ToolChain to be exported.

Toolchain system header size (MB): 500

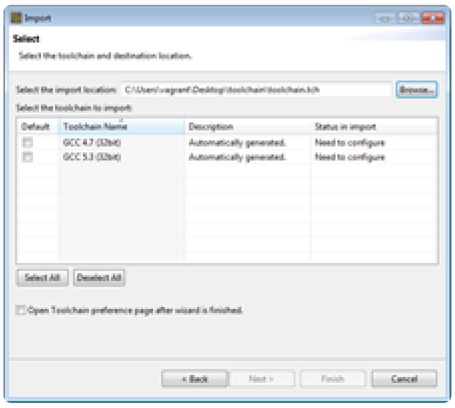
7.7. Import a Toolchain

The exported toolchain can be imported via the [Import] function.

1. Select [File] > [Import] in menu and click [Toolchain] in [Preferences].



2. Select the file to import and check the toolchain to import when the toolchain of the file is displayed.


Import

Select

Select the toolchain and destination location.

Select the import location: C:\Users\vagrant\Desktop\toolchain\toolchain.tch

Select the toolchain to import:

Default	Toolchain Name	Description	Status in import
☐	GCC 4.7 (32bit)	Automatically generated.	Need to configure
☐	GCC 5.3 (32bit)	Automatically generated.	Need to configure

☐ Open Toolchain preference page after wizard is finished.

The name of the toolchain to import is duplicated with the existing toolchain name, the status of ‘import’ becomes “Need to configure”. The name of the toolchain to import can be modified in [Select how to resolve] dialog shown when clicking the [Next] button.

8. Create a Project

Checklist before creating a project

Since Controller Tester is a tool that detects errors by actually executing source codes, the source code under test must be executable. In other words, the source code under test must be buildable for normal testing.

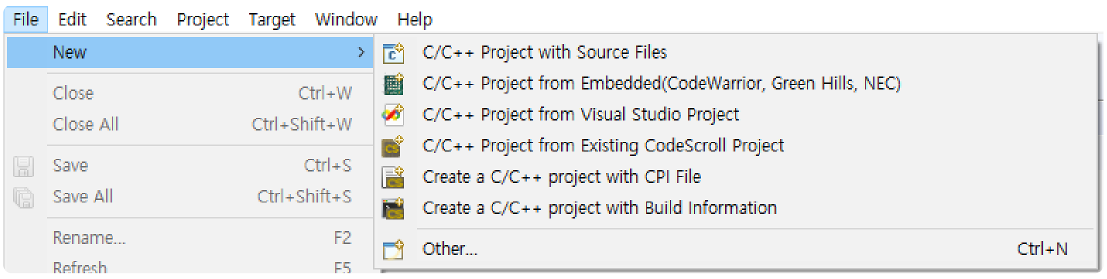
Before creating and testing a project, you need to set up a ‘toolchain’ that takes into account the development environment of the target software. Please refer to Set a toolchain for details.

Controller Tester automatically generates a stub if the target object to link does not exist during the build process. However, the automatic test stub generation feature may have limitations in performing tests, so it is recommended to prepare an appropriate test strategy in advance.

Create a project

To create a Controller Tester project, execute [Create a Project wizard].

Select [File] -> [New] or click the shortcut icon.


File
Edit
Search
Project
Target
Window
Help
New
Close Ctrl+W
Close All Ctrl+Shift+W
Save Ctrl+S
Save All Ctrl+Shift+S
Rename... F2
Refresh F5
C/C++ Project with Source Files
C/C++ Project from Embedded(CodeWarrior, Green Hills, NEC)
C/C++ Project from Visual Studio Project
C/C++ Project from Existing CodeScroll Project
Create a C/C++ project with CPI File
Create a C/C++ project with Build Information
Other... Ctrl+N

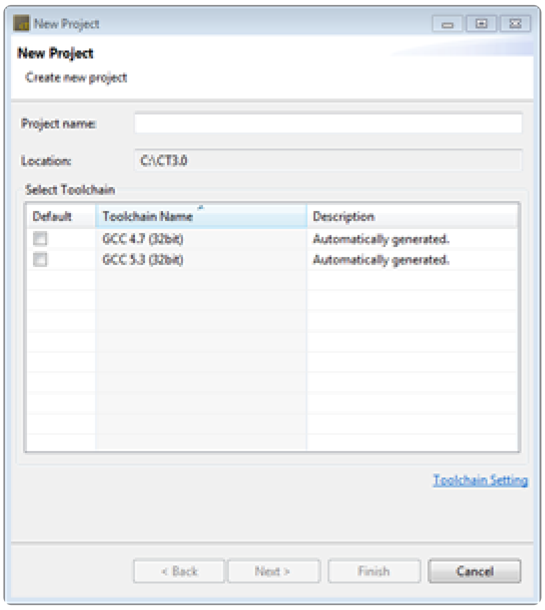
The following types of project creation wizards are provided.

- C/C++ Project with Source Files
  Creates a project by selecting the source file directly.
- C/C++ Project from Embedded
  Creates a project by using an embedded project file.
- C/C++ Project from Visual Studio Project
  Creates a project by using Visual Studio dsw, sln, vcxproj and vcproj files.
- C/C++ Project form Existing CodeScroll Project
  Creates a project by using the CodeScroll project created previously.
- Creates a C/C++ Project with CPI File
  Creates a project by using project creation information located in a CPI file.
- Creates a C/C++ Project with Build Information
  Creates a project by using a makefile and build script.

8.1. C/C++ Project with Source Files

Create a project with C/C ++ source code files. The user needs to enter the necessary information to build the source code.

1. Enter the project name in [Project name].



New Project

New Project

Create new project

Project name:

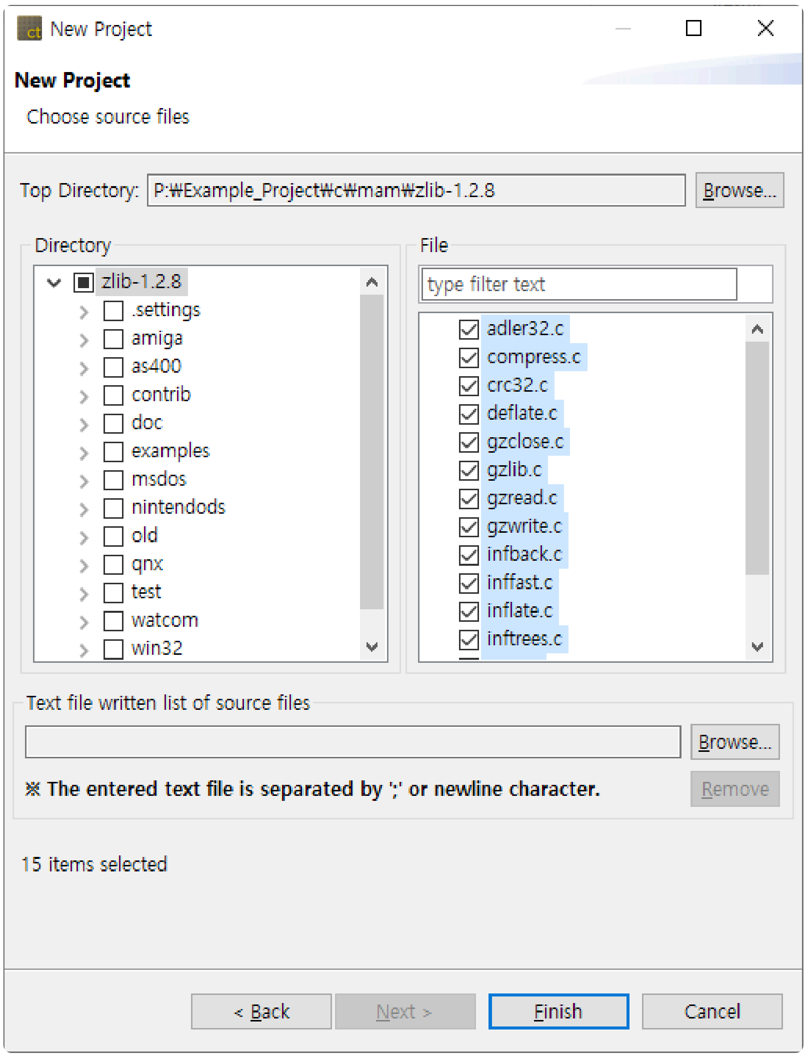
Location: C:\CT3.0

Select Toolchain

Default	Toolchain Name	Description
☐	GCC 4.7 (32bit)	Automatically generated.
☐	GCC 5.3 (32bit)	Automatically generated.

2. In [Select Toolchain], select the toolchain to use in the project. If there is no created toolchain, create a toolchain through [Toolchain Setting]. Please refer to Set a Toolchain for details.

3. Click the [Next] button to move to the next screen. If you click the [Finish] button, an empty project containing no source file is created.



Top Directory: P:₩Example_Project₩c₩mam₩zlib-1.2.8

Directory: zlib-1.2.8, .settings, amiga, as400, contrib, doc, examples, msdos, nintendods, old, qnx, test, watcom, win32

File: type filter text

☑ adler32.c
☑ compress.c
☑ crc32.c
☑ deflate.c
☑ gzclose.c
☑ gzlib.c
☑ gzread.c
☑ gzwrite.c
☑ infback.c
☑ inffast.c
☑ inflate.c
☑ inftrees.c

Text file written list of source files

※ The entered text file is separated by ';' or newline character.

15 items selected

- You can select the source file directly, or through a text file with a file path.

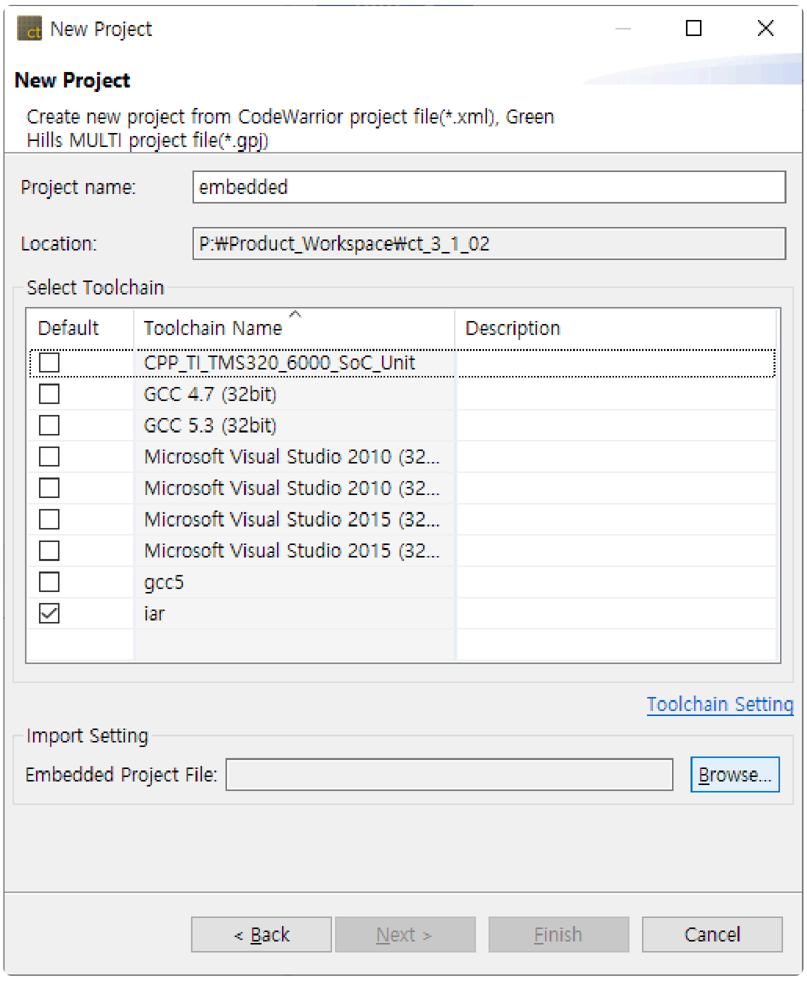
4. Select source files directly.
   a. Click [Browse …] to specify the [Top Directory] to be displayed in the directory screen below.
      - Except in special cases, make the directory one level higher than the directory containing the source files you want to select as the top-level directory.
   b. On the [Directory] screen shown on the left, select the directory containing the source files to be used for project creation.
   c. The files in the selected directory appear on the [File] screen shown on the right. Check the files to add.

5. Select by using a text file with the file paths.
   a. On the [Text file written list of source files] screen shown below, click [Browse …] to select a text file with a list of source files(absolute file path).
   b. Clicking the [Remove] button deselects the selected text file and the source file selected through the file.

6. After all settings are completed, click the [Finish] button to create the project.

8.2. C/C++ Project from Embedded

Create a project with an embedded project file(.xml, .gpj, .prw, .prj). Except in special cases, the information required for the build is automatically entered, so there is nothing to specify by the user.


New Project

New Project

Create new project from CodeWarrior project file(*.xml), Green Hills MULTI project file(*.gpj)

Project name: embedded

Location: P:₩Product_Workspace₩ct_3_1_02

Select Toolchain

Default	Toolchain Name	Description
☐	CPP_TI_TMS320_6000_SoC_Unit	
☐	GCC 4.7 (32bit)	
☐	GCC 5.3 (32bit)	
☐	Microsoft Visual Studio 2010 (32...	
☐	Microsoft Visual Studio 2010 (32...	
☐	Microsoft Visual Studio 2015 (32...	
☐	Microsoft Visual Studio 2015 (32...	
☐	gcc5	
☑	iar	

Toolchain Setting

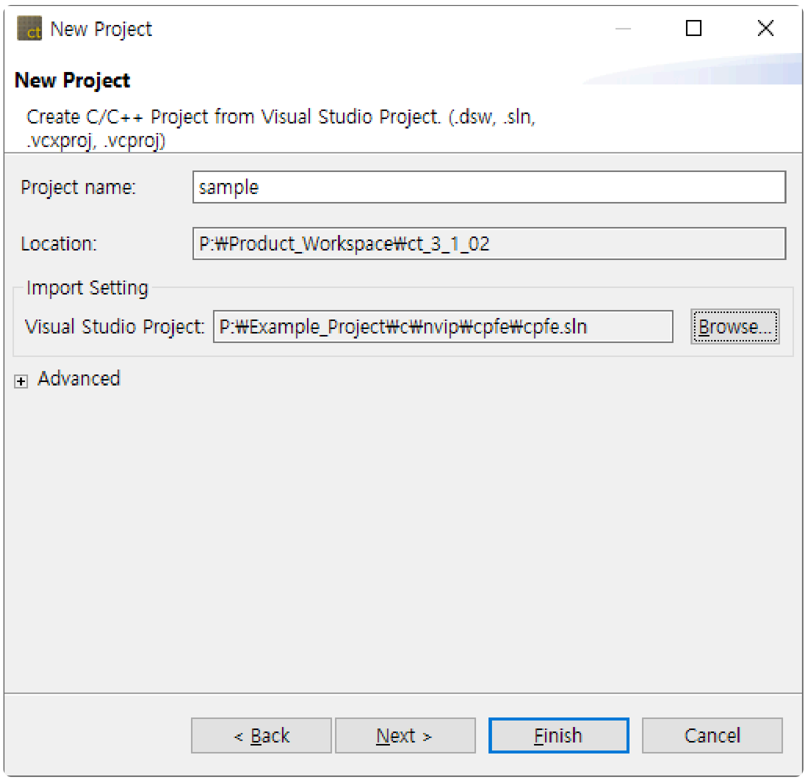
Import Setting

Embedded Project File:

1. Enter a project name in [Project name].
2. Choose a toolchain that fits the embedded project you select.
3. In [Import Setting] -> [Embedded Project File], specify the embedded project file of the software under test.
4. After completing all settings, click [Finish] to create the project.

8.3. C/C++ Project from Visual Studio Project

Create a project with a Microsoft Visual Studio project file(.dsw, .sln, .vcxproj, .vcproj). Except in special cases, the information required for the build is automatically entered, so there is nothing to specify by the user.



Create C/C++ Project from Visual Studio Project. (.dsw, .sln, .vcxproj, .vcproj)

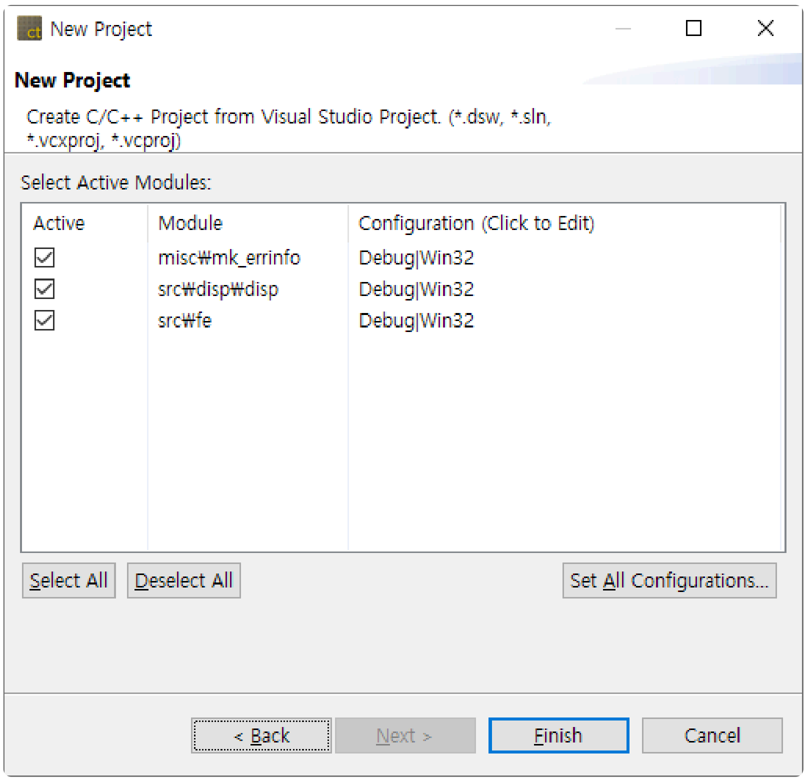
Project name: sample

Location: P:₩Product_Workspace₩ct_3_1_02

Import Setting

Visual Studio Project: P:₩Example_Project₩c₩nvip₩cpfe₩cpfe.sln

1. Enter the project name in [Project name].
2. Specify the Visual Studio project file to import in [Visual Studio Project].
3. If there are values that must be set before calling the compiler of the toolchain to be registered, add a script file to set the values to [Advanced]-> [Environment Script File].
4. Click [Next] to move to the next screen. When you click Done, module settings are randomly selected for the imported Visual Studio project.



New Project

Create C/C++ Project from Visual Studio Project. (*.dsw, *.sln, *.vcxproj, *.vcproj)

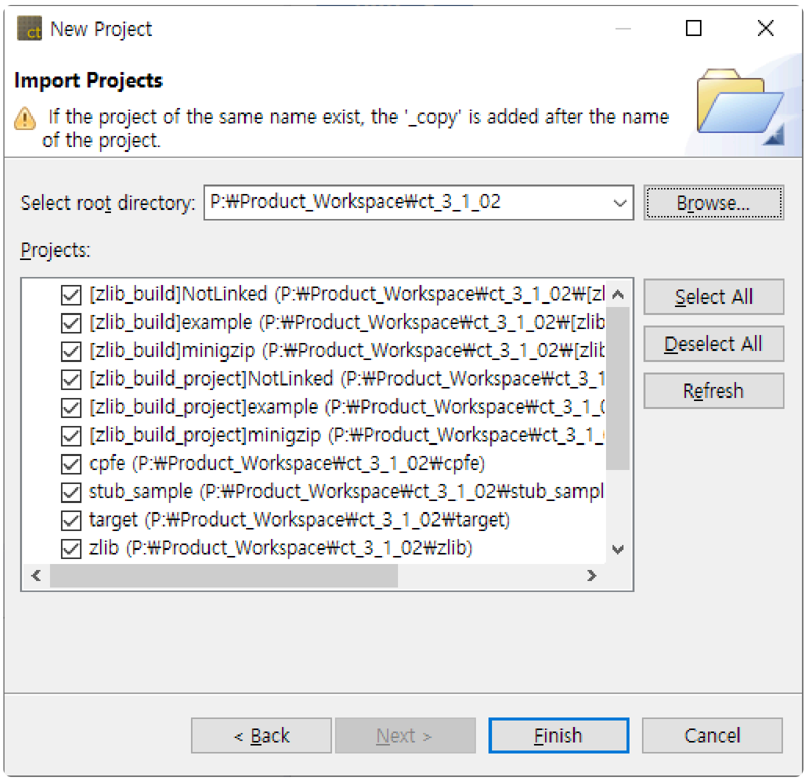
Select Active Modules:

Active	Module	Configuration (Click to Edit)
☑	misc₩mk_errinfo	Debug|Win32
☑	src₩disp₩disp	Debug|Win32
☑	src₩fe	Debug|Win32

5. Select the module to be activated from the modules included in the Visual Studio project.
6. Select the configuration of each module.
    - [Set All Configurations …] allows you to change the configuration for all modules in a batch.
7. After all settings are completed, click the [Finish] button to create the project.

8.4. C/C++ Project form Existing CodeScroll Project

Import an existing CodeScroll project and create a new project with that information. You can easily create a new project with the same configuration(source file, exclude/include analysis, compile flags) as the existing project.



Import Projects

If the project of the same name exist, the '_copy' is added after the name of the project.

Select root directory: P:₩Product_Workspace₩ct_3_1_02

Projects:

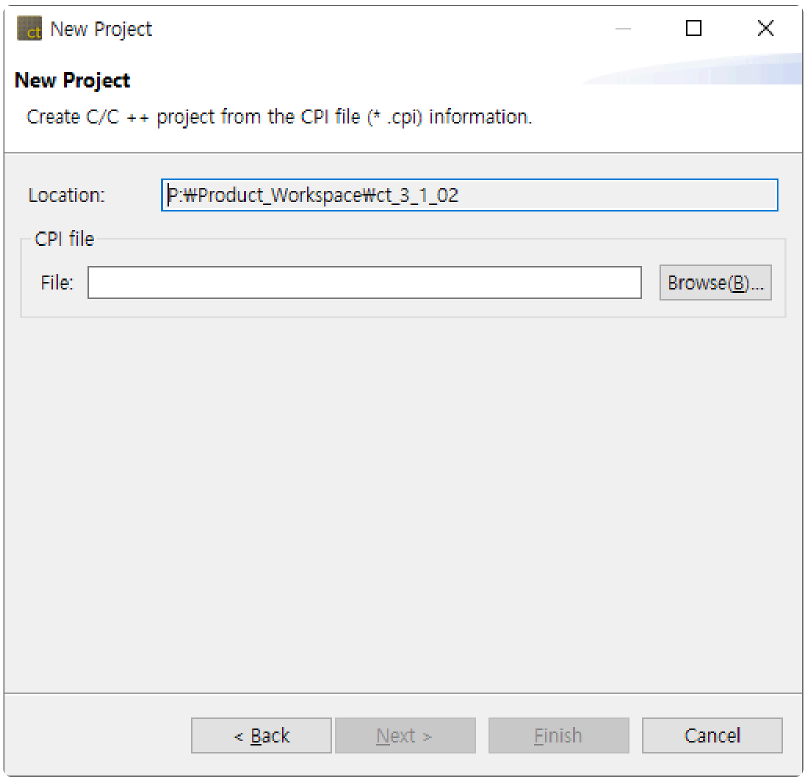
- ☑ [zlib_build]NotLinked (P:₩Product_Workspace₩ct_3_1_02₩[zl
- ☑ [zlib_build]example (P:₩Product_Workspace₩ct_3_1_02₩[zlib
- ☑ [zlib_build]minigzip (P:₩Product_Workspace₩ct_3_1_02₩[zlit
- ☑ [zlib_build_project]NotLinked (P:₩Product_Workspace₩ct_3_1
- ☑ [zlib_build_project]example (P:₩Product_Workspace₩ct_3_1_(
- ☑ [zlib_build_project]minigzip (P:₩Product_Workspace₩ct_3_1_
- ☑ cpfe (P:₩Product_Workspace₩ct_3_1_02₩cpfe)
- ☑ stub_sample (P:₩Product_Workspace₩ct_3_1_02₩stub_sampl
- ☑ target (P:₩Product_Workspace₩ct_3_1_02₩target)
- ☑ zlib (P:₩Product_Workspace₩ct_3_1_02₩zlib)

1. Use the [Browse …] button to select the CodeScroll workspace or CodeScroll project path.
2. Projects existing in the selected path are displayed in the [Projects] list.
    - When the CodeScroll workspace is selected, all the projects under it are displayed.
3. Click [Finish] to create the project.

8.5. Create a C/C++ Project with CPI File

Create a project from a CPI file. The CPI file is an information file for project creation in the command line interface.

The CPI file must be created by the user using the template file in the {installation path}\plugins\com.codescroll.gp.cli_x.x.x.x\cpi folder.


New Project
New Project
Create C/C ++ project from the CPI file (* .cpi) information.
Location:
P:₩Product_Workspace₩ct_3_1_02
CPI file
File:
Browse(B)...
< Back
Next >
Finish
Cancel

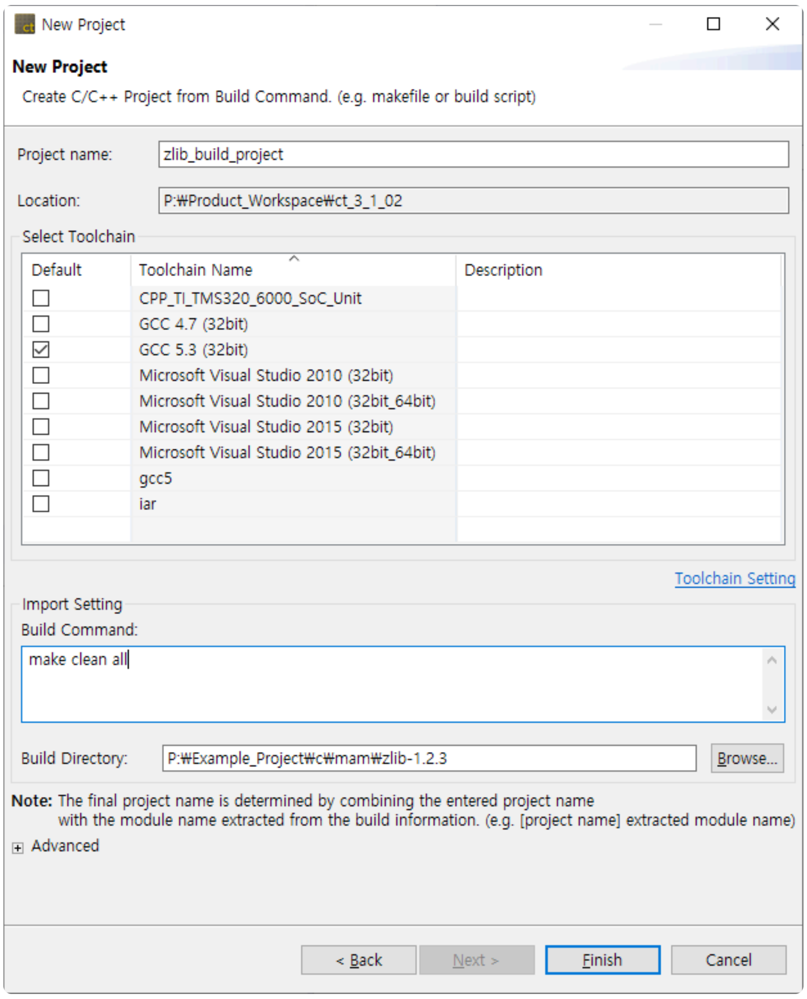
1. Select a CPI file with the [Browse…] button.
2. Click the [Finish] button to create the project.

✻ You can also create a project by dragging and dropping a CPI file into the test navigator.

8.6. Create a C/C++ Project with Build Information

Create a C / C ++ project from build information. The project is created as many as the number of modules extracted from the build information.

1. Enter a project name in [Project name]. The final project name is determined by combining the entered project name with the module name extracted from the build information.
    - Ex) [Project name]Extracted module name


New Project
New Project
Create C/C++ Project from Build Command. (e.g. makefile or build script)

Project name: zlib_build_project

Location: P:₩Product_Workspace₩ct_3_1_02

Select Toolchain

Default	Toolchain Name	Description
☐	CPP_TI_TMS320_6000_SoC_Unit	
☐	GCC 4.7 (32bit)	
☑	GCC 5.3 (32bit)	
☐	Microsoft Visual Studio 2010 (32bit)	
☐	Microsoft Visual Studio 2010 (32bit_64bit)	
☐	Microsoft Visual Studio 2015 (32bit)	
☐	Microsoft Visual Studio 2015 (32bit_64bit)	
☐	gcc5	
☐	iar	

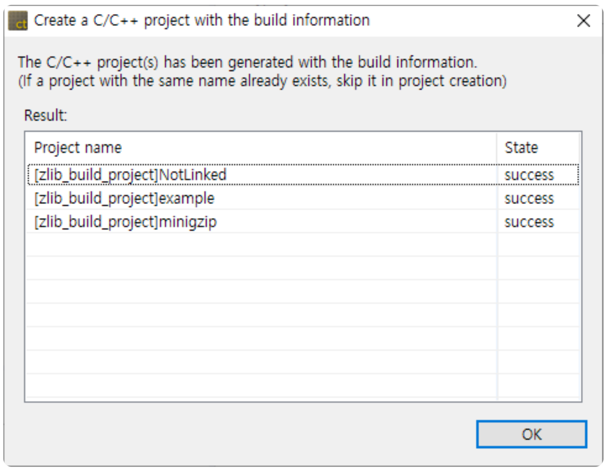
Import Setting

Build Command: make clean all

Build Directory: P:₩Example_Project₩c₩mam₩zlib-1.2.3

Note: The final project name is determined by combining the entered project name with the module name extracted from the build information. (e.g. [project name] extracted module name)

2. Choose the same toolchain as the compiler you use for the build.
3. In [Import Setting]-> [Build Command], enter the command required for the build.
    - Ex) Make all / make clean
4. Specify the path where the makefile is located in [Import Setting]-> [Build Directory].
5. If there are values that must be set before calling the compiler of the toolchain to be registered, add a script file to set the values to [Advanced]-> [Environment Script File].
6. After completing all settings, click [Finish] to create the project.
7. When the project creation is completed after building, the result screen appears.


Create a C/C++ project with the build information

The C/C++ project(s) has been generated with the build information.
(If a project with the same name already exists, skip it in project creation)

Result:

Project name	State
[zlib_build_project]NotLinked	success
[zlib_build_project]example	success
[zlib_build_project]minigzip	success

- Success: Project creation complete.
- Error: If the creation failed due to an error during project creation.
- Exclude: If the same project name exists in the workspace.

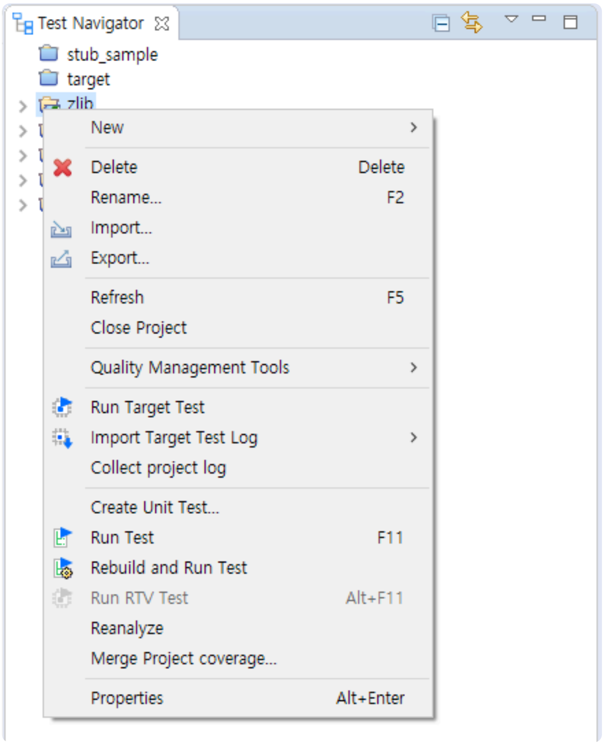
9. Create a Test

Generate test data and test code to test the functions of the source code. You can create individual tests for each function.

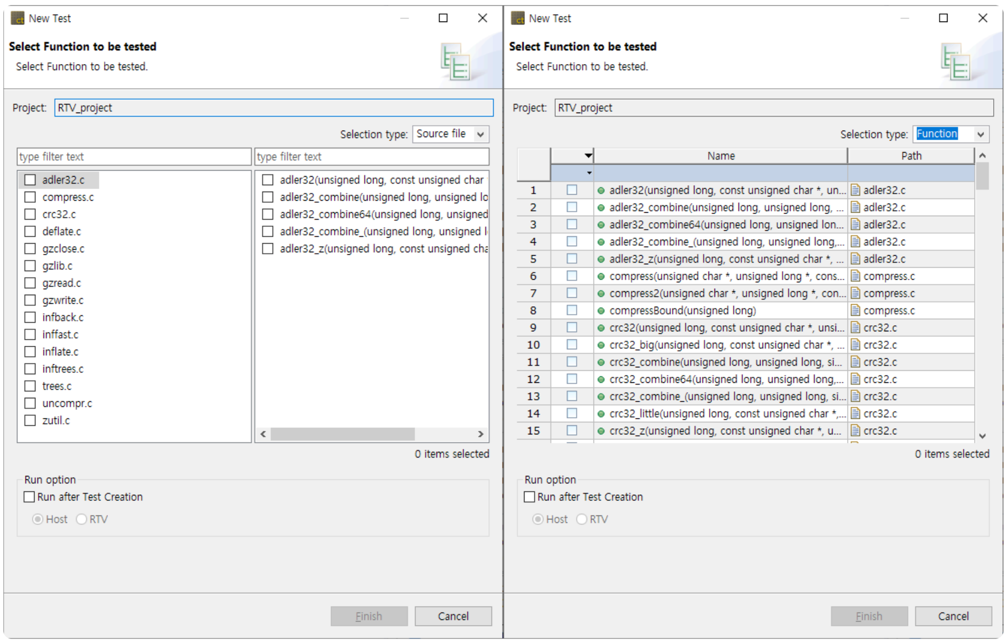
Create unit tests

Generate test data and test code for each function under test.

1. Select the project or module to create unit tests, right-click and click the [Create Unit Test] menu.



2. After the analysis is finished, in [Select function to be tested], select the function to perform the unit test.



Project: RTV_project

Selection type: Source file

adler32.c
compress.c
crc32.c
deflate.c
gzclose.c
gzlib.c
gzread.c
gzwrite.c
infback.c
inffast.c
inflate.c
inftrees.c
trees.c
uncompr.c
zutil.c

adler32(unsigned long, const unsigned char
adler32_combine(unsigned long, unsigned lo
adler32_combine64(unsigned long, unsigned
adler32_combine_(unsigned long, unsigned l
adler32_z(unsigned long, const unsigned cha

0 items selected

Run option
Run after Test Creation
[✓ Host] RTV

Project: RTV_project

Selection type: Function

		Name	Path
1	☐	adler32(unsigned long, const unsigned char *, un...	adler32.c
2	☐	adler32_combine(unsigned long, unsigned long, ...	adler32.c
3	☐	adler32_combine64(unsigned long, unsigned lon...	adler32.c
4	☐	adler32_combine_(unsigned long, unsigned long,...	adler32.c
5	☐	adler32_z(unsigned long, const unsigned char *, ...	adler32.c
6	☐	compress(unsigned char *, unsigned long *, cons...	compress.c
7	☐	compress2(unsigned char *, unsigned long *, con...	compress.c
8	☐	compressBound(unsigned long)	compress.c
9	☐	crc32(unsigned long, const unsigned char *, unsi...	crc32.c
10	☐	crc32_big(unsigned long, const unsigned char *, ...	crc32.c
11	☐	crc32_combine(unsigned long, unsigned long, si...	crc32.c
12	☐	crc32_combine64(unsigned long, unsigned long,...	crc32.c
13	☐	crc32_combine_(unsigned long, unsigned long, si...	crc32.c
14	☐	crc32_little(unsigned long, const unsigned char *,...	crc32.c
15	☐	crc32_z(unsigned long, const unsigned char *, u...	crc32.c

0 items selected

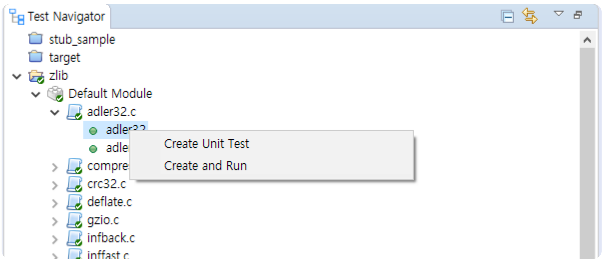
Run option
Run after Test Creation
[✓ Host] RTV

   a. You can filter the function under test using [type filter text].
   b. You can use the [Selection type] combo box to select the function to be tested based on the source file or function.
   c. You can easily select and deselect all functions under test with the right-click menu.
   d. When [Run after Test Creation] is selected, the test is executed after the test data is generated.
3. Click [Finish] to create the unit test.

Create and run tests

The [Create and Run] function allows you to create and run unit tests at once without using the [Create Unit Test] function.

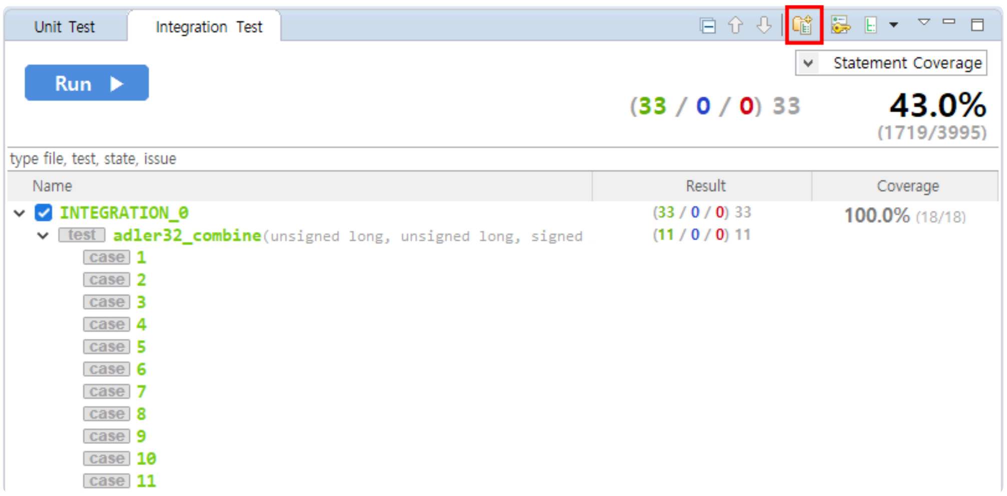
1. Select the function to be tested in the test navigator and right-click.



2. If you select the [Create and Run] menu, it creates a test for the target function and then runs the test.

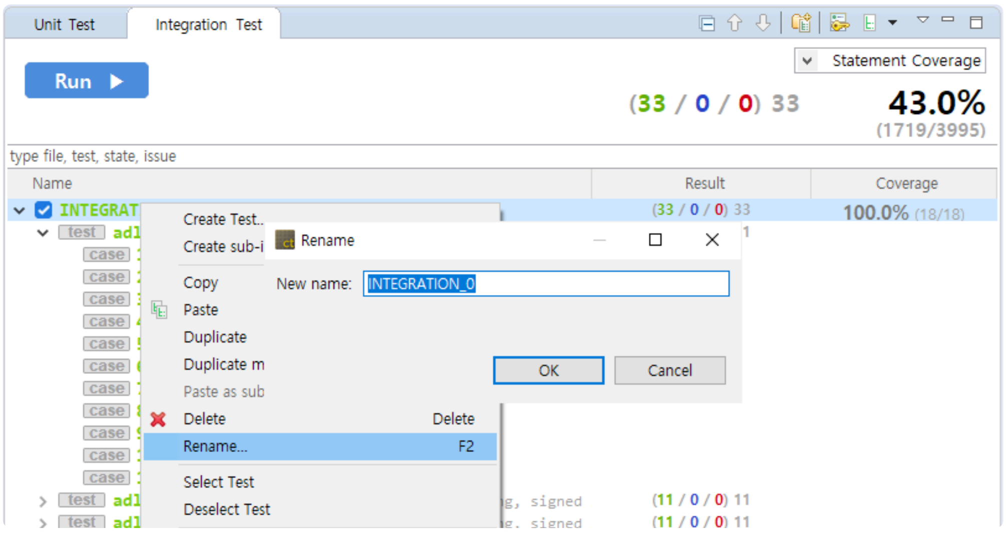
Create an integration test

You can use the toolbar menu to create an integrated test.



Name	Result	Coverage
INTEGRATION_0	(33 / 0 / 0) 33	100.0% (18/18)
test adler32_combine(unsigned long, unsigned long, signed	(11 / 0 / 0) 11	
case 1		
case 2		
case 3		
case 4		
case 5		
case 6		
case 7		
case 8		
case 9		
case 10		
case 11		

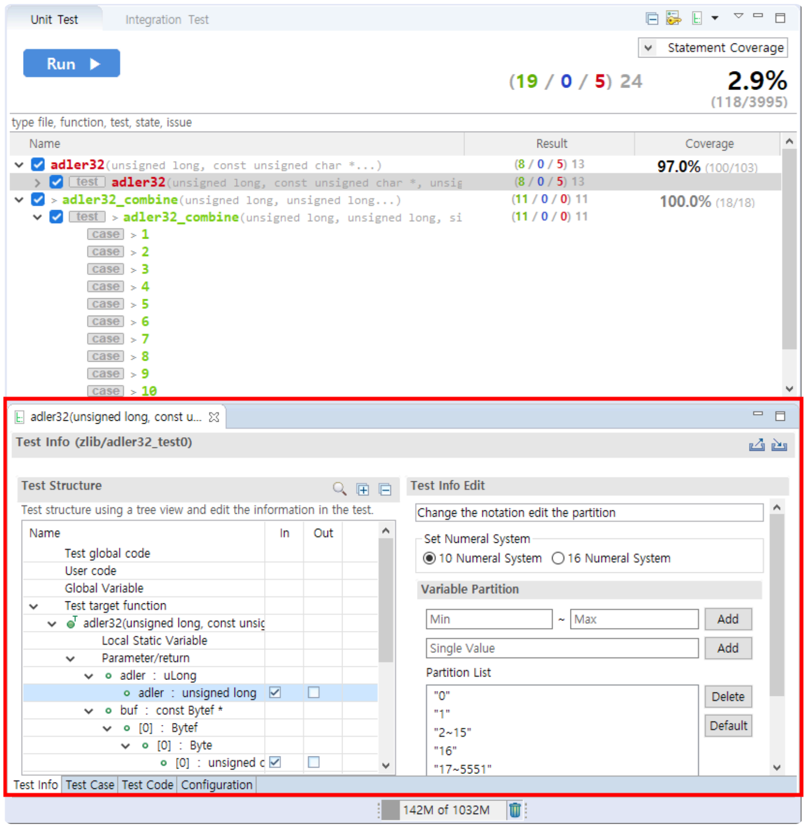
The integration test name is automatically assigned and can be renamed using the [Rename] context menu.



New name: INTEGRATION_0

10. Test Editor

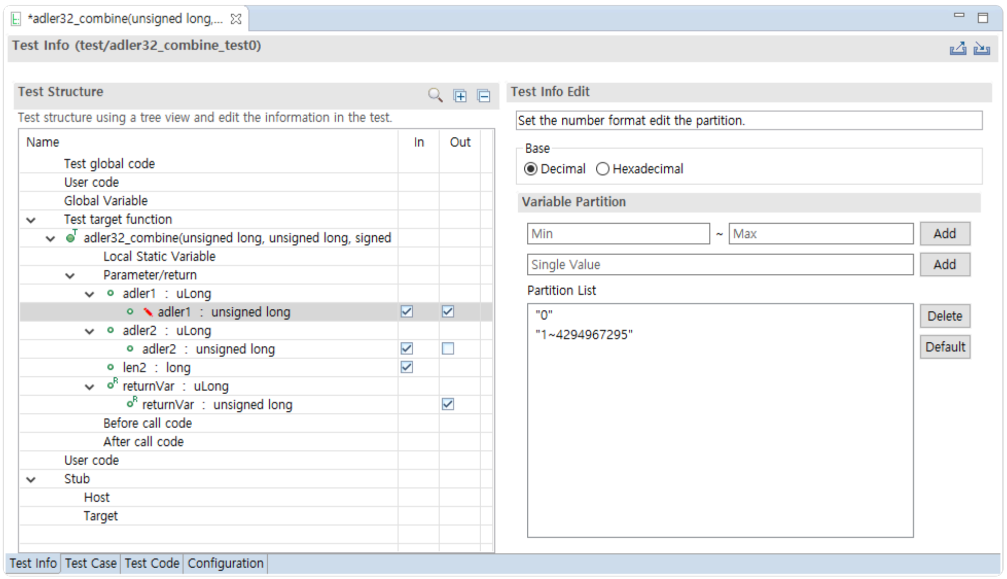
The test editor can be opened by double-clicking the test or test case in each test view, located at the bottom of the unit/integrated test view.



✻ You can move the editor and open it in a separate window.

10.1. Test Info

The Test Information tab is a feature that presents the test code as a tree of test structures, making it easy for users to modify the test code.


*adler32_combine(unsigned long,...

Test Info (test/adler32_combine_test0)

Test Structure

Test structure using a tree view and edit the information in the test.

Name	In	Out
Test global code		
User code		
Global Variable		
Test target function		
adler32_combine(unsigned long, unsigned long, signed		
Local Static Variable		
Parameter/return		
adler1 : uLong		
adler1 : unsigned long	✓	✓
adler2 : uLong		
adler2 : unsigned long	✓	☐
len2 : long	✓	
returnVar : uLong		
returnVar : unsigned long		✓
Before call code		
After call code		
User code		
Stub		
Host		
Target		

Test Info Edit

Set the number format edit the partition.

Base: [✓ Decimal] Hexadecimal

Variable Partition

Min ~ Max Add

Single Value Add

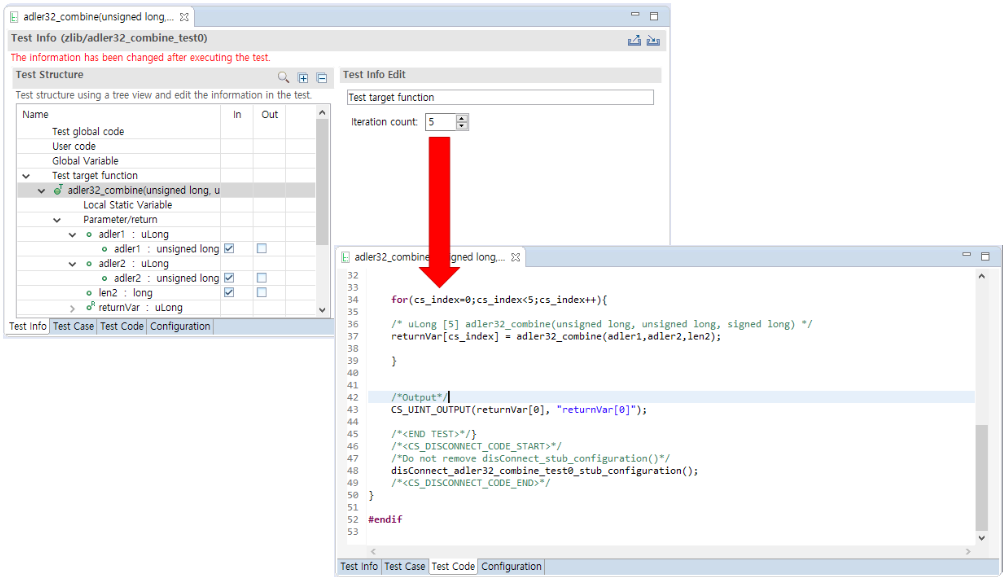
Partition List

"0"
"1~4294967295"

- User code can be inserted into the test code.
- You can control global variables related to the function under test.
- You can control the input and output of the function parameters and return values.
- You can enter the code to be executed just before calling the function under test.
- 🖍 markers appear at modified items. When you save modifications, the markers disappear.

Repeat function calls

You can have the function under test be called multiple times.


adler32_combine(unsigned long,...

Test Info (zlib/adler32_combine_test0)

The information has been changed after executing the test.

Test Structure

Test structure using a tree view and edit the information in the test.

Name	In	Out
Test global code		
User code		
Global Variable		
Test target function		
adler32_combine(unsigned long, u		
Local Static Variable		
Parameter/return		
adler1 : uLong		
adler1 : unsigned long	✓	☐
adler2 : uLong		
adler2 : unsigned long	✓	☐
len2 : long	✓	☐
returnVar : uLong		

Test Info Edit

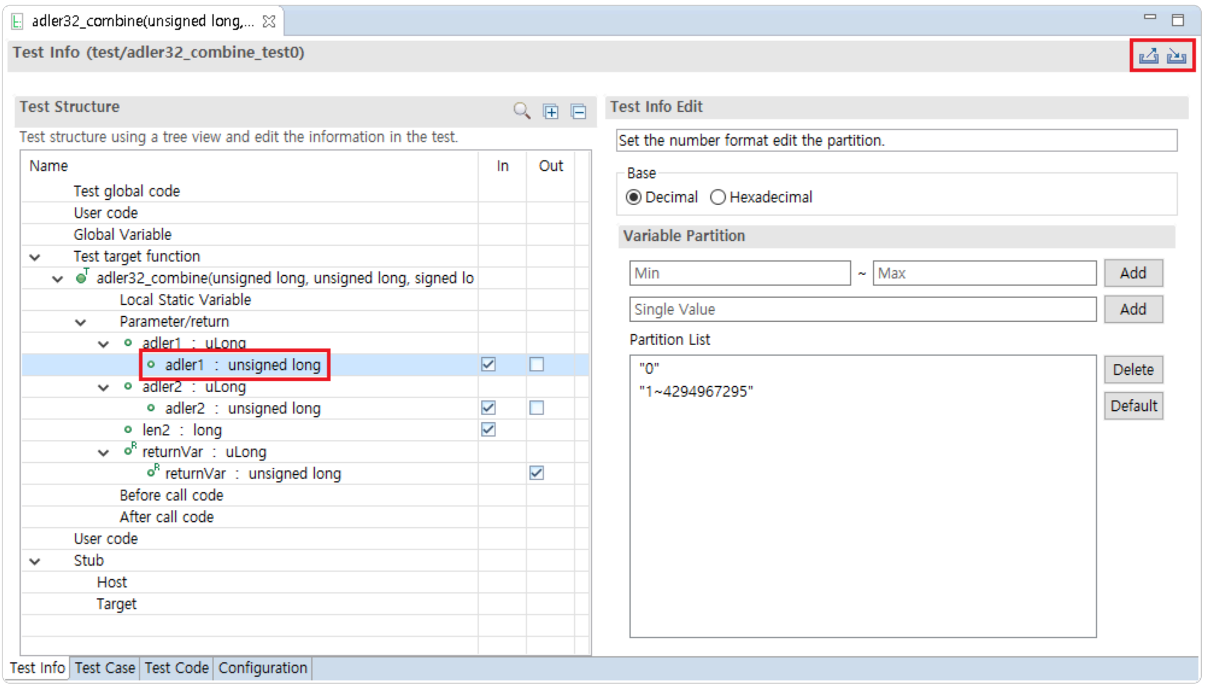
Test target function

Iteration count: 5

```
    for(cs_index=0;cs_index<5;cs_index++){

    /* uLong [5] adler32_combine(unsigned long, unsigned long, signed long) */
    returnVar[cs_index] = adler32_combine(adler1,adler2,len2);

    }


    /*Output*/
    CS_UINT_OUTPUT(returnVar[0], "returnVar[0]");

    /*<END TEST>*/}
    /*<CS_DISCONNECT_CODE_START>*/
    /*Do not remove disConnect_stub_configuration()*/
    disConnect_adler32_combine_test0_stub_configuration();
    /*<CS_DISCONNECT_CODE_END>*/
}

#endif
```

Export/Import variable partition

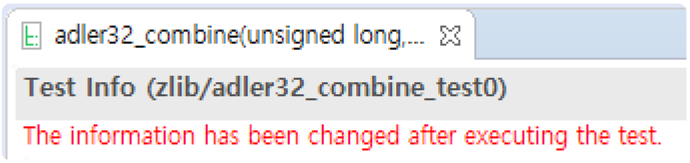
You can export/import variable partition information by selecting a variable on the Test Information tab.



Menu	Description
Export Variable Partition	Export the partition information of the selected variable.
Import Variable Partition	Import the partition information of the selected variable.

Change detection

If you edit and save the information of a test that has already been executed, “The information has been changed after executing the test.” is displayed at the top of the test editor.

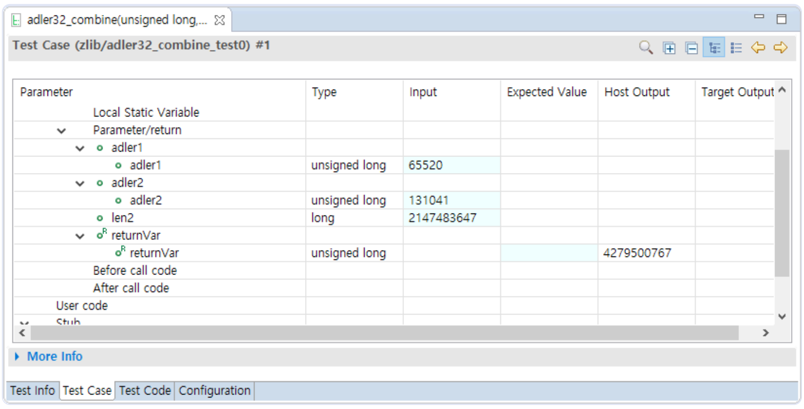

adler32_combine(unsigned long,...

Test Info (zlib/adler32_combine_test0)

The information has been changed after executing the test.

10.2. Test Case

Test Case Tab provide the ability to edit inputs for a function under test and the expected value for the execution result.

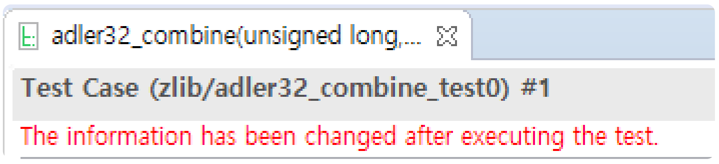

adler32_combine(unsigned long,...
Test Case (zlib/adler32_combine_test0) #1
More Info
Test Info
Test Case
Test Code
Configuration

Parameter	Type	Input	Expected Value	Host Output	Target Output
Local Static Variable					
Parameter/return					
adler1					
adler1	unsigned long	65520			
adler2					
adler2	unsigned long	131041			
len2	long	2147483647			
returnVar					
returnVar	unsigned long			4279500767	
Before call code					
After call code					
User code					
Stub					

- In the Test Structure tree, you can enter input values for the variables specified as input.
  - **If there is no input value, the value of the variable is ‘undefined value’, and the tool initializes the variable with no value entered as 0 (Blank if a string) for the convenience of the user.**
- You can switch the representation of the Test Structure as a table or tree with the [Show as Tree], [Show as Table] toolbar menu.
- With the [Apply the test case in a lump] context menu, you can apply the input and expected values of the test case to other test cases in the same test at once.
- If you select the ‘Out’ of a variable in the Test Structure tree, You can check the value of the variable after the test is performed.
- Editable cells are displayed in a pale sky color.
- If the expected value is different from the host/target output, it is displayed in blue.
- If the host and target output values are different, it is displayed in yellow.
- You can use ~ (range) and logical operators! (Not), & (and), and | (or) in expected values.
- The following shortcuts are available.
  - Undo : `Ctrl` + `Z`
  - Move row: arrow keys (↑, ↓)
  - Editable cell focus: `Enter`
  - Editable cell focus out: `Esc`
  - Move column (editable cell): `Tab`(right), `Shift` + `Tab`(left)
  - Move test cases: `Ctrl` + ← / →

Change detection

If you edit and save the information of a test case that has already been executed, “The information has been changed after executing the test.” is displayed at the top of the test editor.

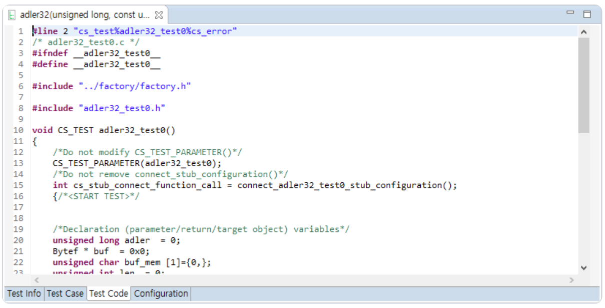


Test Case (zlib/adler32_combine_test0) #1

The information has been changed after executing the test.

10.3. Test Code

You can check the test code by clicking the Test Code tab in the test editor.

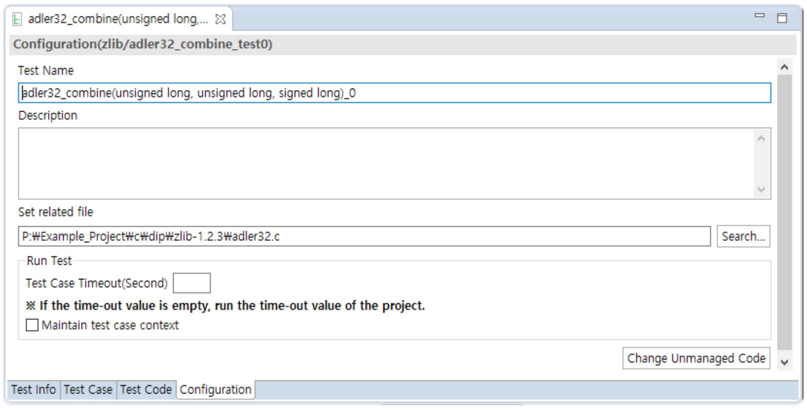


```
#line 2 "cs_test%adler32_test0%cs_error"
/* adler32_test0.c */
#ifndef __adler32_test0__
#define __adler32_test0__

#include "../factory/factory.h"

#include "adler32_test0.h"

void CS_TEST adler32_test0()
{
    /*Do not modify CS_TEST_PARAMETER()*/
    CS_TEST_PARAMETER(adler32_test0);
    /*Do not remove connect_stub_configuration()*/
    int cs_stub_connect_function_call = connect_adler32_test0_stub_configuration();
    {/*<START TEST>*/


    /*Declaration (parameter/return/target object) variables*/
    unsigned long adler  = 0;
    Bytef * buf  = 0x0;
    unsigned char buf_mem [1]={0,};
    unsigned int len  = 0;
```

- If the user edits and saves the test structure tree, the changes are automatically reflected in the test code.
- If the return type of the function under test is a primitive type, a macro that outputs the return value is automatically generated.
- If you want to modify the test code yourself, you must switch the test to unmanaged code.
- The test execution function must have a return type and an input parameter of a void type.

10.4. Configuration

On the configuration tab, you can make various settings for unit testing.


adler32_combine(unsigned long,...

Configuration(zlib/adler32_combine_test0)

Test Name

adler32_combine(unsigned long, unsigned long, signed long)_0

Description

Set related file

P:₩Example_Project₩c₩dip₩zlib-1.2.3₩adler32.c

Search...

Run Test

Test Case Timeout(Second)

※ If the time-out value is empty, run the time-out value of the project.

☐ Maintain test case context

Change Unmanaged Code

Test Info | Test Case | Test Code | Configuration

- If you modify and save the test name, the test name that appears in the unit test view changes.
- You can enter a description for the test.
- With the related file settings, you can select the file to which the function under test belongs.
- You can set the timeout for the test.
- You can choose whether to keep the context for the test.
- If you want to write test code yourself, you need to do [Change Unmanaged Code].

10.5. Test Macro

Controller Tester provides several macros to help users write test code more easily. You can check and write the macro provided using the shortcut(`Ctrl` + `Spacebar`) in the Test Editor.

ASSERT macro

Examine the conditional expression and print the success/failure in the Test Case Tab.

Macro	Parameter	Example
CS_ASSERT(_b)	_b: conditional expression	`CS_ASSERT(val!=1);`
CS_ASSERT_MSG(_B, _msg)	_B: conditional expression _mgs: message to print when the conditional expression is false	`CS_ASSERT_MSG(val==1, "val is not 1!");`

Output macro

Print the values of specific variables in the Test Case Tab.

Macro	Parameter	Example

CS_INT_OUTPUT(_v, _s)
CS_UINT_OUTPUT(_v, _s)
CS_FLT_OUTPUT(_v, _s)
CS_STR_OUTPUT(_v, _s)
	v: a variable to print the value
	_s: a name to show in the Test Case Tab
		`CS_INT_OUTPUT(int_var, "int_var_name");`
		`CS_UINT_OUTPUT(unsigned_int_var, "unsigned_int_var_name");`
		`CS_FLT_OUTPUT(float_var, "float_var_name");`
		`CS_STR_OUTPUT(string_var, "string_var_name");`

Input macro

Pass test data to the function under test.

Macro	Parameter	Example

CS_INT_INPUT(_t, _s)
CS_UINT_INPUT(_t, _s)
CS_FLT_INPUT(_t, _s)
CS_STR_INPUT(_t, _s)
	_t: a type of the variable
	_s: a name to show in the Test Case Tab
		`CS_INT_INPUT(int, "int_var_name");`
		`CS_UINT_INPUT(unsigned int, "unsigned_int_var_name");`
		`CS_FLT_INPUT(float, "float_var_name");`
		`CS_STR_INPUT(char*, "string_var_name");`

Address-related macros

If there is a part that directly assigns or fetches the value in the embedded address in the converted source code, it may not operate normally when executed on the local computer. In this case, you can use an address-related macro for the virtual address.

Macro	Description
CS_VIRTUAL_ADDR(_b,_e)	Creates the space from the address (_b) to the address (_e)

CS_ADDR_ASSIGN(_t,_a,_v)
CS_ADDR_SET(_t,_a,_v)
	Assigns the value (_v) of type (_t) to the address (_a)

CS_ADDR_GET(_t,_a)	Fetches the value of type (_t) from the address (_a)
CS_VIRTUAL_ADDR_CLEAR()	Frees the memory space created

Address-related macro example

```
// Create a virtual memory area of size 100 from 0xFFE40000U.
CS_VIRTUAL_ADDR(0xFFE40000U, 0xFFE40000U+100);

// Assign value 10 of int type to 0xFFE40000U
CS_ADDR_ASSIGN(int ,0xFFE40000U, 10);
CS_ADDR_SET(int ,0xFFE40000U, 10);

// Return the value from 0xFFE40000U to the variable a.
int a = CS_ADDR_GET(int ,0xFFE40000U);

// Return an address of 0xFFE40000U into variable ptr of pointer type.
int* ptr = CS_ADDR_PTR(0xFFE40000U);

// Frees the memory space created.
CS_VIRTUAL_ADDR_CLEAR();
```

For more information about address-related macros, see the Virtual Address Usage Guide page in the User Guides.

Other macros

Macro	Parameter	Description	Example
CS_LOG(_msg)	_msg: log message	Outputs user log	`CS_LOG("User Log");`
CS_TESTCASENO()		Returns the number of the test currently running	`int testCaseNum = CS_TESTCASENO();`

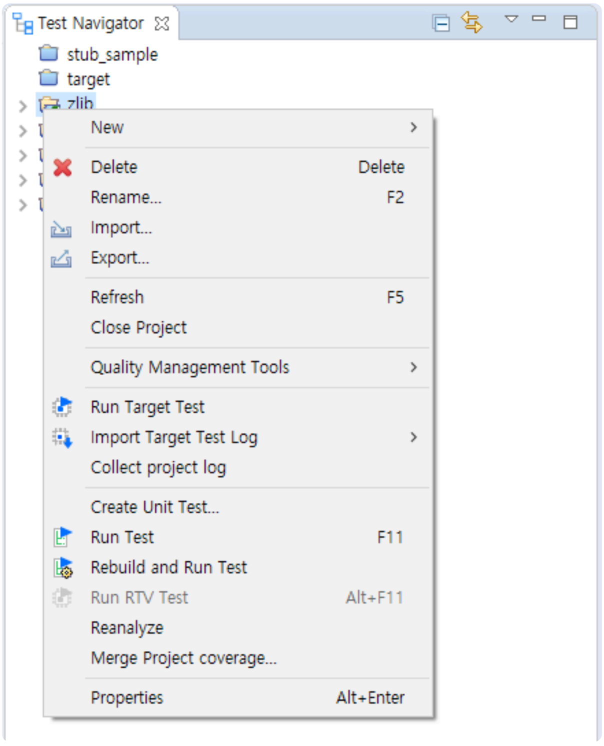
11. Test Run

Testing can be performed in a variety of ways.

Run all tests

Run the selected tests in the [Unit Test] view and [Integration Test] view.

1. Select the project to run the test, right-click ans slect [Run test]

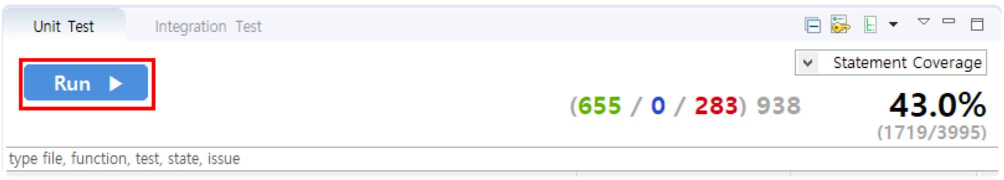


2. A progress monitor of the test opens. When the test is completed, you can check the results through each test view.

Run unit tests

Run the selected unit tests in the [Unit Test] view.

1. Click the [Run] button on the dashboard in the [Unit Test] view.



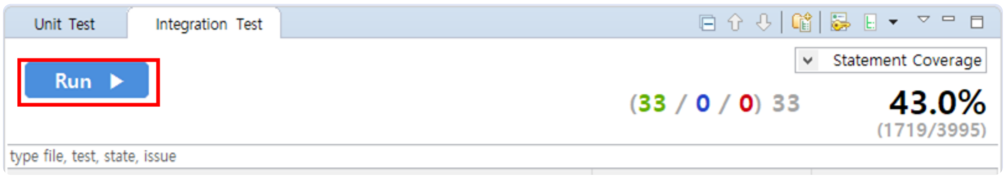
2. A progress monitor of the test opens. When the test is completed, you can check the results through each test view.

To perform only a specific test case, select the test case you want to run and right-click the mouse and click the [Run Test Case] menu.

Run integration tests

Run the selected tests in the [Integration Test] view.

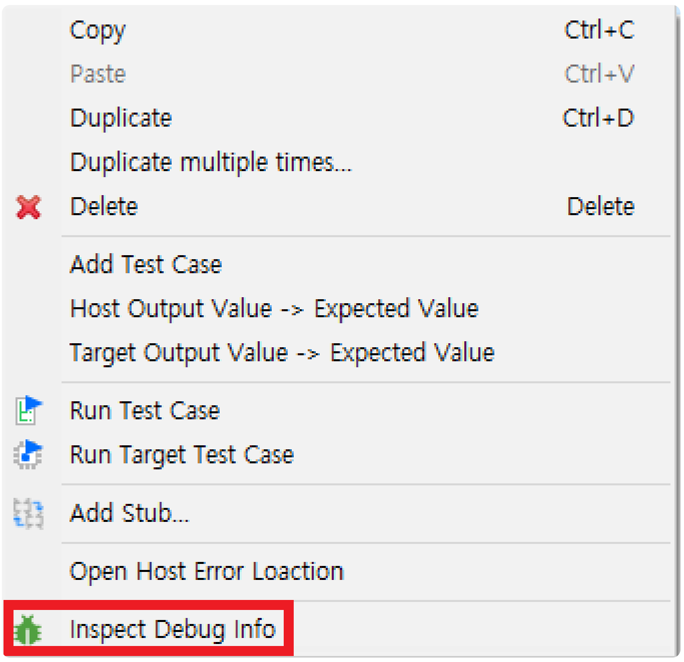
1. Click the [Run] button on the dashboard in the [Integration Test] view.



2. A progress monitor of the test opens. When the test is completed, you can check the results through each test view.

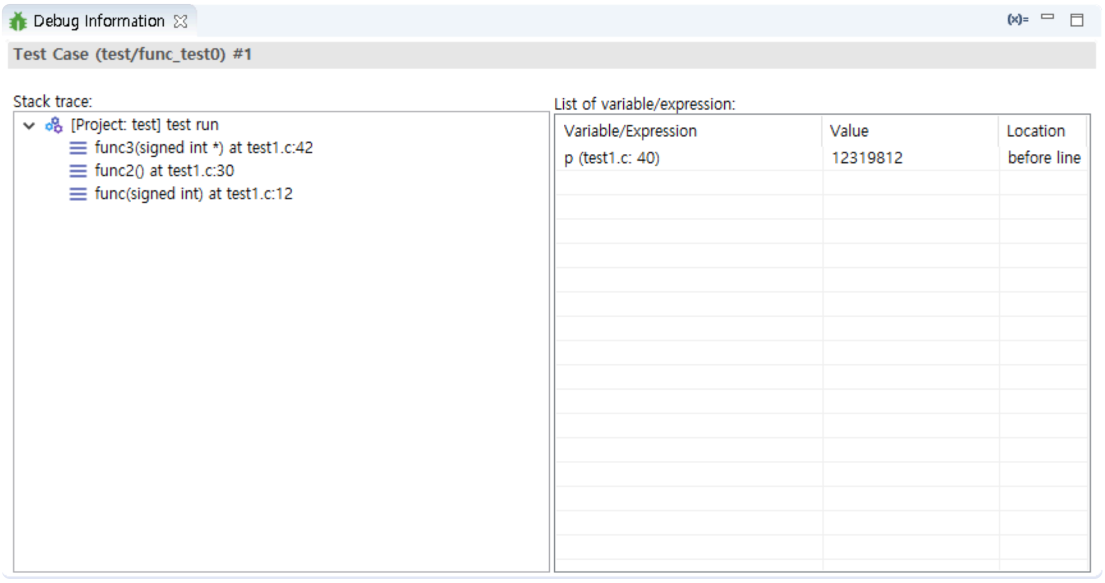
12. Inspect Debug Information

If an error occurs while running the test case, you can use the [Inspect Debug Info] function to determine the cause of the error.
[Inspect Debug Info] function can be checked in the unit test view with the context menu of the test case.



Test cases that have not been executed are automatically executed before [Check Debug Information] is performed.

When [Inspect Debug Info] is performed, debug information is displayed in the [Inspect Debug Info].



Test Case (test/func_test0) #1

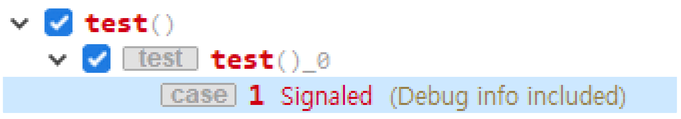
Stack trace:

```
[Project: test] test run
    func3(signed int *) at test1.c:42
    func2() at test1.c:30
    func(signed int) at test1.c:12
```

List of variable/expression:

Variable/Expression	Value	Location
p (test1.c: 40)	12319812	before line

The test case (Debug info included) is displayed in the test case where the [Inspect Debug Info] was performed.


test()
test test()_0
case 1 Signaled (Debug info included)

13. Properties

Controller Tester provides a page that enables to set the properties of the project, module, and source files.

The property page types are:

- Project Properties
- Module Properties
- Source File Properties

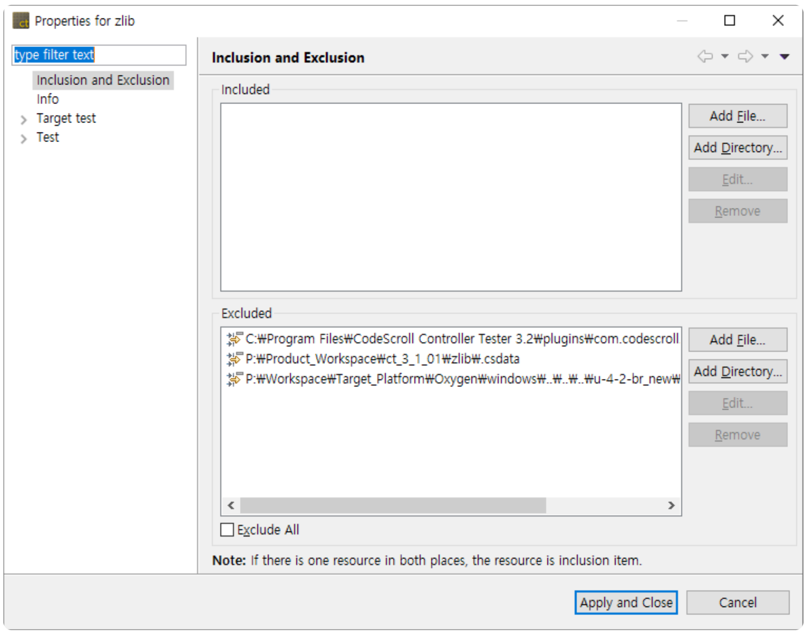
13.1. Project Properties

You can edit the properties of the created project.
Select [Project]-> [Properties] from the menu or right-click the project in the Test Navigator view and click the [Properties] menu.

Inclusion and Exclusion Info

You can set what to exclude or include when analyzing the project.

> ✻ To analyze only selected directories or files, add the targets to be analyzed to [Included] and check [Exclude All].



C:₩Program Files₩CodeScroll Controller Tester 3.2₩plugins₩com.codescroll
P:₩Product_Workspace₩ct_3_1_01₩zlib₩.csdata
P:₩Workspace₩Target_Platform₩Oxygen₩windows₩..₩..₩..₩u-4-2-br_new₩

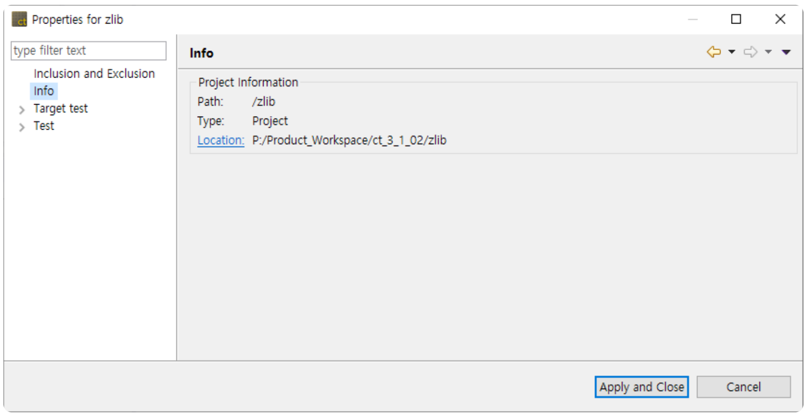
Note: If there is one resource in both places, the resource is inclusion item.

- Add targets to include in the analysis.
  1. Click the [Add File] or [Add Directory] button.
  2. Select files or a directory to analyze.
  3. Click the [Open] or [OK] button.

- Add targets to exclude from the analysis.
  1. Click the [Add File] or [Add Directory] button.
  2. Select files or a directory to exclude from the analysis.
  3. Click the [Open] or [OK] button.

Info

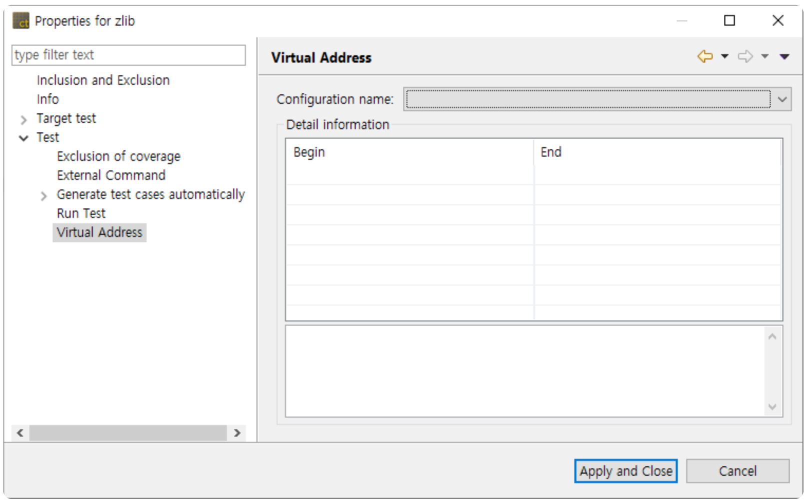
Shows brief information(path, type, location) about the project.



Project Information
Path: /zlib
Type: Project
Location: P:/Product_Workspace/ct_3_1_02/zlib

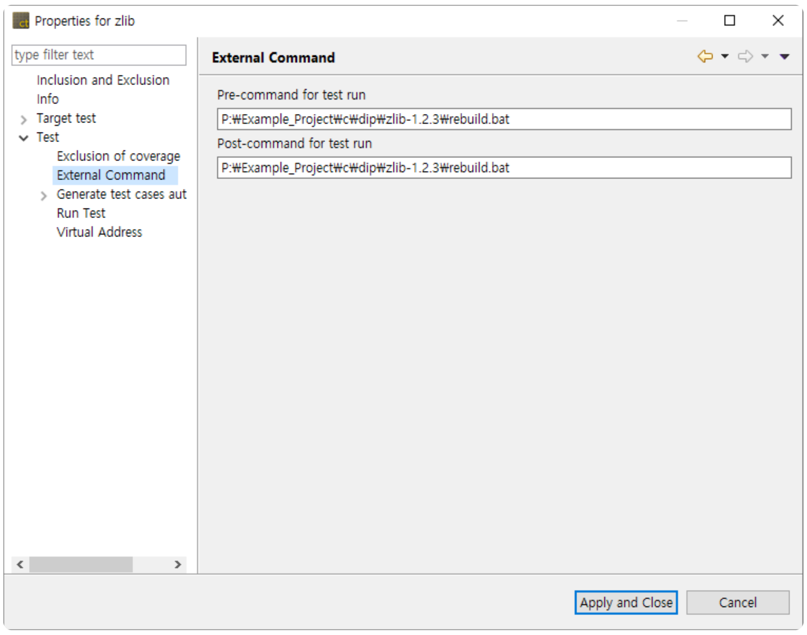
Virtual Address

You can select a memory setting managed by the Virtual Address preference.



External Command

You can enter external commands to run before or after the test run.
In [Pre-command for test run], you can enter a command or batch file to execute an external command before running the test.
In [Post-command for test run], you can enter a command or batch file to execute an external command after running the test.



External Command

Pre-command for test run

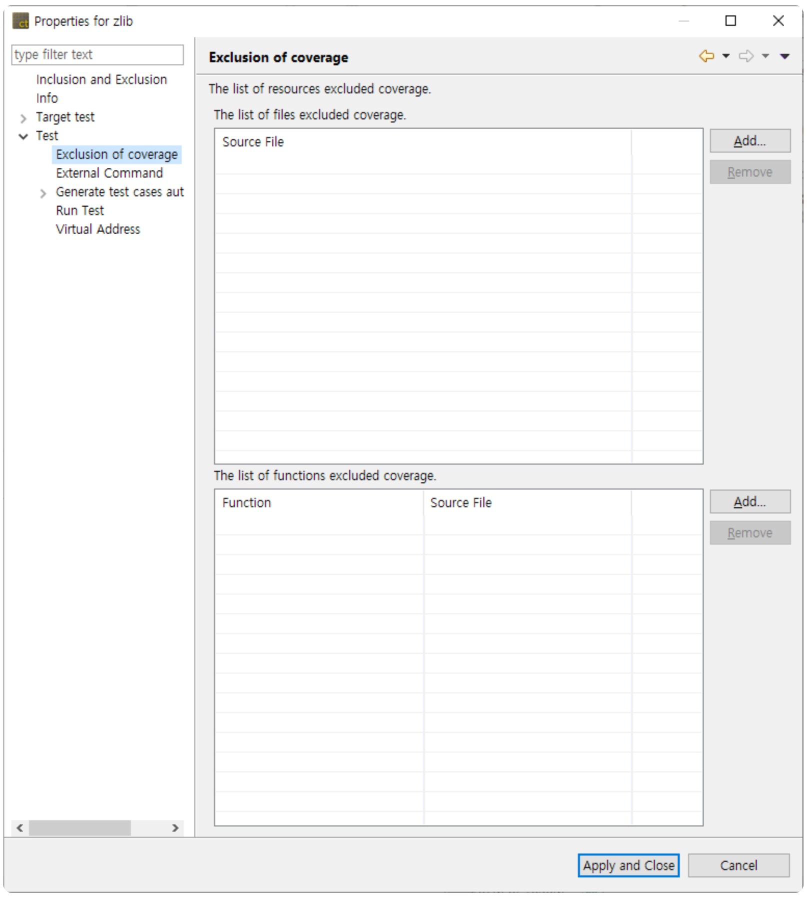
P:₩Example_Project₩c₩dip₩zlib-1.2.3₩rebuild.bat

Post-command for test run

P:₩Example_Project₩c₩dip₩zlib-1.2.3₩rebuild.bat

Exclusion of coverage

You can set coverage exclusions on a per-file or per-function basis.
You can see that the coverage of the excluded function is excluded from the coverage results obtained by running the test.



Exclusion of coverage

The list of resources excluded coverage.

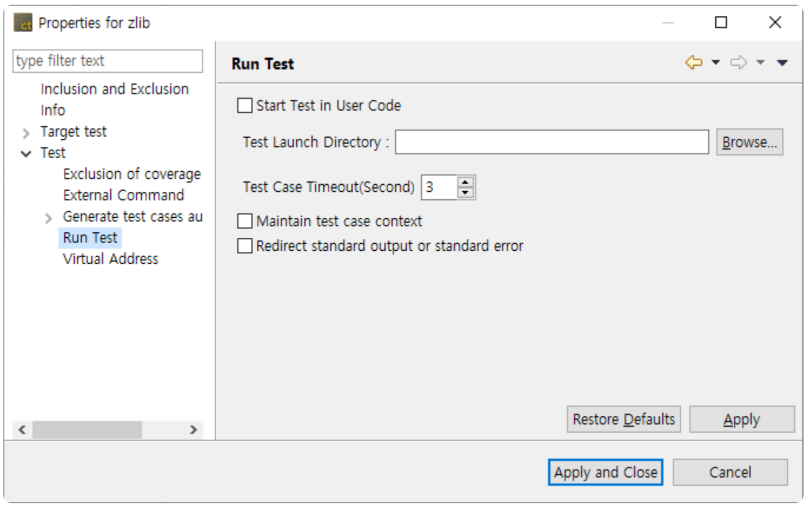
The list of files excluded coverage.

The list of functions excluded coverage.

Run Test

Set the generated tests to run in a user-specified directory, not in a workspace. In this case, you do not need to copy the library or header files used by the target under test to the workspace or change the link settings.

Click the [Start Test in User Code] checkbox.
Select the home directory to run the test and click the [Apply] button.



☐ Start Test in User Code
Test Launch Directory :
Test Case Timeout(Second) 3
☐ Maintain test case context
☐ Redirect standard output or standard error

[Test Case Timeout] Set the time to be used as the timeout judgment when executing the test case. If the test execution time exceeds the test case timeout time, the test for that test case ends and the result is reported as a timeout.

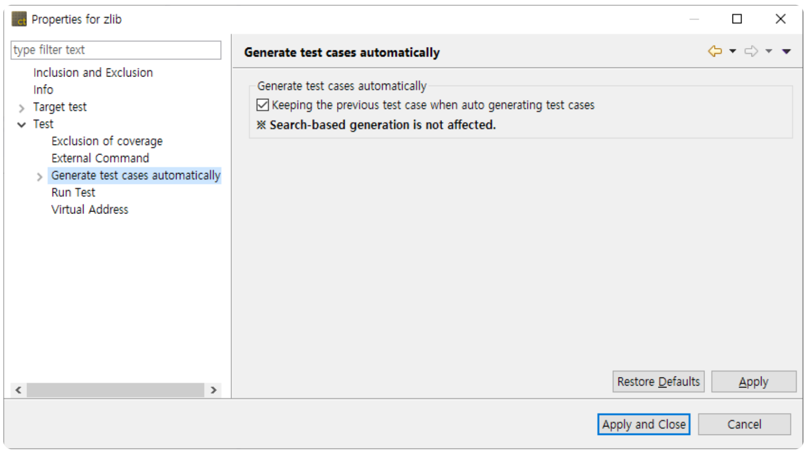
[Maintain test case context] is a feature that performs all test cases with one launcher. The previous test execution result (static, global variable) is maintained during the test, and each test case result value does not appear independently. This makes the relationship between the test case result values clear.

[Redirect standard output or standard error] is a feature to record standard output and standard error in the log file for each test case.

Generate test cases automatically

You can set to keep previous test cases when automatically generating test cases.

! The search-based generation is not affected.

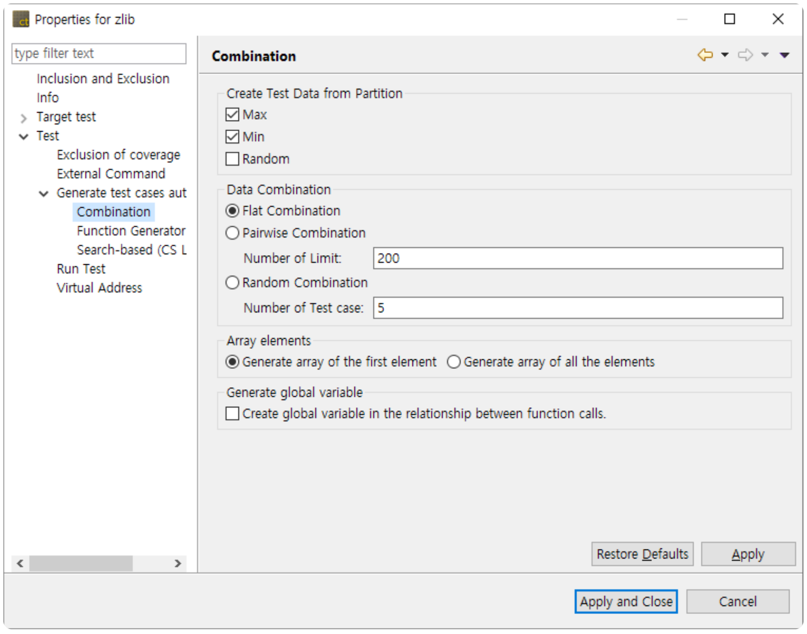


Generate test cases automatically

Generate test cases automatically
☑ Keeping the previous test case when auto generating test cases
※ Search-based generation is not affected.

Combination

You can set up how to extract test data if the variable partition is range.



Combination

Create Test Data from Partition
☑ Max
☑ Min
☐ Random

Data Combination
● Flat Combination
○ Pairwise Combination
Number of Limit: 200
○ Random Combination
Number of Test case: 5

Array elements
● Generate array of the first element ○ Generate array of all the elements

Generate global variable
☐ Create global variable in the relationship between function calls.

Select the desired test data extraction method by checking the checkbox. The meaning of each value is as follows.

Method	Description
Max value	Selects the maximum value of the partition section.
Min value	Selects the minimum value of the partition section.
Random value	Selects a random value among partition sections.

You can select multiple test methods of data extraction.
When all are unchecked, the default is automatically set to the maximum and minimum values.
[Data combination] supports Flat, Pairwise and Random. The meaning of the combination is shown in the following table.

Combination	Description
Flat	Combines simply based on variables having the largest number of test data.
Pairwise	Combines so that each selected parameter data is paired at least once with the parameter data other than itself. Pairwise is performed as many as the maximum number(default 200) of symbols used for the combination, and when the number of symbols is exceeded, Flat is performed.
Random	Combines the test data as many as the number of test cases that the user defines any value between the minimum value and the maximum value for the variable partition of input parameters(default 5).

[Array elements] is a feature to select how to generate test data for each array element.

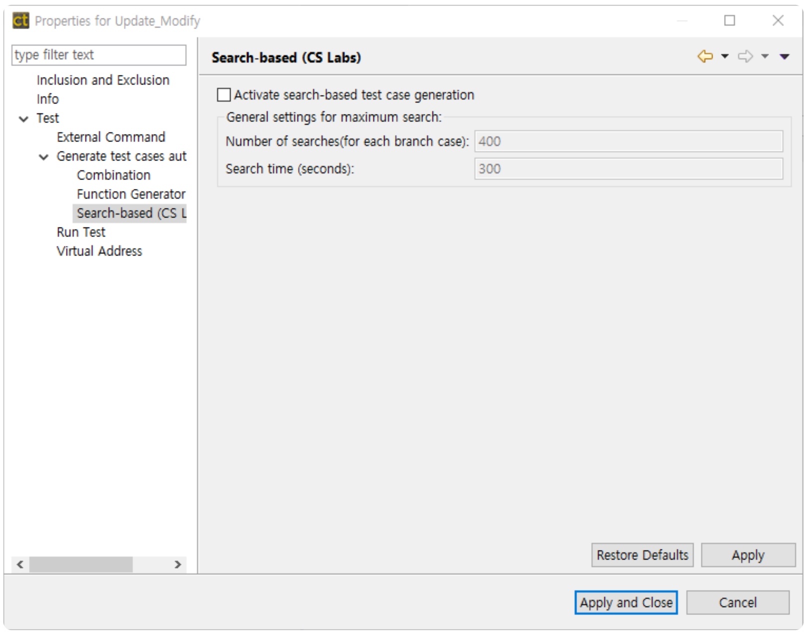
Method	Description
Generate an array of the first element	Creates only the first element regardless of the array size.
Generate an array of all the elements	Creates elements as much as the array size.

When creating a test, global variable creation is an option to create all global variables used by all functions called from the function under test.

Search-based (CS Labs)

CS Labs allows you to preview new features that will be released in CodeScroll tools later. Based on feedback for the new features, CS Labs features may or may not be applied as formal features.

You can set the maximum search when automatically generating test cases based on search.
You can turn this feature on or off with [activating search-based test case generation] option. Reanalysis is required after turning the feature on.



Activate search-based test case generation

General settings for maximum search:

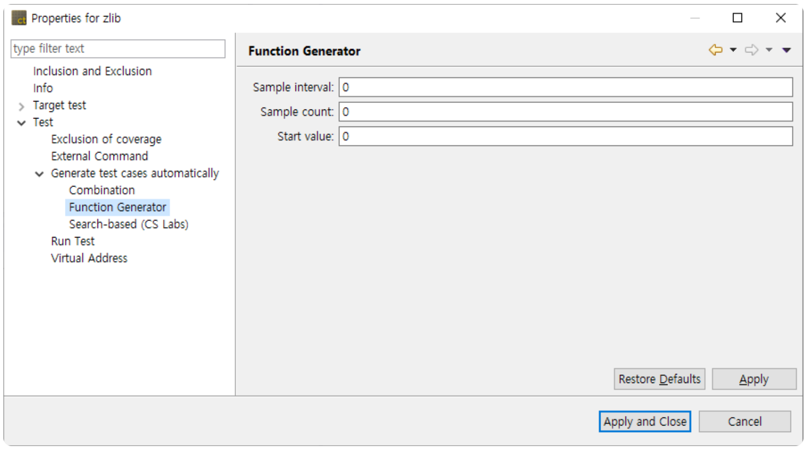
Number of searches(for each branch case): 400

Search time (seconds): 300

Option	Description
Number of searches(for each branch)	Searches for the number of times entered for each branch combination.
Search time(seconds)	Searches for the time entered.

Function Generator

When using the function generator to automatically generate test cases, specify common setting values that each function has in common.



Sample interval: 0

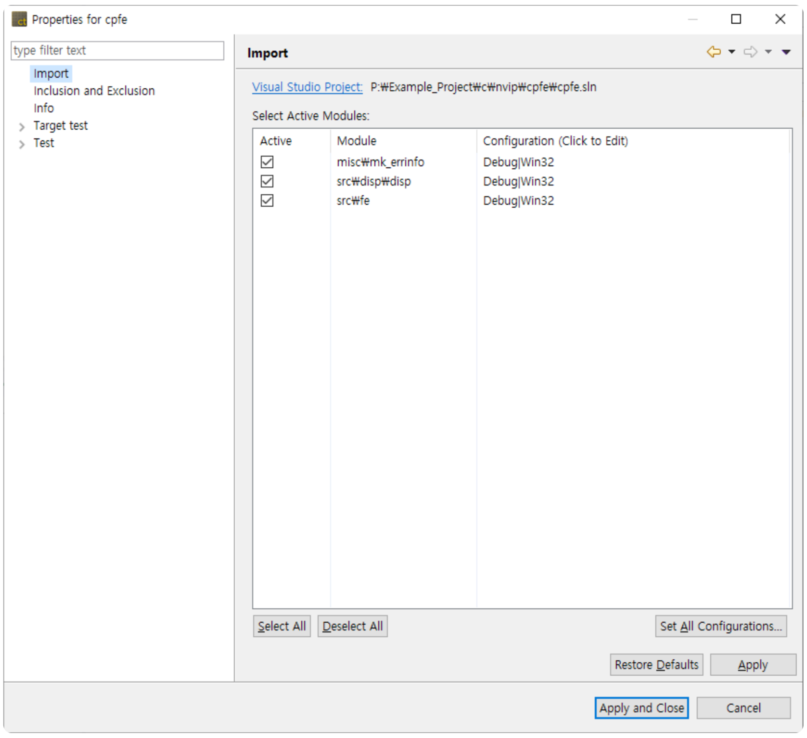
Sample count: 0

Start value: 0

Option	Description
Sample interval	Interval of samples when sampling from function
Sample count	Number of samples when sampling from function (Number of test cases)
Start value	Default value at which the function starts, and generates a value based on the value

Import settings

Project created by Visual Studio project


Properties for cpfe

Import

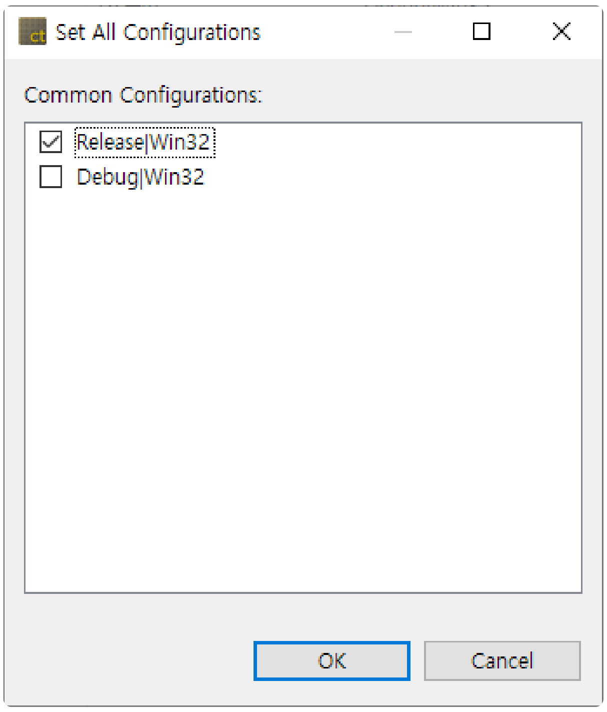
Visual Studio Project: P:₩Example_Project₩c₩nvip₩cpfe₩cpfe.sln

Select Active Modules:

Active	Module	Configuration (Click to Edit)
☑	misc₩mk_errinfo	Debug|Win32
☑	src₩disp₩disp	Debug|Win32
☑	src₩fe	Debug|Win32

You can see the path of the Visual Studio project used for creating the project and the modules active in the selected project.
You can change whether each module is active or not and the configuration.
You can change the configuration of all modules collectively through the [Set All Configurations] menu.

1. If you click the [Set All Configurations] button, a dialog box where you can select one of the configurations common to all modules opens.


Set All Configurations

Common Configurations:

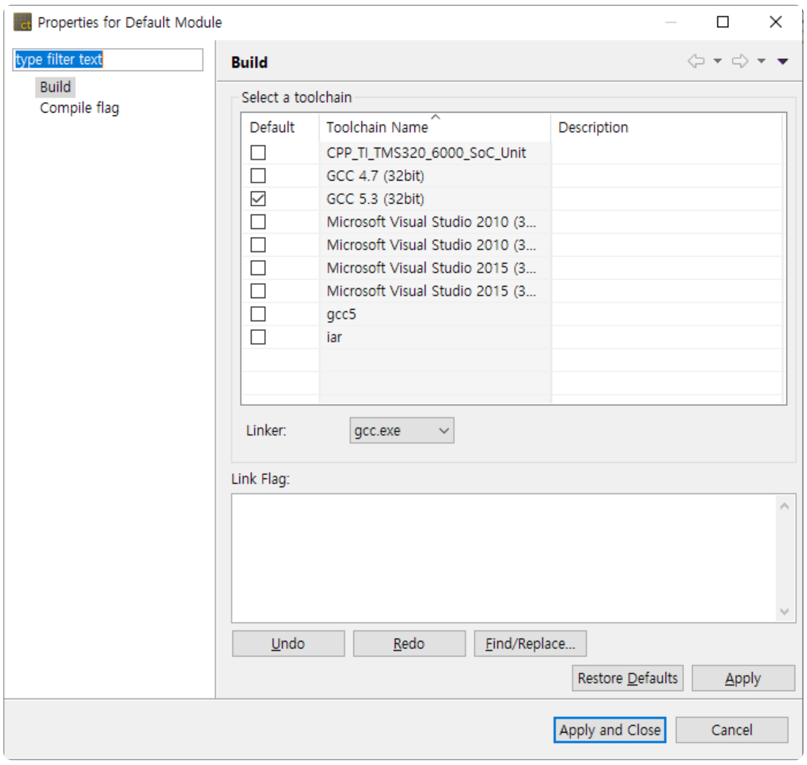
☑ Release|Win32
☐ Debug|Win32

2. Select the configuration to be applied to all modules in common and click the [OK] button.

13.2. Module Properties

Build

You can set toolchain related information (toolchain, linker) and link flags for the module. Changing the toolchain also changes the toolchain set in all source files under the module.



Select a toolchain

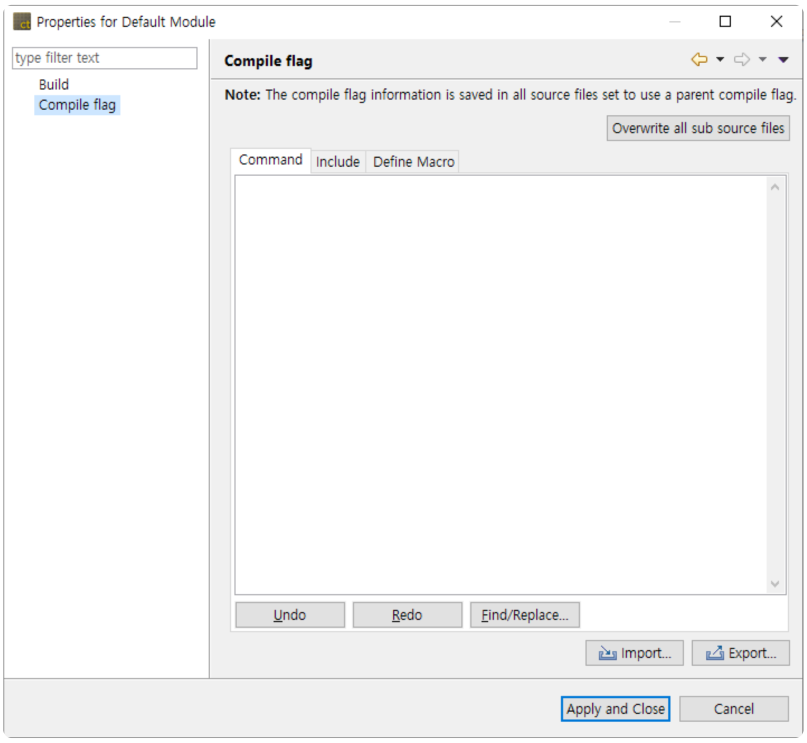
Default	Toolchain Name	Description
☐	CPP_TI_TMS320_6000_SoC_Unit	
☐	GCC 4.7 (32bit)	
☑	GCC 5.3 (32bit)	
☐	Microsoft Visual Studio 2010 (3...	
☐	Microsoft Visual Studio 2010 (3...	
☐	Microsoft Visual Studio 2015 (3...	
☐	Microsoft Visual Studio 2015 (3...	
☐	gcc5	
☐	iar	

Linker: gcc.exe

Link Flag:

Compile flag

You can set compile flag information for that module.

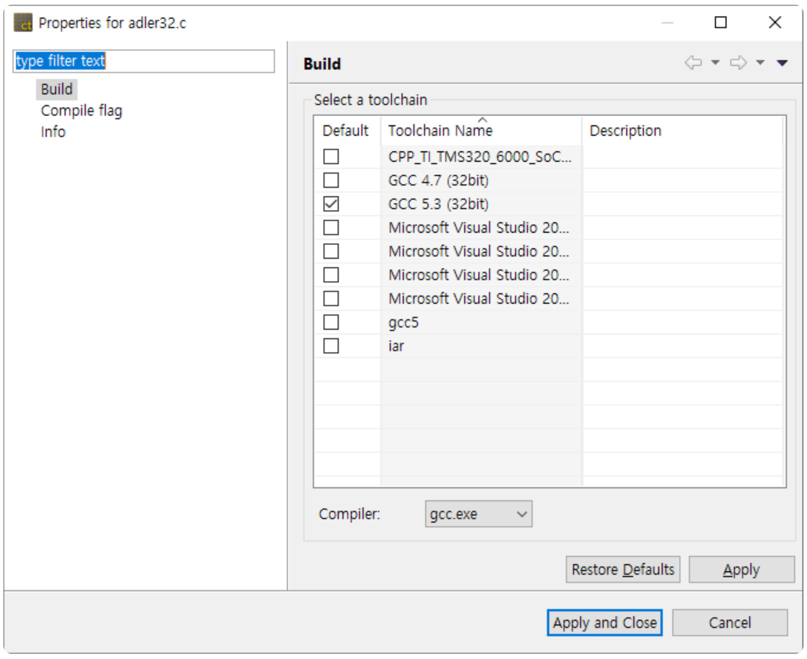

Properties for Default Module
type filter text
Build
Compile flag
Compile flag
Note: The compile flag information is saved in all source files set to use a parent compile flag.
Overwrite all sub source files
Command
Include
Define Macro
Undo
Redo
Find/Replace...
Import...
Export...
Apply and Close
Cancel

- Enter compile flags in [Command] tab. [Include] tab and [Define Macro] tab help to enter compile flags easily.
- [Overwrite all sub source files] overwrites the compile flag entered to all source files under the module.
- [Import] imports an external compile flag. [Export] saves the current compile flag externally.
    - Import
        1. Click the [Import] button.
        2. Select the file (.cf file) which has compile flags from the file open dialog.
    - Export
        1. Click the [Export] button.
        2. In the save dialog, enter the name and location of the file to enter the compile flag and save.

13.3. Source File Properties

Build

You can set toolchain related information (toolchain, compiler) for the source file.

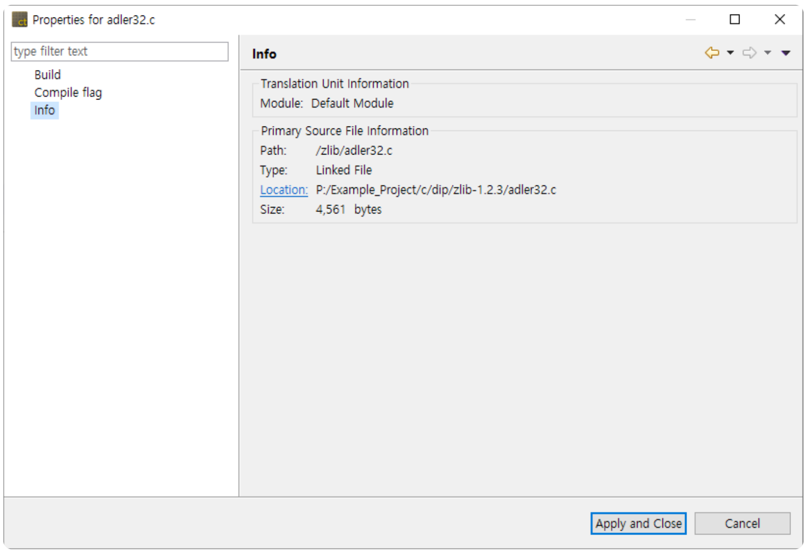


Default	Toolchain Name	Description
☐	CPP_TI_TMS320_6000_SoC...	
☐	GCC 4.7 (32bit)	
✓	GCC 5.3 (32bit)	
☐	Microsoft Visual Studio 20...	
☐	Microsoft Visual Studio 20...	
☐	Microsoft Visual Studio 20...	
☐	Microsoft Visual Studio 20...	
☐	gcc5	
☐	iar	

Compiler: gcc.exe

Info

Shows the information of the source file and the module containing the source file.

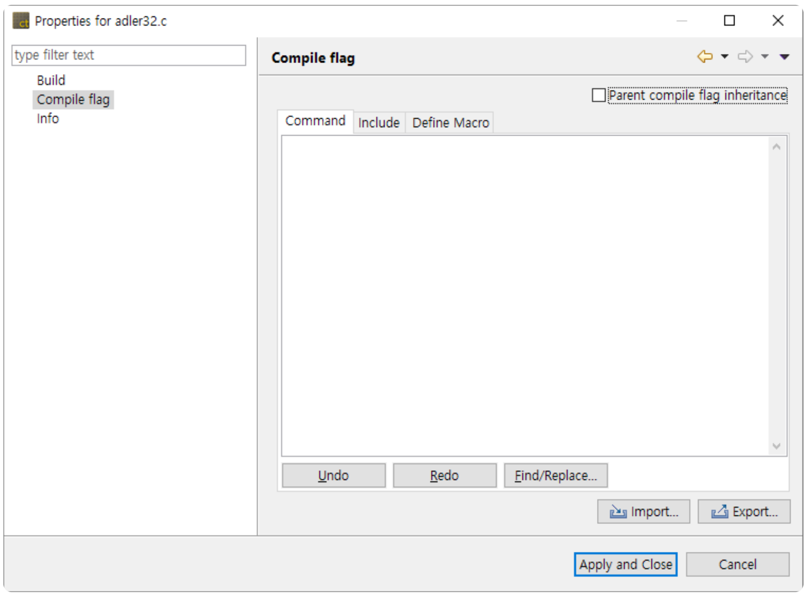


Translation Unit Information
Module: Default Module

Primary Source File Information
Path: /zlib/adler32.c
Type: Linked File
Location: P:/Example_Project/c/dip/zlib-1.2.3/adler32.c
Size: 4,561 bytes

Compile flag

You can set compile flags for source files.



- If you check the [Parent compile flag inheritance] checkbox, the compile flag of the module containing the source file is applied. Conversely, you can change the current compile flag information by unchecking the checkbox.
- [Import] imports an external compile flag. [Export] saves the current compile flag externally.
  - Import
    1. Click the [Import] button.
    2. Select the file (.cf file) which has compile flags from the file open dialog.
  - Export
    1. Click the [Export] button.
    2. In the save dialog, enter the name and location of the file to enter the compile flag and save.

14. Preferences

In the preference menu, you can check or change the current settings of the tool.

The preferences provided by Controller Tester are as follows.

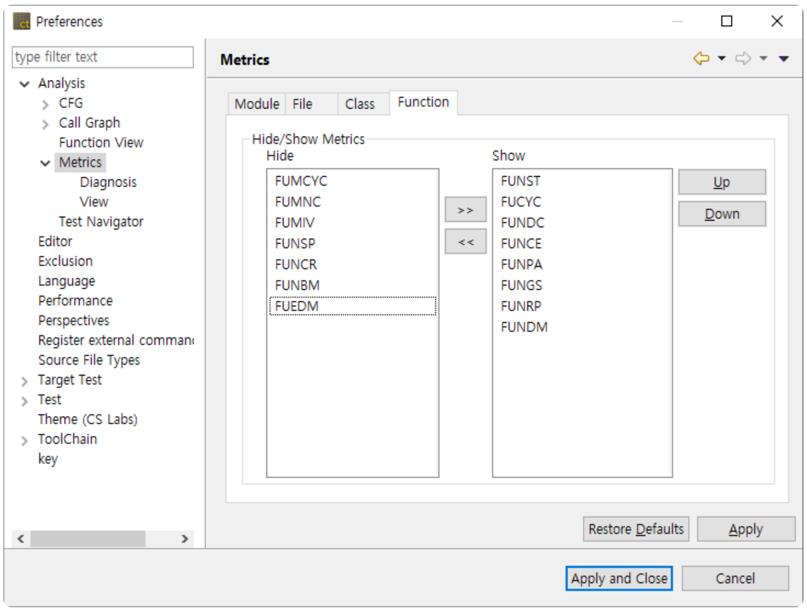
- Analysis
- Exclusion
- Performance
- Source File Types
- Language
- Theme
- Test
- Toochain
- Editor

14.1. Analysis

You can check or change the settings related to the analysis.

Metric

For any view showing metric data, you can set which metrics are visible or hidden and the order in which they are displayed.
The name of the selected metric is displayed as a tooltip message.



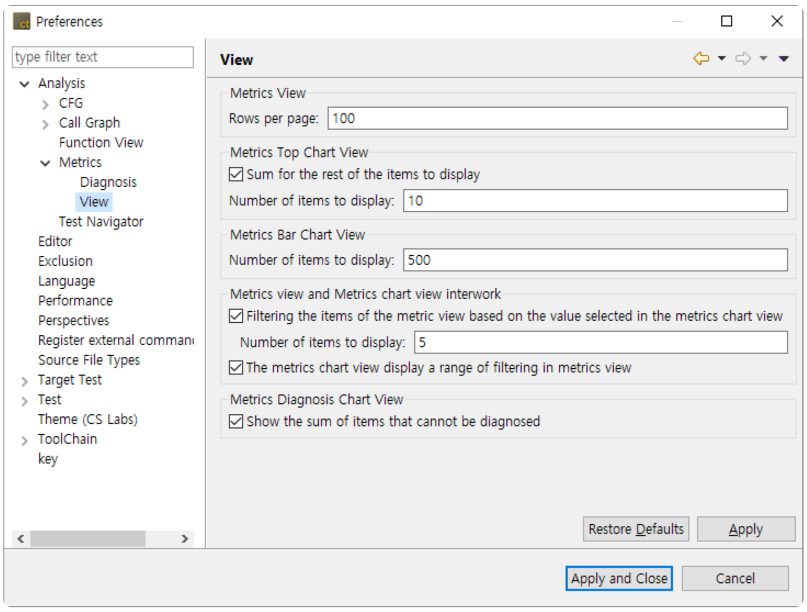
Hide/Show Metrics

Hide	Show
FUMCYC	FUNST
FUMNC	FUCYC
FUMIV	FUNDC
FUNSP	FUNCE
FUNCR	FUNPA
FUNBM	FUNGS
FUEDM	FUNRP
	FUNDM

After selecting a metric, you can move to the ‘Hide’ list or the ‘Show’ list with the [>>] or [<<] button.
After selecting a metric in the ‘Show’ list, you can change the order in which the metrics are displayed with the [Up] or [Down] button.

Metrics View

You can change the settings of the views showing metric data.


Preferences

View

Metrics View
Rows per page: 100

Metrics Top Chart View
☑ Sum for the rest of the items to display
Number of items to display: 10

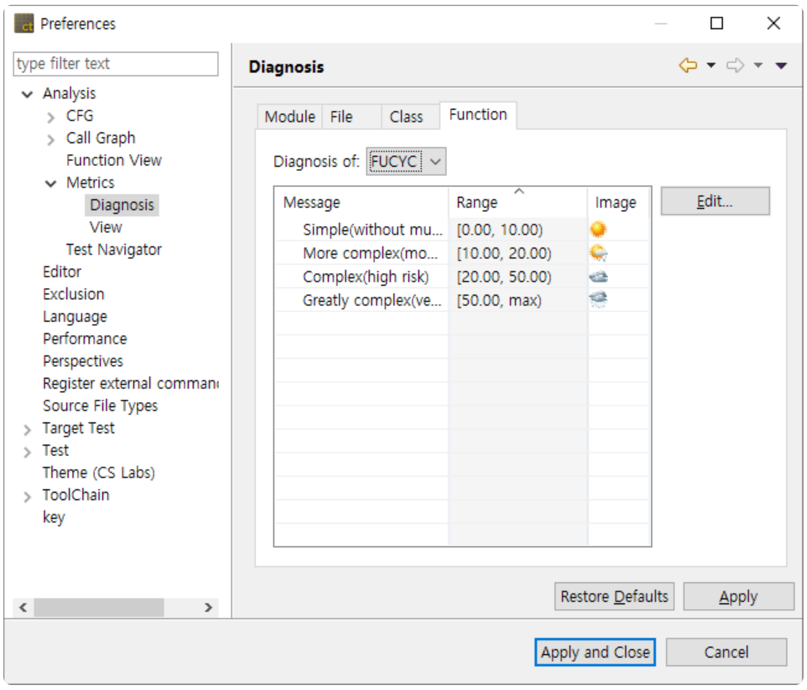
Metrics Bar Chart View
Number of items to display: 500

Metrics view and Metrics chart view interwork
☑ Filtering the items of the metric view based on the value selected in the metrics chart view
Number of items to display: 5
☑ The metrics chart view display a range of filtering in metrics view

Metrics Diagnosis Chart View
☑ Show the sum of items that cannot be diagnosed

Diagnosis

You can check or set diagnostic information for metrics.
Set the message and diagnostic image (shown in the metrics view) to be displayed when the selected metric value is included in each range.


Preferences

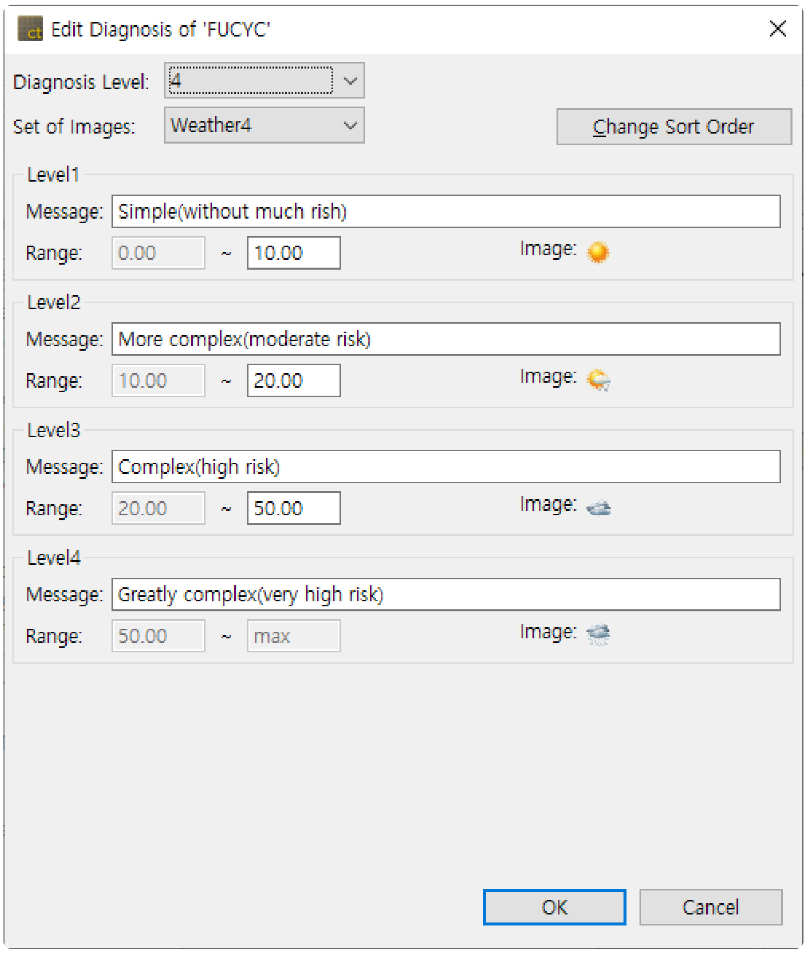
Diagnosis

Module | File | Class | Function

Diagnosis of: FUCYC

Message	Range	Image
Simple(without mu...	[0.00, 10.00)	☀
More complex(mo...	[10.00, 20.00)	⛅
Complex(high risk)	[20.00, 50.00)	☁
Greatly complex(ve...	[50.00, max)	🌧

To edit the diagnostic information, click the [Edit] button.
A dialog box appears where you can edit the diagnostic information for the selected metric.


Edit Diagnosis of 'FUCYC'

Diagnosis Level: 4

Set of Images: Weather4

Change Sort Order

Level1

Message: Simple(without much rish)

Range: 0.00 ~ 10.00 Image:

Level2

Message: More complex(moderate risk)

Range: 10.00 ~ 20.00 Image:

Level3

Message: Complex(high risk)

Range: 20.00 ~ 50.00 Image:

Level4

Message: Greatly complex(very high risk)

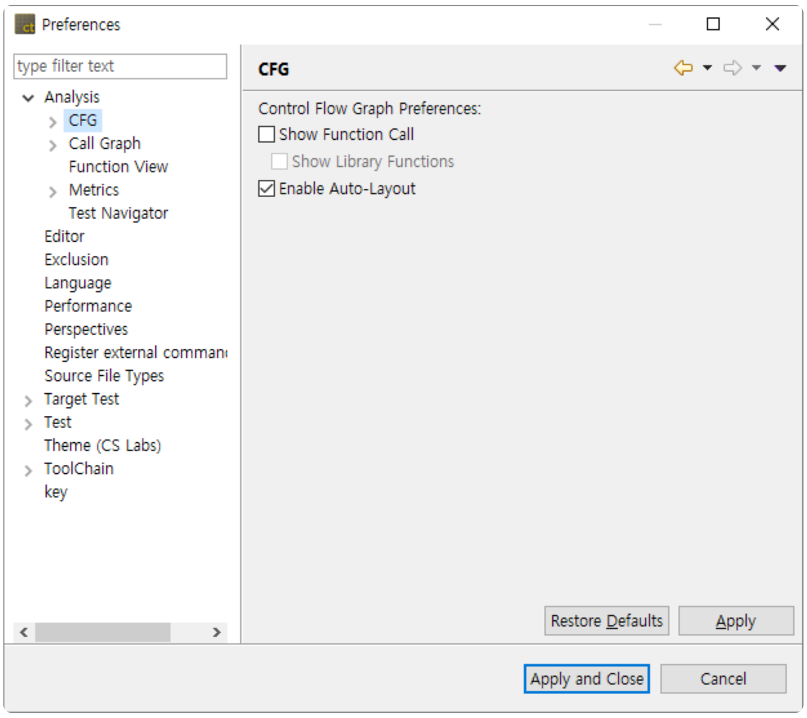
Range: 50.00 ~ max Image:

OK Cancel

1. Set the diagnostic stage (2 ~ 5).
2. Sets the diagnostic image to show in the metrics view.
3. Press the [Change Sort Order] button to change the sort order of diagnostic images.
4. Enter the diagnostic message and diagnostic range for each step.
5. Select the [OK] button.

CFG

You can change the settings for the control flow graph displayed in the control flow graph view.



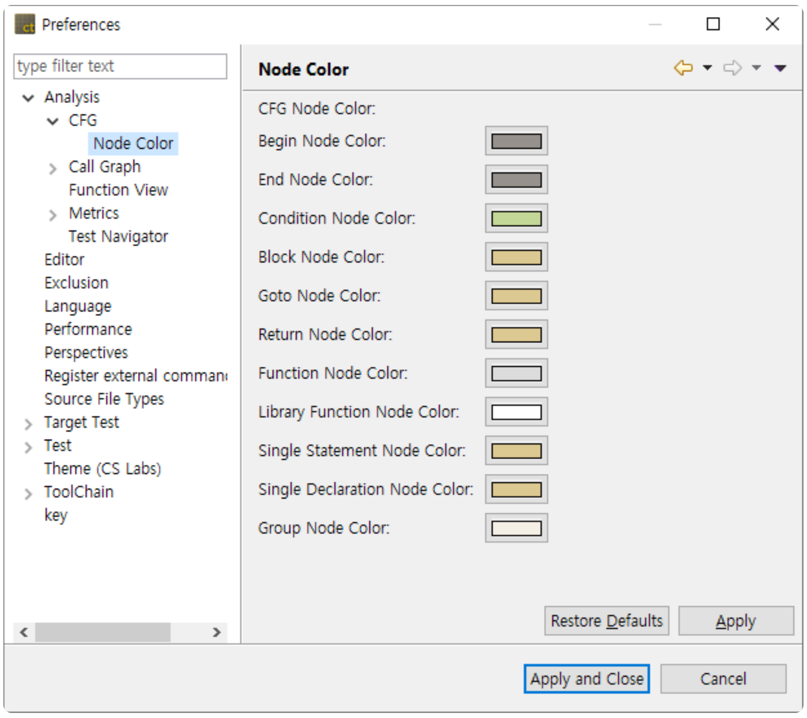
CFG

Control Flow Graph Preferences:

- [ ] Show Function Call
  - [ ] Show Library Functions
- [x] Enable Auto-Layout

Node Color

You can change the color of nodes in the control flow graph.



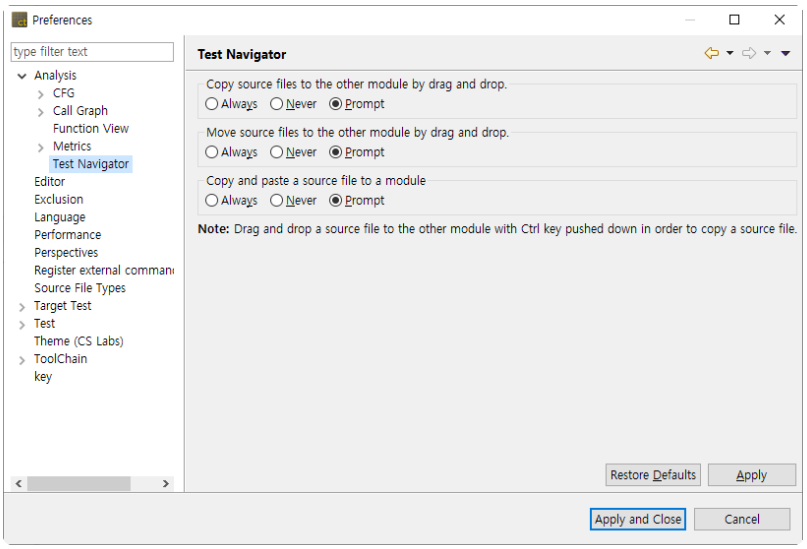
Node Color

CFG Node Color:

Begin Node Color:	⬛
End Node Color:	⬛
Condition Node Color:	🟩
Block Node Color:	🟨
Goto Node Color:	🟨
Return Node Color:	🟨
Function Node Color:	⬜
Library Function Node Color:	⬜
Single Statement Node Color:	🟨
Single Declaration Node Color:	🟨
Group Node Color:	⬜

Test Navigator

For each operation that copies or moves source files in the Test Navigator view, you can set options to ask whether or not to continue.


Test Navigator

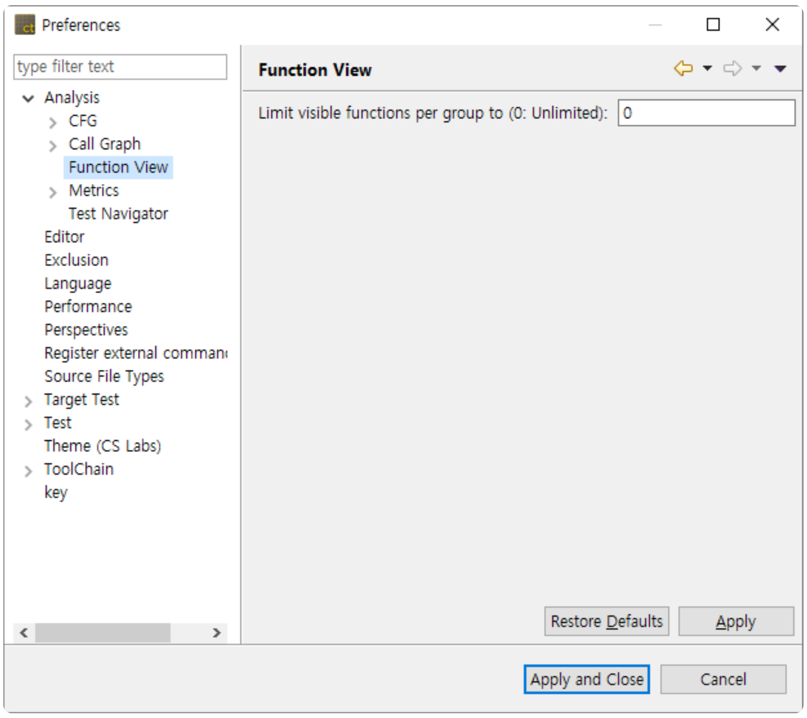
Copy source files to the other module by drag and drop.
Always Never [✓ Prompt]

Move source files to the other module by drag and drop.
Always Never [✓ Prompt]

Copy and paste a source file to a module
Always Never [✓ Prompt]

Note: Drag and drop a source file to the other module with Ctrl key pushed down in order to copy a source file.

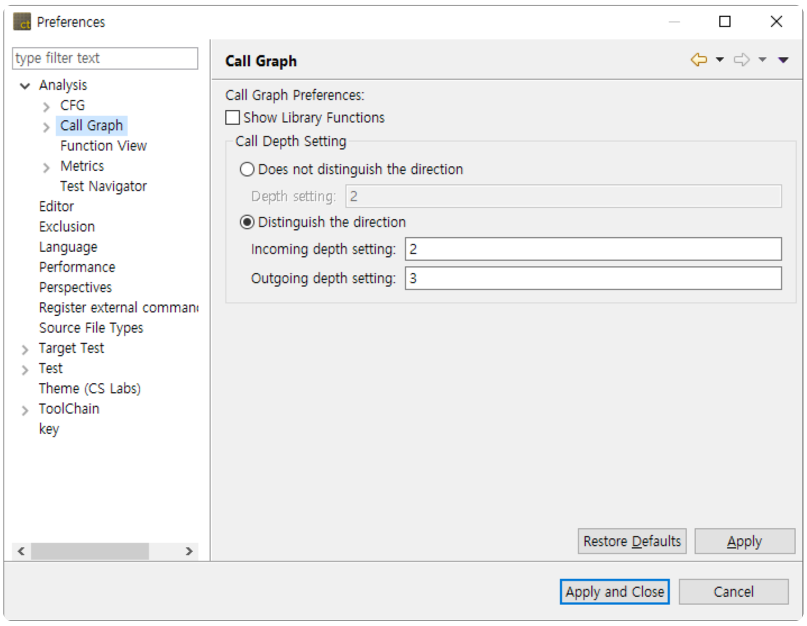
Function View


Function View

Limit visible functions per group to (0: Unlimited): 0

Call Graph

You can change the settings of the function call graph displayed in the call graph view.



Call Graph

Call Graph Preferences:

☐ Show Library Functions

Call Depth Setting

○ Does not distinguish the direction

Depth setting: 2

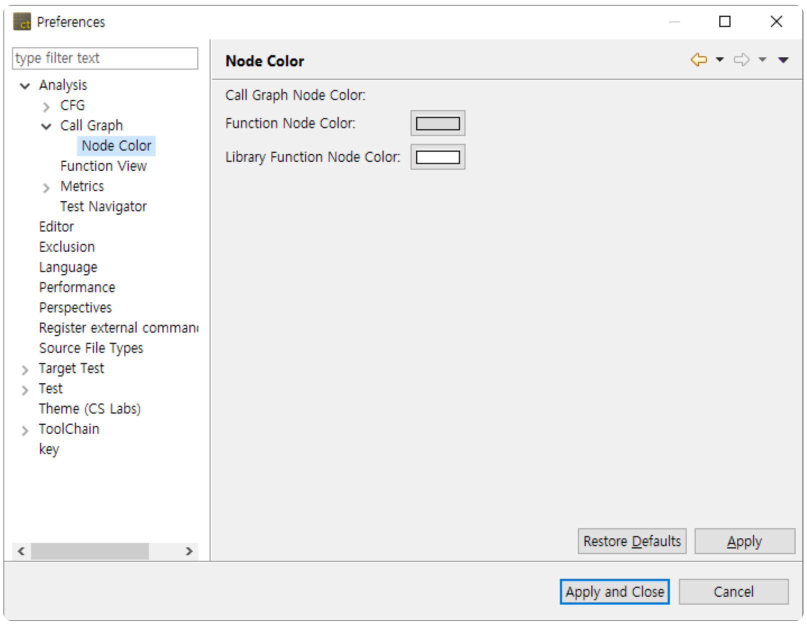
● Distinguish the direction

Incoming depth setting: 2

Outgoing depth setting: 3

The [Show Library Functions] checkbox allows you to set whether or not to display library functions. If you set the value of ‘Does not distinguish the direction’ to ‘2’ in ‘Call Depth Setting’, it shows the call information of one depth for both the caller and callee, centering on the selected function(Just the callers or callee of the selected function shown).

If you want to set the caller and callee separately, you can specify the value of each step by selecting the sub-option. You can change the color of nodes visible in the function call graph.



Node Color

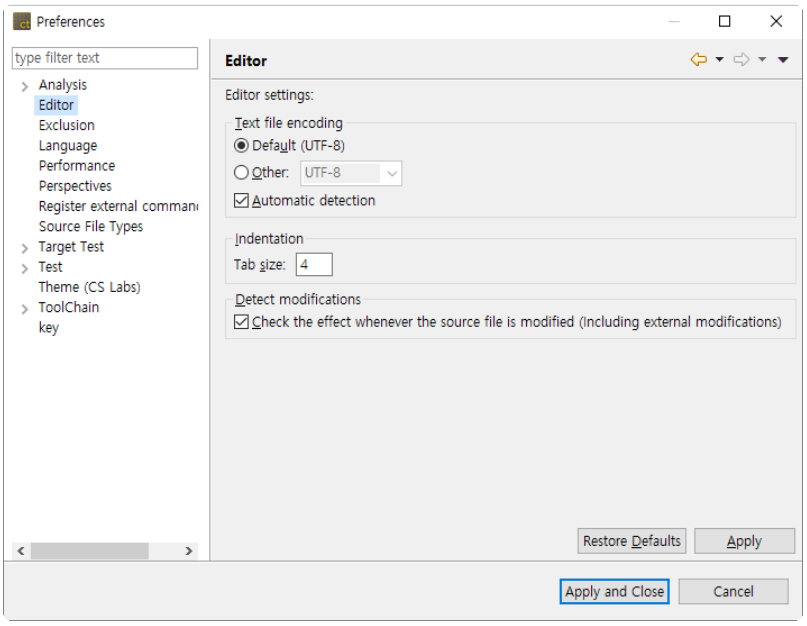
Call Graph Node Color:

Function Node Color:

Library Function Node Color:

14.2. Exclusion

You can set the directories and files to exclude from the analysis.



Editor settings:

Text file encoding
- [✓ Default (UTF-8)]
- Other: UTF-8
- [✓ Automatic detection]

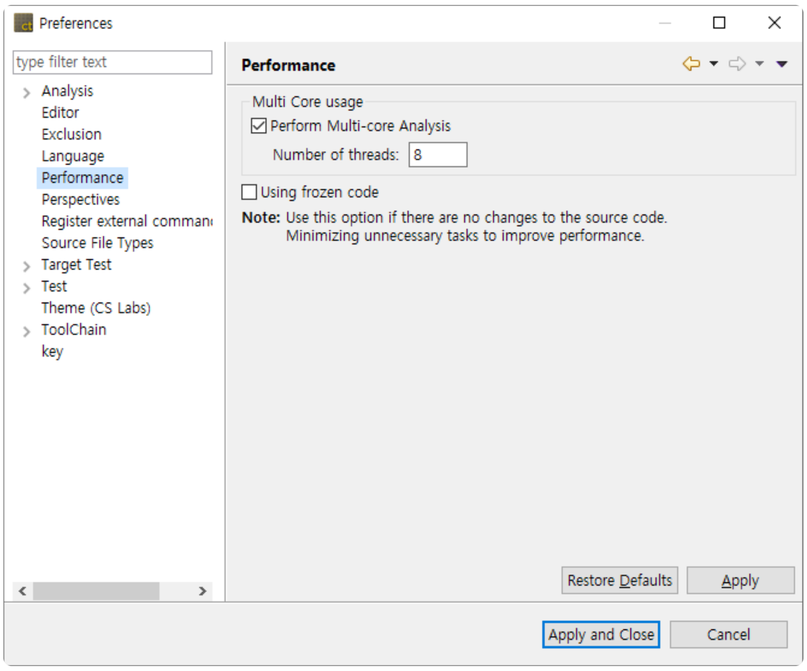
Indentation
- Tab size: 4

Detect modifications
- [✓ Check the effect whenever the source file is modified (Including external modifications)]

- Add the analysis exclusion target.
  1. Click [Add].
  2. Select the directories or files to be excluded.
  3. Click [OK] or [Open].
- Delete the analysis exclusion target.
  1. Select the directories or files to be deleted.
  2. Click [Remove].

14.3. Performance

It provides the settings that can improve the work performance suitably for the user environment.



Multi Core usage

☑ Perform Multi-core Analysis

Number of threads: 8

☐ Using frozen code

Note: Use this option if there are no changes to the source code.
Minimizing unnecessary tasks to improve performance.

Multi-Core Usage

The option [Multi Core usage] improves performance by using multiple cores when executing the project analysis. (If PC has not enough CPU resource, it can affect the performance of the other tasks.)

- Perform Multi-core Analysis: Enter the number of the core to be used when analyzing the source code. (The range of the core number: 2 ~ the maximum number of cores in the execution environment)

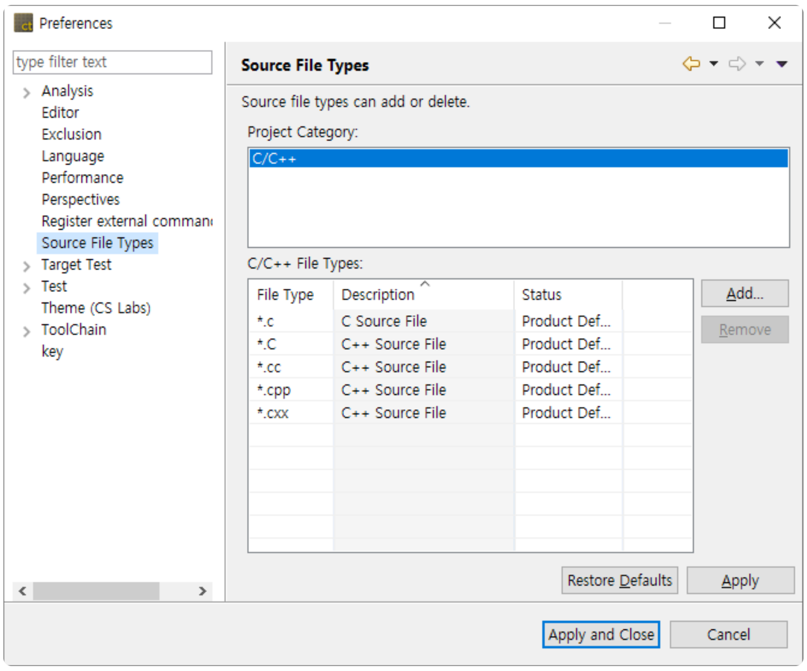
Using frozen code

The option [Using frozen code] improves the performance by minimizing unnecessary tasks (detecting and re-analyzing source code modifications etc.) assuming that there is no change in the source code configuration.
Use this option only if the PC performance is very slow and the source code configuration is never changed during testing. (If the source code or analysis setting is changed while the option is enabled, it may cause unexpected problems.)

Difference with Editor – [Detect modifications] option
While if [Detect modifications] option of Editor is enabled, it analyzes the modified source code when executing [Analyze], if [Using frozen code] option of analysis is enabled, it does not analyze the modified source code until re-analyzed even though the source codes are modified. In addition, Editor – [Detect modifications] option is ignored.

14.4. Source File Types

You can set the extension to be used as a source file for each project type.



Source File Types

Source file types can add or delete.

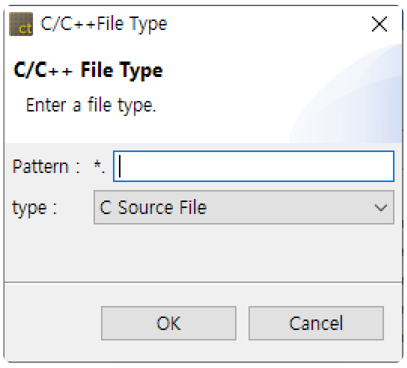
Project Category:

C/C++

C/C++ File Types:

File Type	Description	Status
*.c	C Source File	Product Def...
*.C	C++ Source File	Product Def...
*.cc	C++ Source File	Product Def...
*.cpp	C++ Source File	Product Def...
*.cxx	C++ Source File	Product Def...

- Add a source file extension.
    1. Select the project type.
    2. Click [Add].
    3. Enter an extension, select the type and click [OK].



C/C++ File Type

Enter a file type.

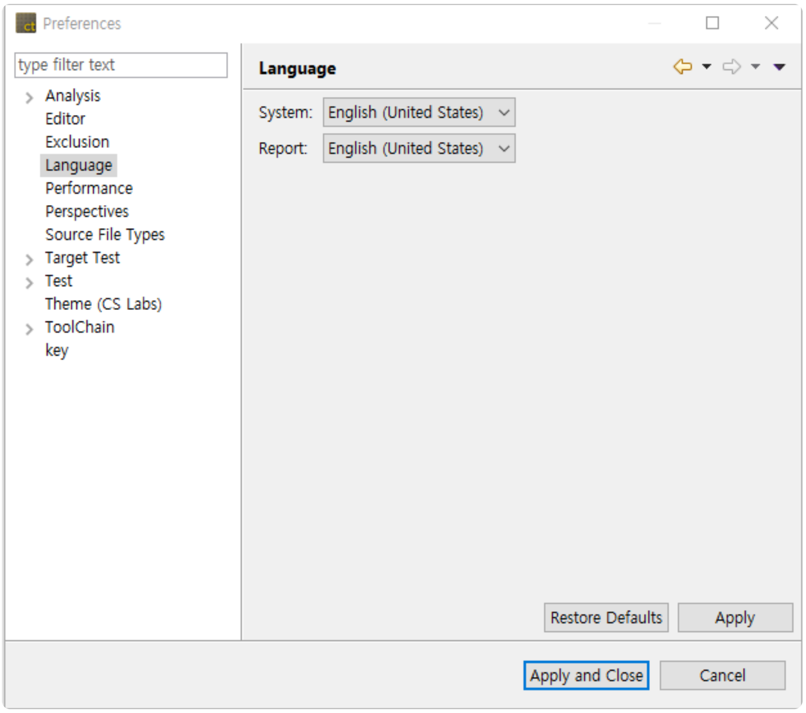
Pattern : *.

type : C Source File

- Remove a source file extension.
    1. Select the project type.
    2. Select the extension to be removed.
    3. Click [Remove].

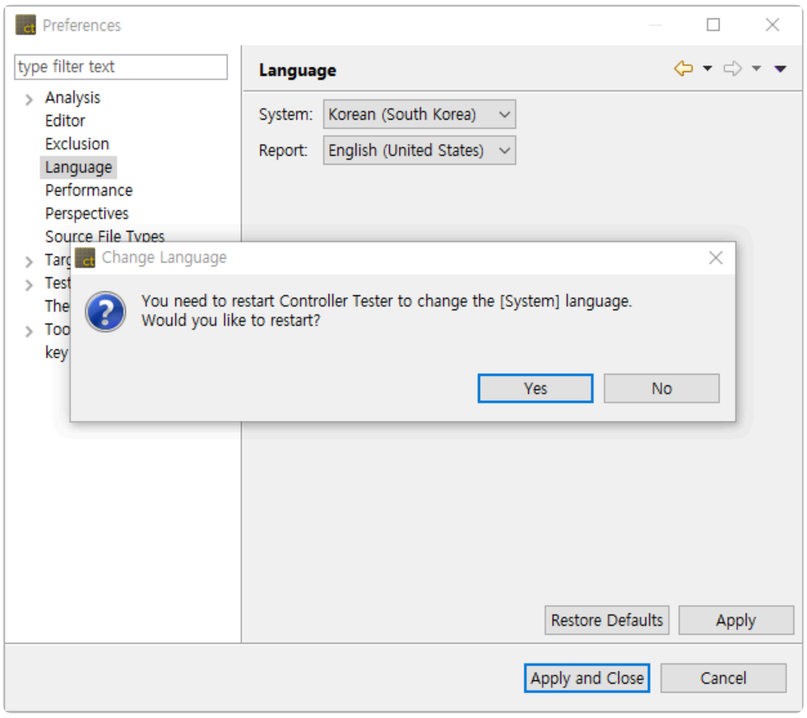
14.5. Language

Sets the language to be displayed in tools and reports.
You can select a language from the drop-down menu for [System] and [Report].



System: English (United States)
Report: English (United States)

If you click the [Apply] button after changing the [System], a dialog box asking you to restart Controller Tester will open.



System: Korean (South Korea)
Report: English (United States)

You need to restart Controller Tester to change the [System] language.
Would you like to restart?

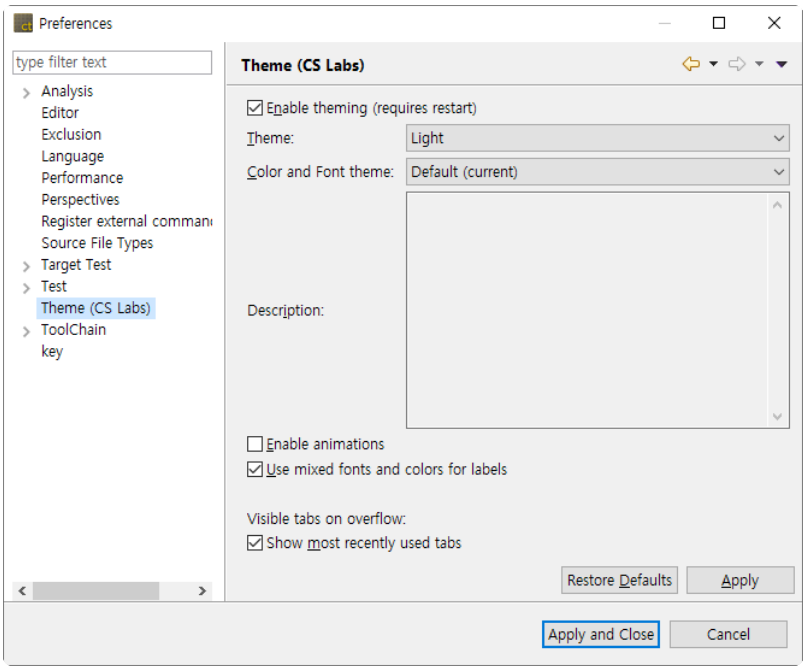
When you change the system language, the report language also changes automatically.

To set the report language differently from the system language, change the report language after restart.

14.6. Theme

It provides the settings for changing the theme of the Controller Tester.

CS Labs allows you to preview new features that will be released in CodeScroll tools later. Based on feedback for the new features, CS Labs features may or may not be applied as formal features.



Theme (CS Labs)

☑ Enable theming (requires restart)

Theme: Light

Color and Font theme: Default (current)

Description:

☐ Enable animations

☑ Use mixed fonts and colors for labels

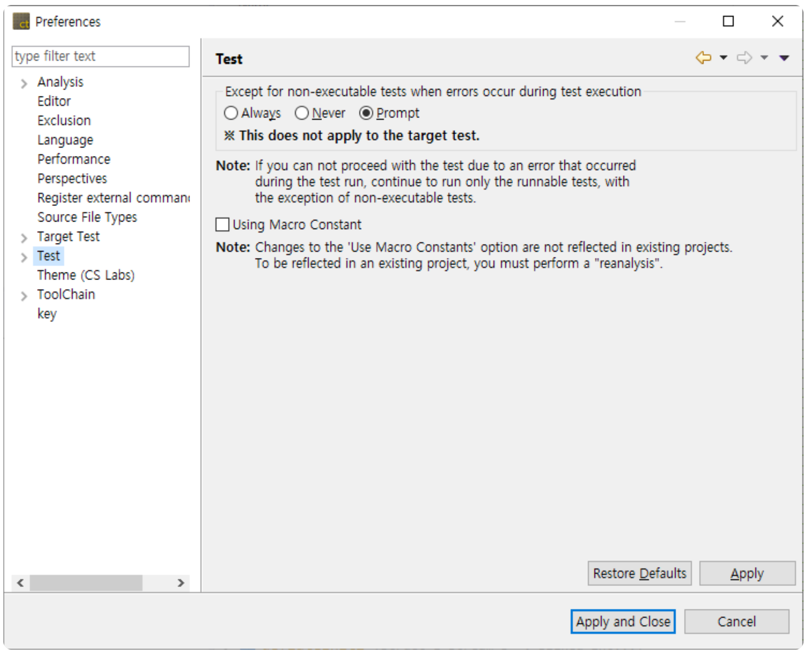
Visible tabs on overflow:

☑ Show most recently used tabs

14.7. Test

Provides settings related to editing test and execution.
[Except for non-executable tests when errors occur during test execution] is an option that allows you to execute only executable tests, excluding non-executable tests, when the whole test cannot be performed due to an error that occurs during test execution.
The [Using Macro Constant] option allows you to edit the test using macro constants defined in the source file (ex: using macro constants for input/expected values of array indexes and test cases).

! This setting only applies to converted projects.



Except for non-executable tests when errors occur during test execution
○ Always ○ Never [✓ ● Prompt]
※ This does not apply to the target test.

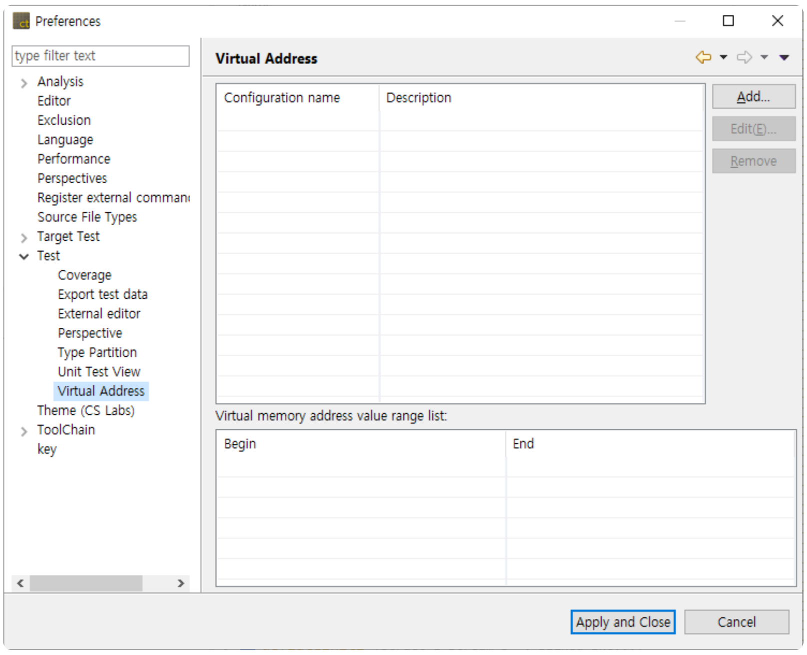
Note: If you can not proceed with the test due to an error that occurred during the test run, continue to run only the runnable tests, with the exception of non-executable tests.

☐ Using Macro Constant

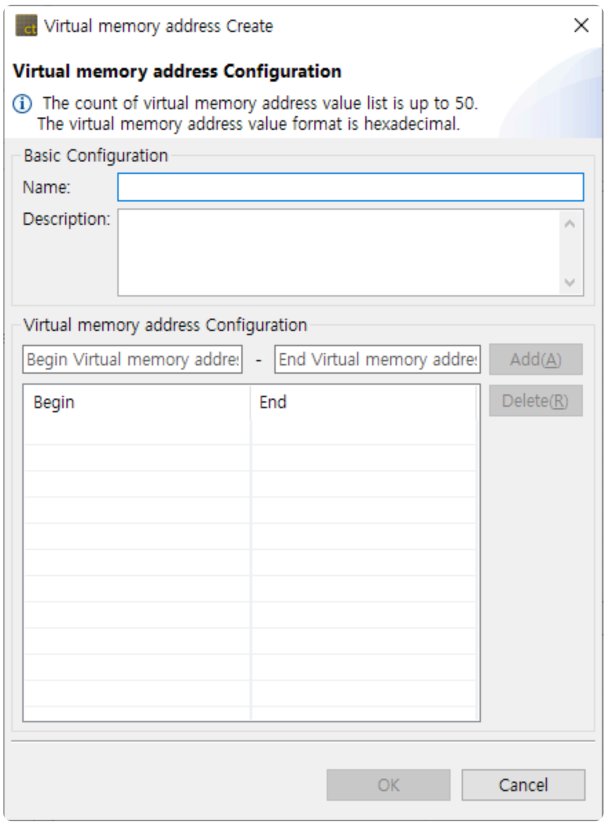
Note: Changes to the 'Use Macro Constants' option are not reflected in existing projects. To be reflected in an existing project, you must perform a "reanalysis".

Virtual Address

It provides the memory settings for the embedded environment test. You can manage the memory address group to be used in the project properties.



In the screen above, you can check the virtual memory address information set. Click [Add…] button to add the virtual memory address.

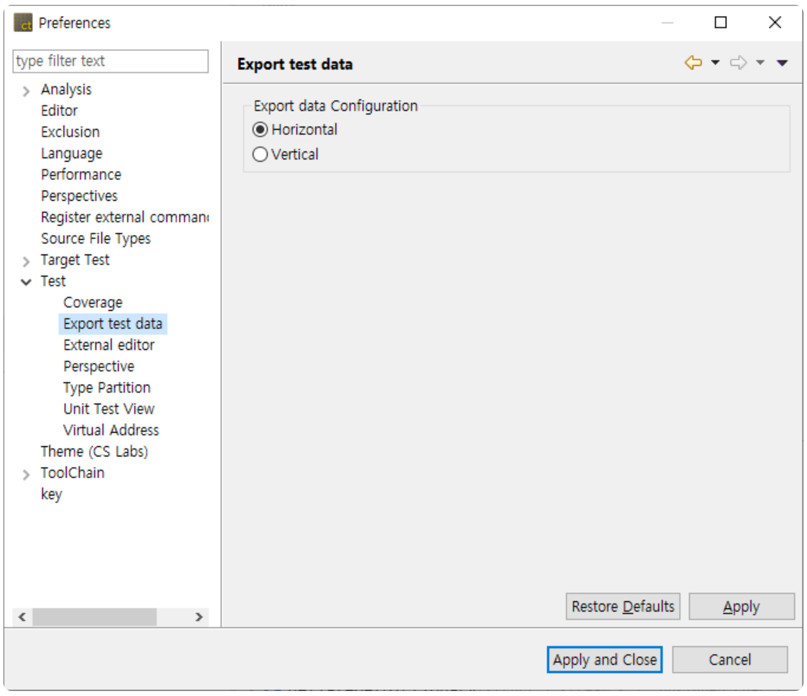

Virtual memory address Create
Virtual memory address Configuration
Basic Configuration
Name:
Description:
Virtual memory address Configuration
Begin Virtual memory addre
End Virtual memory addre
Add(A)
Begin
End
Delete(R)
OK
Cancel

The count of virtual memory address value list is up to 50.
The virtual memory address value format is hexadecimal.

The virtual memory address areas can be specified up to 50 areas and it can be entered in hexadecimal.

Export test data

When exporting data, you can set the output direction of variables to either horizontal or vertical
Select the output direction of the export variable and click [Apply].



Export test data

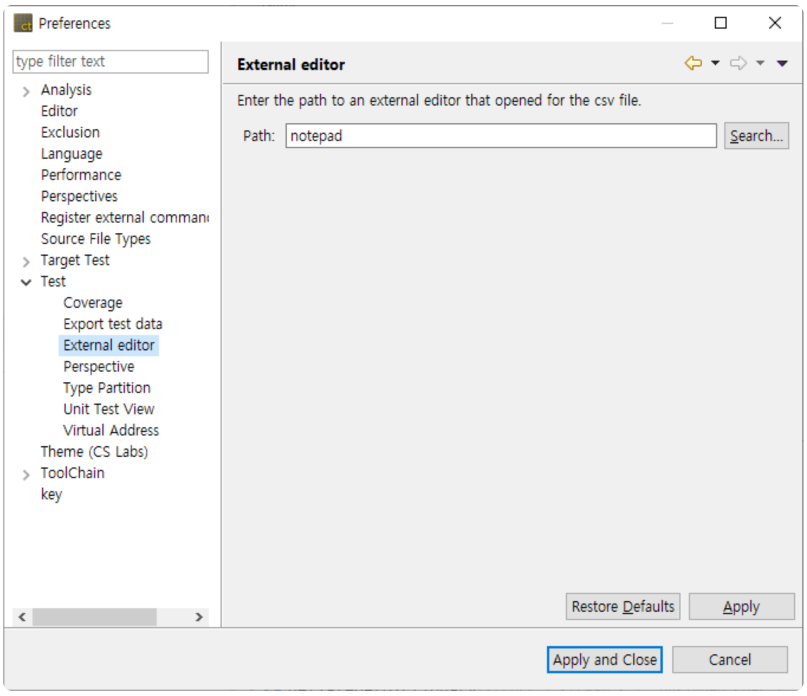
Export data Configuration

● Horizontal

○ Vertical

External Editor

You can set the external editor to open CSV file.
Enter the path of the external editor and click [Apply].



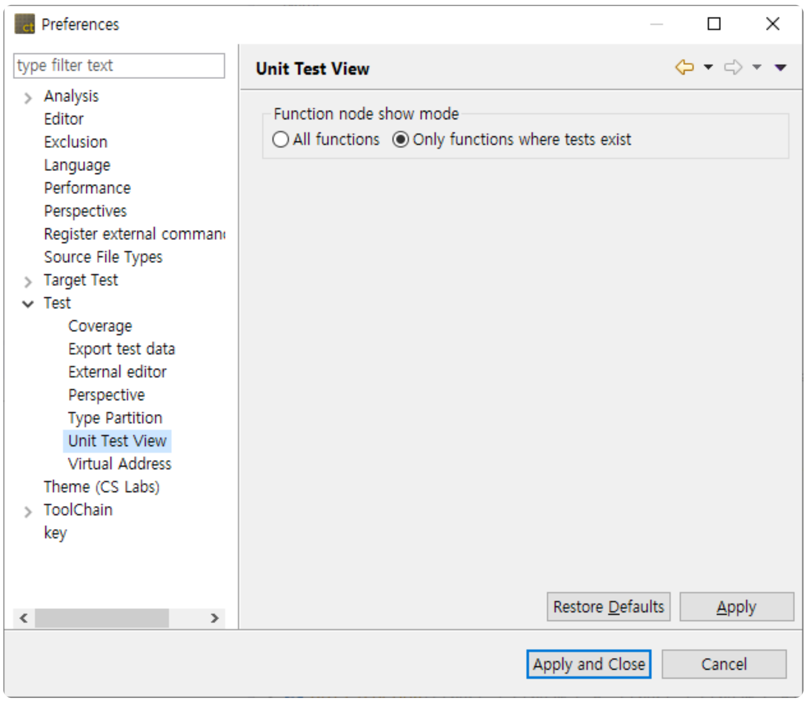
External editor

Enter the path to an external editor that opened for the csv file.

Path: notepad

Unit Test View

You can set the function node display in the Unit Test view included in the test perspective that UI/UX is improved.

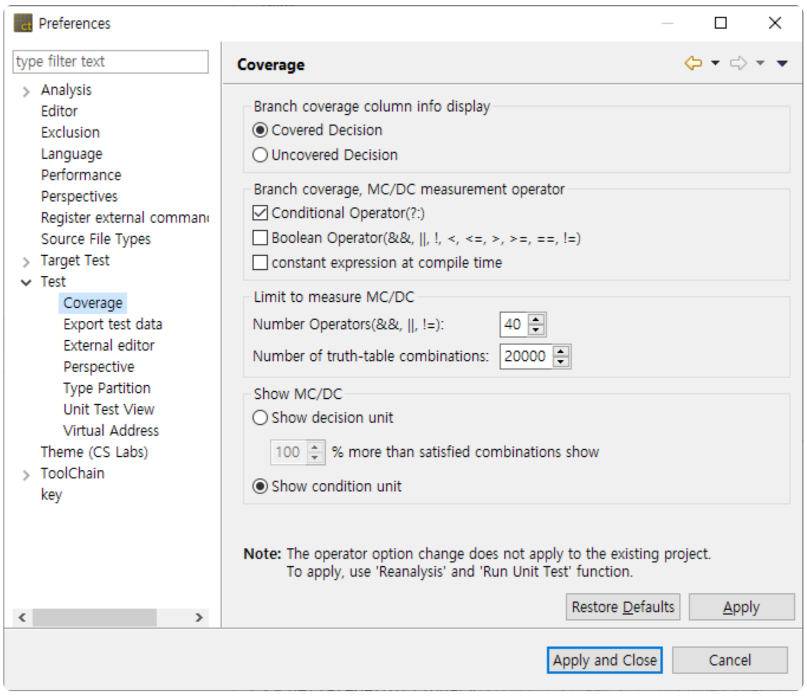

Preferences

Unit Test View

Function node show mode
All functions [✓ Only functions where tests exist]

Coverage

You can set the branch coverage measurement and whether to display the covered/uncovered.


Preferences

Coverage

Branch coverage column info display
[✓ Covered Decision]
Uncovered Decision

Branch coverage, MC/DC measurement operator
[✓ Conditional Operator(?:)]
Boolean Operator(&&, ||, !, <, <=, >, >=, ==, !=)
constant expression at compile time

Limit to measure MC/DC
Number Operators(&&, ||, !=): 40
Number of truth-table combinations: 20000

Show MC/DC
Show decision unit
100 % more than satisfied combinations show
[✓ Show condition unit]

Note: The operator option change does not apply to the existing project.
To apply, use 'Reanalysis' and 'Run Unit Test' function.

[Branch coverage Column Info display] radio button allows you to select the information of the marker to be displayed in the left column of the editor.

- T/F marker option is shown in the source code editor.
- Covered Decision: T/F indication of a covered decision
- Uncovered Decision: T/F indication of an uncovered decision

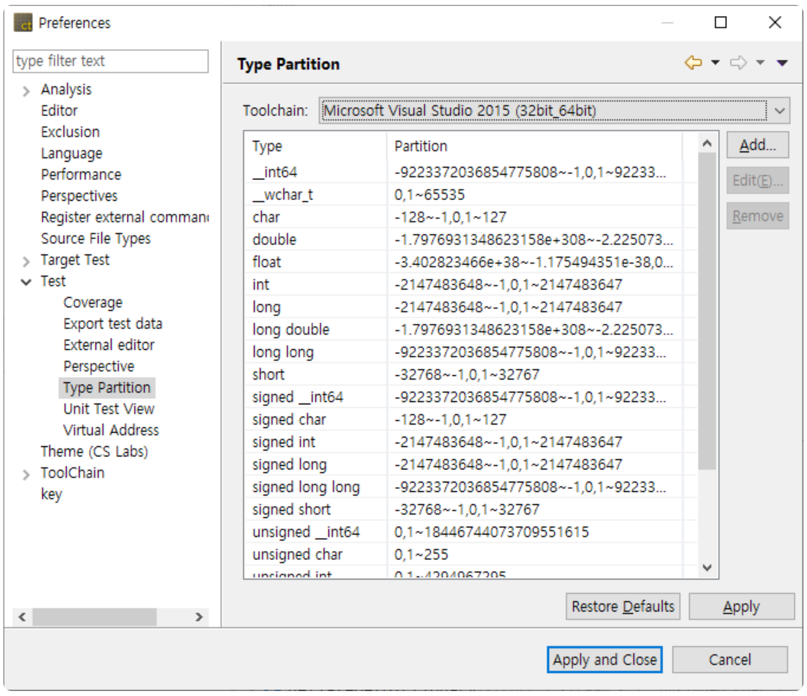
The checkbox [Branch coverage, MC/DC measurement operator] sets the branch coverage measuring target. If it is re-analyzed and executed, the settings are applied.

- Conditional Operator(?:) expression: Measures the branch coverage for ternary operator expression.
- Boolean Operator(&,||,!,<,<=,>,>=,==,!=): Measures the branch coverage for boolean operator expression.
- If unchecked all, measures the branch coverage for ‘if’, ‘for’, ‘while’, ‘do-while’ and ‘switch’ statements only.

! When changing the ‘Conditional Operator(?:)’ setting, the COVER’s [Toolchain] > [Standard] must be set identically to share coverage with COVER. For details, please refer to the Import Coverage by Ternary Operator Settings page in User Guides.

Type Partition

You can edit the basic type partition for each toolchain and restore it into the default value provided. In Toolchain combo box, select the toolchain to be modified, edit the partition and click [Apply].



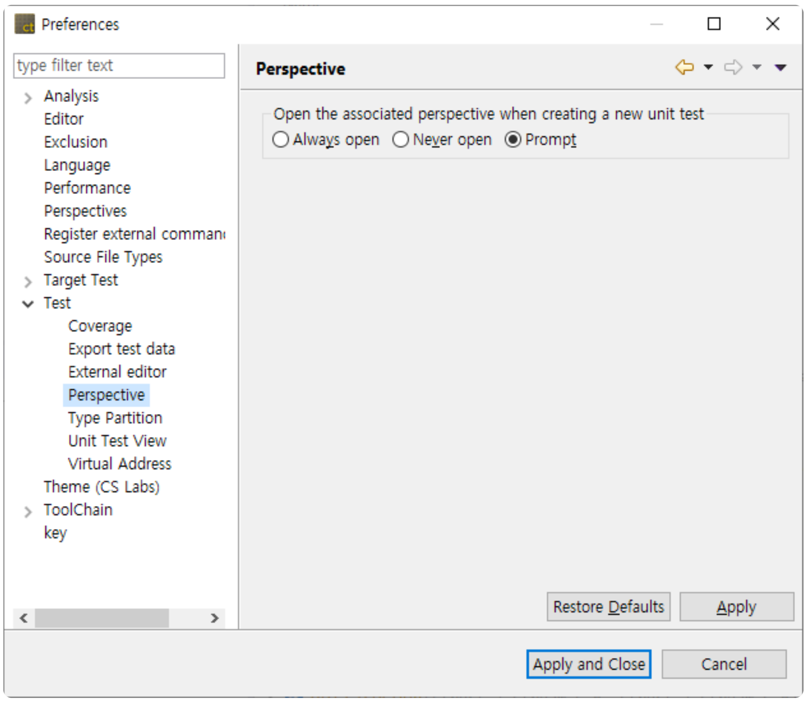
Type Partition

Toolchain: Microsoft Visual Studio 2015 (32bit_64bit)

Type	Partition
__int64	-9223372036854775808~-1,0,1~92233...
__wchar_t	0,1~65535
char	-128~-1,0,1~127
double	-1.7976931348623158e+308~-2.225073...
float	-3.402823466e+38~-1.175494351e-38,0...
int	-2147483648~-1,0,1~2147483647
long	-2147483648~-1,0,1~2147483647
long double	-1.7976931348623158e+308~-2.225073...
long long	-9223372036854775808~-1,0,1~92233...
short	-32768~-1,0,1~32767
signed __int64	-9223372036854775808~-1,0,1~92233...
signed char	-128~-1,0,1~127
signed int	-2147483648~-1,0,1~2147483647
signed long	-2147483648~-1,0,1~2147483647
signed long long	-9223372036854775808~-1,0,1~92233...
signed short	-32768~-1,0,1~32767
unsigned __int64	0,1~18446744073709551615
unsigned char	0,1~255
unsigned int	0,1~4294967295

Perspective

After the test has created, you can set the opening option for the perspective associated. Select one among [Always open], [Never open] and [Prompt] and click [Apply].



Perspective

Open the associated perspective when creating a new unit test

Always open   Never open   [✓ Prompt]

14.8. Toochain

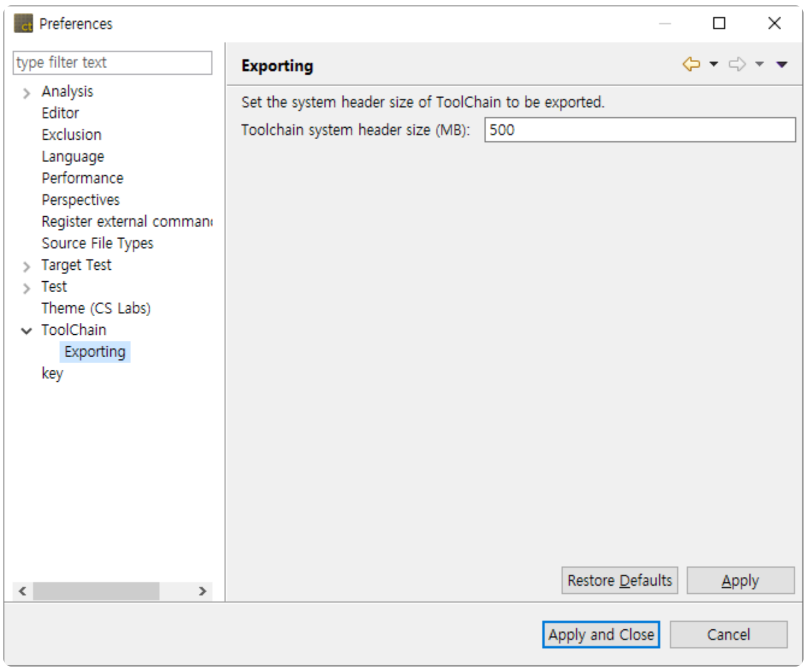
You can set the information for the toolchain to be used in the tool.

You must have a toolchain (compiler information) for the source to be tested in order to create or analyze the project.

The detail description of the toolchain settings can be found in the ‘Set a Toolchain (Analyzer)’.

Export Toolchain

It sets the system header size of the toolchain to be exported. The system headers larger than the size you set cannot be exported.



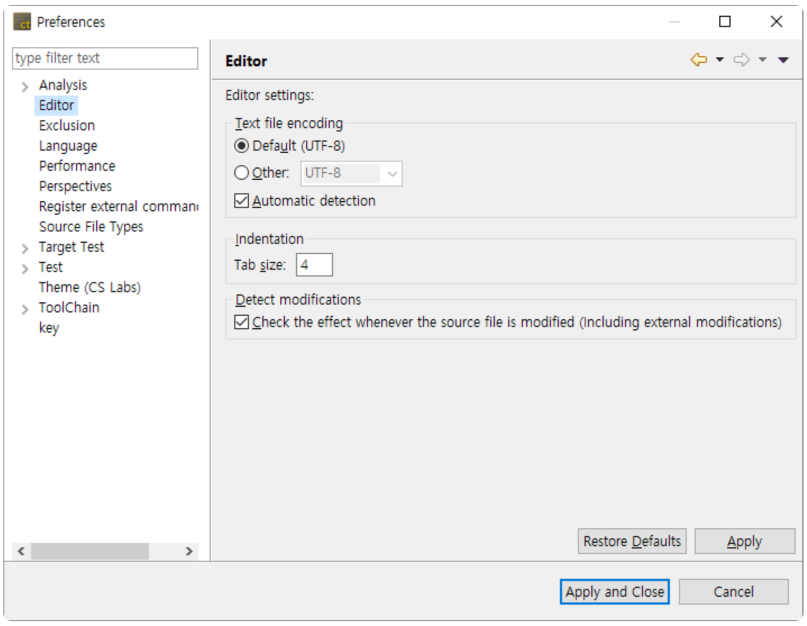
Exporting

Set the system header size of ToolChain to be exported.

Toolchain system header size (MB): 500

14.9. Editor

You can change the settings related to the editor.



Editor

Editor settings:

Text file encoding

(●) Default (UTF-8)

( ) Other: UTF-8

☑ Automatic detection

Indentation

Tab size: 4

Detect modifications

☑ Check the effect whenever the source file is modified (Including external modifications)

Text file encoding
You can set the encoding to be used when opening a text file in the editor. If the [Automatic detection] option is on, it will automatically detect the encoding of the text file. (If it cannot be detected automatically, it will open with the encoding you set.)

Indentation
If you change the tab size, the tab size shown in the editor is changed too.

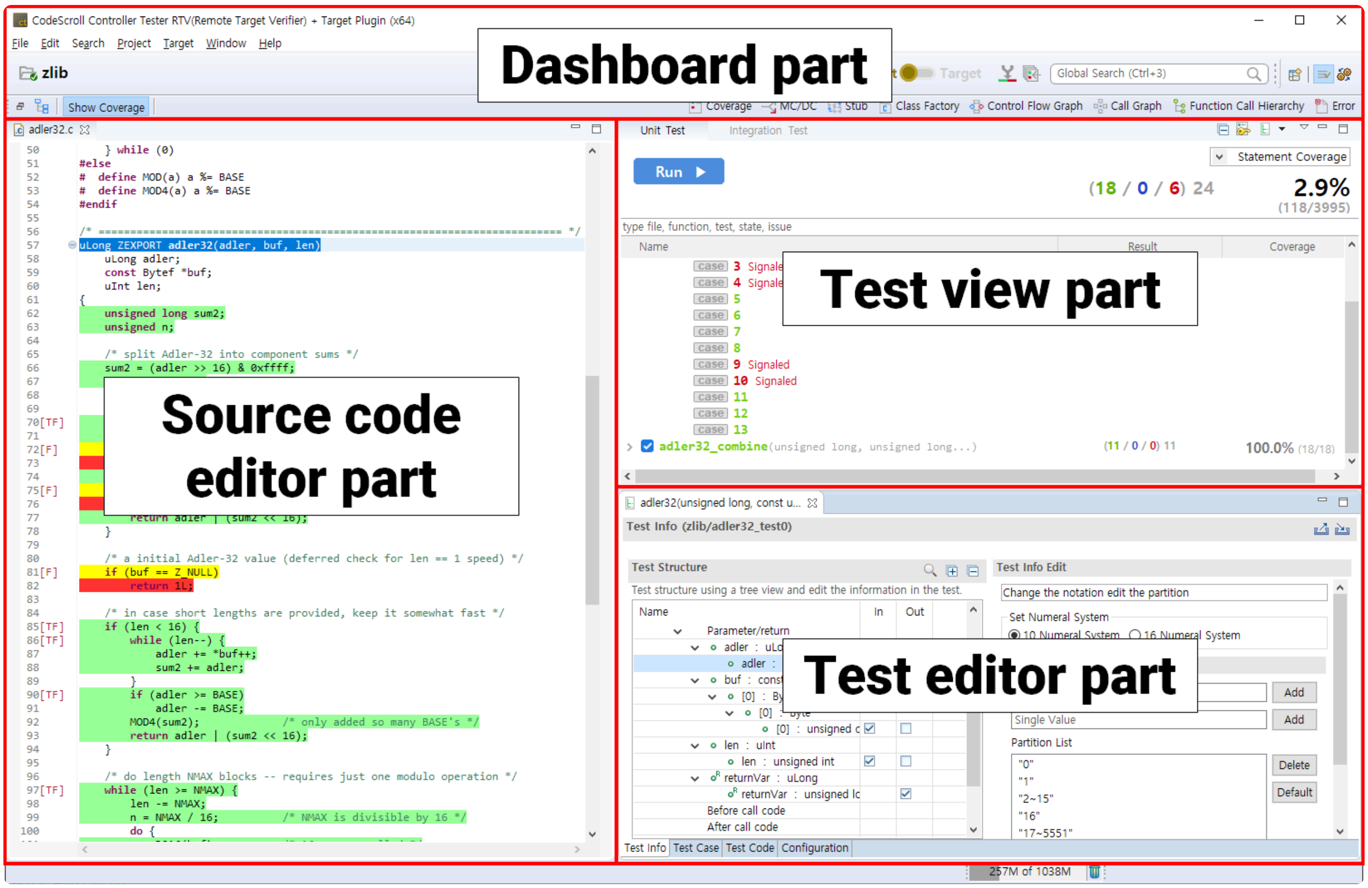
Detect modifications
If the [Detect modifications] option is on, it checks the impact of the changes each time the source file is modified.

> If the disc speed if slow, deselect this checkbox to improve the performance.

15. Test Perspective

The Test Perspective provides UI for displaying only the necessary information so as to keep the flow of the testing task and focus on the goal.

It provides a high DOF screen with Eclipse RCP. You can set it in the [Window] menu and in each view.



```
    } while (0)
#else
#  define MOD(a) a %= BASE
#  define MOD4(a) a %= BASE
#endif

/* ========================================================================= */
uLong ZEXPORT adler32(adler, buf, len)
    uLong adler;
    const Bytef *buf;
    uInt len;
{
    unsigned long sum2;
    unsigned n;

    /* split Adler-32 into component sums */
    sum2 = (adler >> 16) & 0xffff;
```

```
    }

    /* a initial Adler-32 value (deferred check for len == 1 speed) */
    if (buf == Z_NULL)
        return 1L;

    /* in case short lengths are provided, keep it somewhat fast */
    if (len < 16) {
        while (len--) {
            adler += *buf++;
            sum2 += adler;
        }
        if (adler >= BASE)
            adler -= BASE;
        MOD4(sum2);             /* only added so many BASE's */
        return adler | (sum2 << 16);
    }

    /* do length NMAX blocks -- requires just one modulo operation */
    while (len >= NMAX) {
        len -= NMAX;
        n = NMAX / 16;          /* NMAX is divisible by 16 */
        do {
```

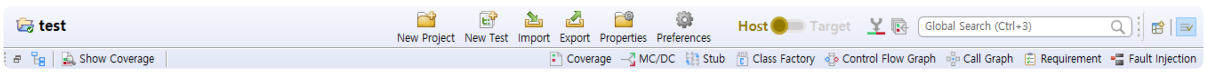
The components that make up the test perspective are:

- Dashboard
- Test Navigator View
- Unit Test View
- Integration Test View
- Coverage View
- MC/DC View
- Stub View
- Class Factory View
- Control Flow Graph View
- Call Graph View
- Error View
- Debug Information View
- Fault Injection View
- Input/output Data Graph View
- Console View
- Requirement View

Views that are not included by default can be opened from [Window]> [Show View]> [Other…] on the top menu.

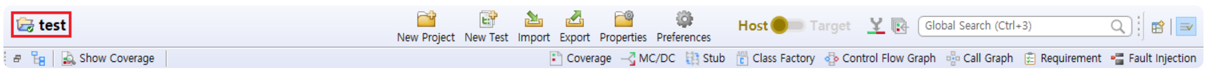
15.1. Dashboard

The dashboard section provides a summary of frequently used functions or tests that are currently in progress.



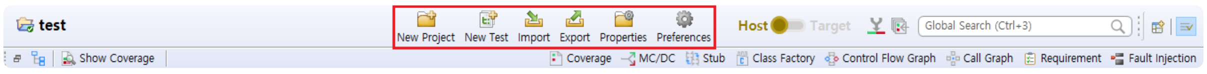
Project name

It shows the name of the project selected in the Test Navigator View.



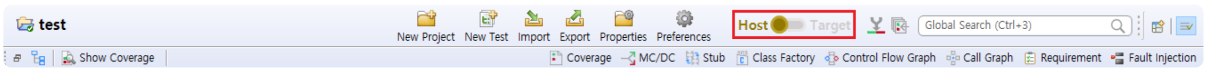
Bookmark menu

You can use the [New Project], [New Test], [Import], [Export], [Properties] and [Preferences] features.



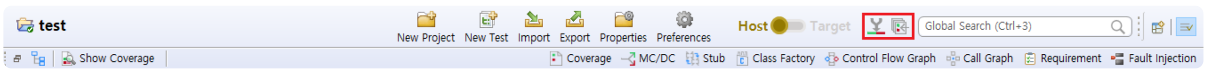
Host/Target setting menu

You can change the test environment to the host or target.



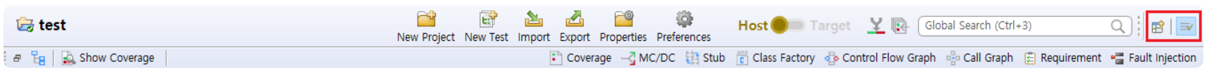
Coverage-related menu

You can use the Show the [Merger coverage between host and target] and the [Show full coverage (Include External Coverage)] features.



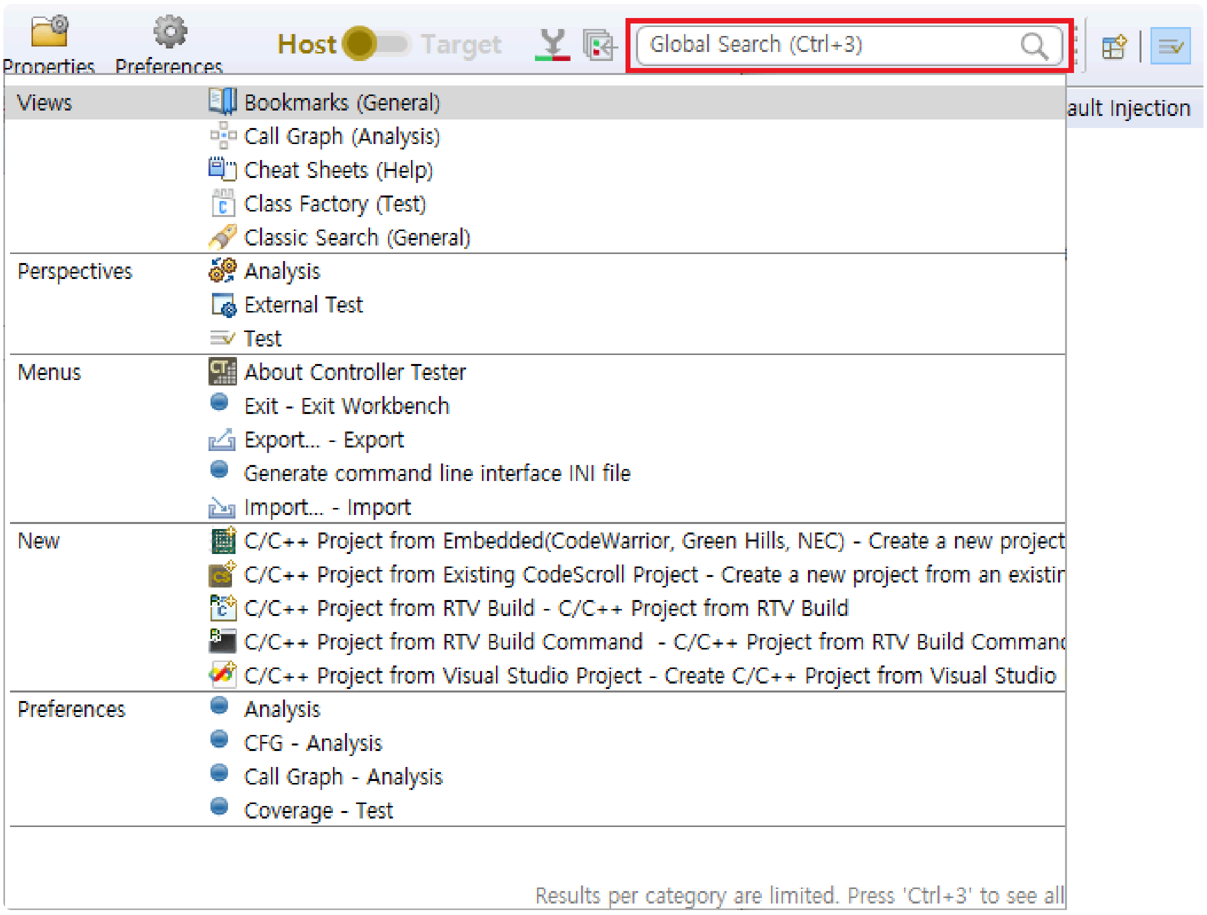
Open Perspective menu

You can select and open the perspective located in Controller Tester



Global Search

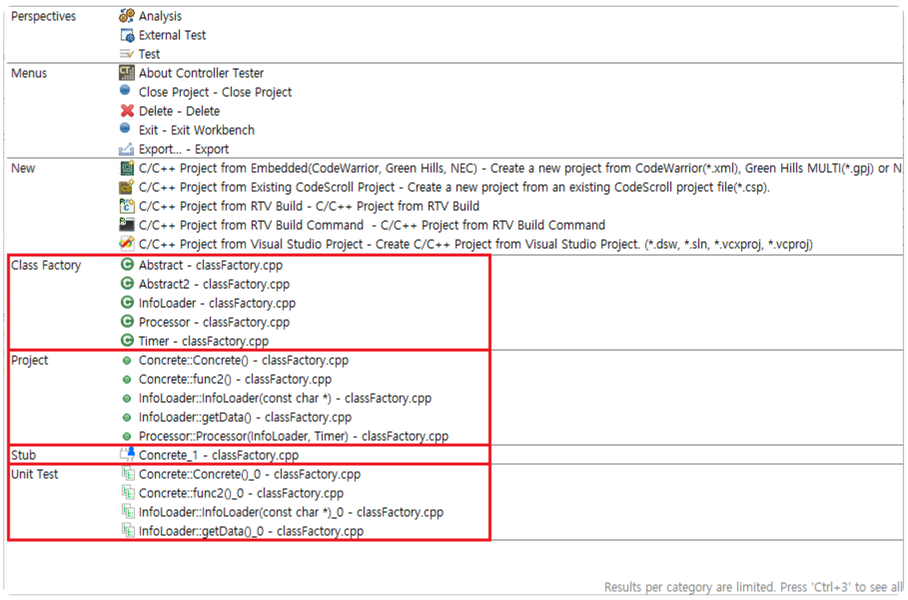
The Global Search allows you to search New, Views, Editor, Menus, Properties, Preferences, Project resource (source file, function), Test, Stub and Class Factory, etc. by keywords. Select the Global Search window or press the shortcut key (`Ctrl` + `3`) to use the Global Search feature.



Views	Bookmarks (General)
	Call Graph (Analysis)
	Cheat Sheets (Help)
	Class Factory (Test)
	Classic Search (General)
Perspectives	Analysis
	External Test
	Test
Menus	About Controller Tester
	Exit - Exit Workbench
	Export... - Export
	Generate command line interface INI file
	Import... - Import
New	C/C++ Project from Embedded(CodeWarrior, Green Hills, NEC) - Create a new project
	C/C++ Project from Existing CodeScroll Project - Create a new project from an existin
	C/C++ Project from RTV Build - C/C++ Project from RTV Build
	C/C++ Project from RTV Build Command - C/C++ Project from RTV Build Commanc
	C/C++ Project from Visual Studio Project - Create C/C++ Project from Visual Studio
Preferences	Analysis
	CFG - Analysis
	Call Graph - Analysis
	Coverage - Test

Results per category are limited. Press 'Ctrl+3' to see all

✱ The project resource (source file, function, etc.), test, stub and class factory can be searched by selecting the analyzed project.

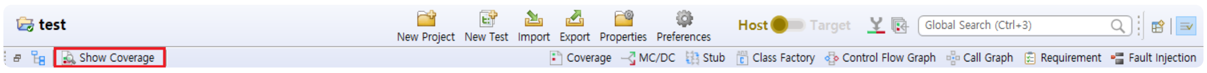


Perspectives	Analysis
	External Test
	Test
Menus	About Controller Tester
	Close Project - Close Project
	Delete - Delete
	Exit - Exit Workbench
	Export... - Export
New	C/C++ Project from Embedded(CodeWarrior, Green Hills, NEC) - Create a new project from CodeWarrior(*.xml), Green Hills MULTI(*.gpj) or N
	C/C++ Project from Existing CodeScroll Project - Create a new project from an existing CodeScroll project file(*.csp).
	C/C++ Project from RTV Build - C/C++ Project from RTV Build
	C/C++ Project from RTV Build Command - C/C++ Project from RTV Build Command
	C/C++ Project from Visual Studio Project - Create C/C++ Project from Visual Studio Project. (*.dsw, *.sln, *.vcxproj, *.vcproj)
Class Factory	Abstract - classFactory.cpp
	Abstract2 - classFactory.cpp
	InfoLoader - classFactory.cpp
	Processor - classFactory.cpp
	Timer - classFactory.cpp
Project	Concrete::Concrete() - classFactory.cpp
	Concrete::func2() - classFactory.cpp
	InfoLoader::InfoLoader(const char *) - classFactory.cpp
	InfoLoader::getData() - classFactory.cpp
	Processor::Processor(InfoLoader, Timer) - classFactory.cpp
Stub	Concrete_1 - classFactory.cpp
Unit Test	Concrete::Concrete()_0 - classFactory.cpp
	Concrete::func2()_0 - classFactory.cpp
	InfoLoader::InfoLoader(const char *)_0 - classFactory.cpp
	InfoLoader::getData()_0 - classFactory.cpp

Results per category are limited. Press 'Ctrl+3' to see all

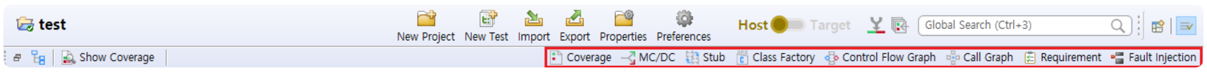
Show Coverage

It allows you to set the covered area in the source code editor is marked or not.



Open/Close the test-related view menu

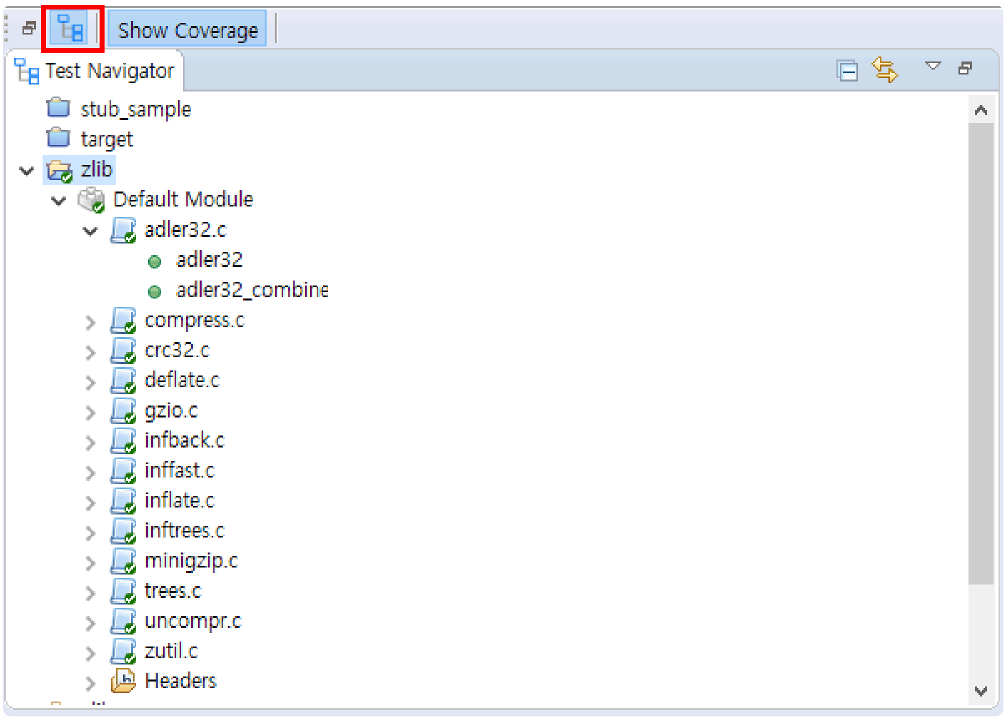
You can open and close the test-related views.



15.2. Test Navigator View

The Test Navigator View shows the hierarchy structure of the projects and the test models under the projects included in the workspace.

The Test Navigator View does not occupy any space but remains the minimized state. If you select [Test Navigator] in the dashboard, the Test Navigator View is located above the Source Code Editor.



Icon

Icon	Description(*: created after analysis)
📂	Open project
📁	Closed project
▨	Module
📄	Source file
●	*Global variable
●	*Function
📂	*Header folder
📄	*Header file
📄	*System header file

Toolbar menu

Menu	Description
Link with Selection	Highlights the items selected in the other view.
Collapse All	Hides all tree nodes.

Icon overlay

Icon overlay	Description
✓	Analyzed
❗	Changed after analysis

Copy the source file into the other module

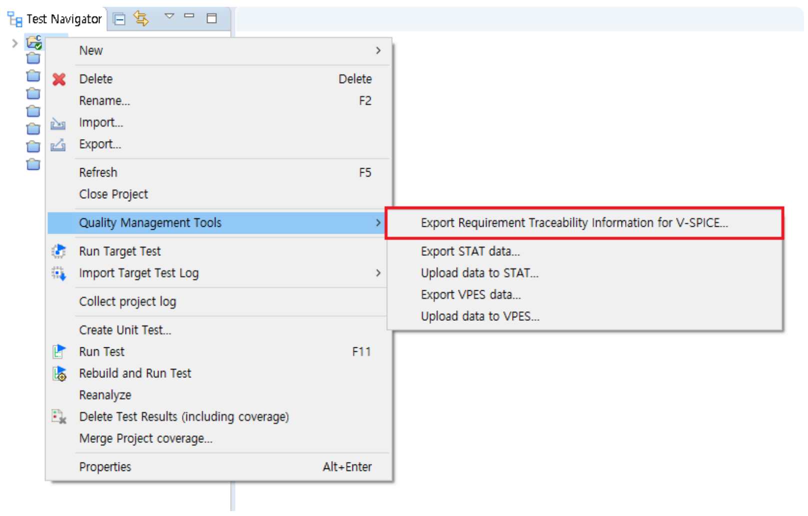
To copy the source file into the other module, with `Ctrl` key pressed, drag and drop the source file to be copied into the target module.
Alternatively, right-click the source file to be copied, select [Copy], right-click the target module and select [Paste]. (Shortcut keys: `Ctrl` + `C` and `Ctrl` + `V`)

Move the source file to the other module

To move the source file to the other module, drag and drop the source file to be moved into the target module.

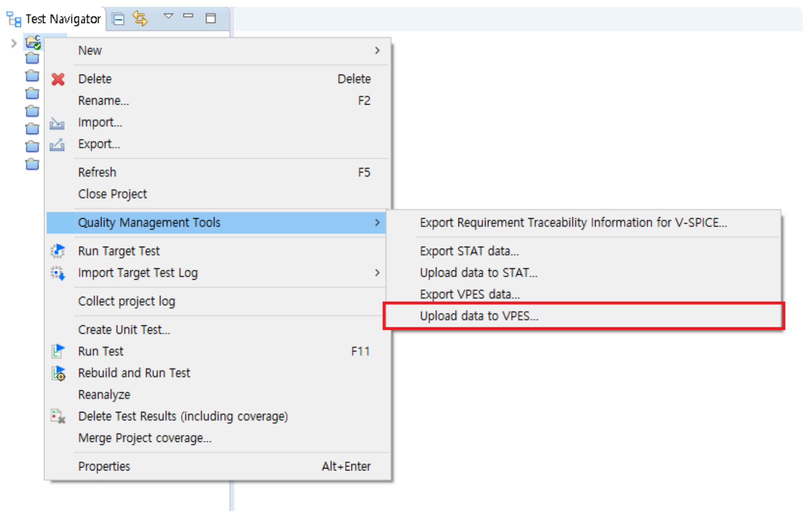
Export Requirement Traceability Information for V-SPICE

Connection information between requirements and tests can be exported to an xml file that conforms to the V-SPICE format.



Select a project and right-click on the menu to select [Quality Management Tools] > [Export Requirements Traceability Information for V-SPICE…] function.

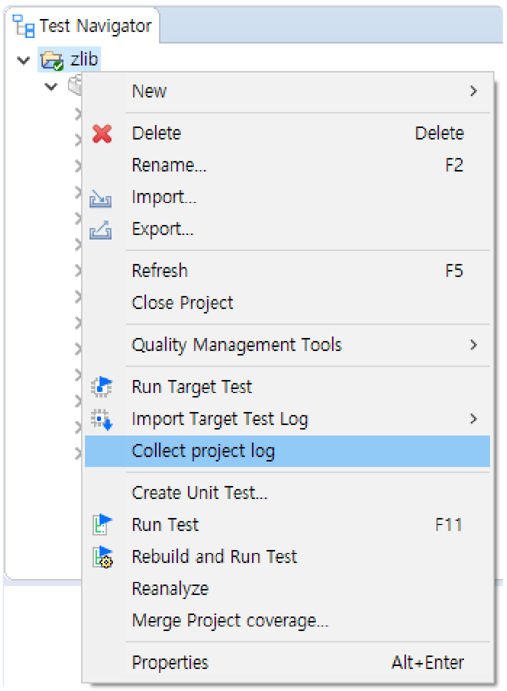
Upload data to VPES



When you select and right-click a project, [Upload data to VPES…] is indicated in the menu. For this feature, please contact Technical support.

Collect Project Log

This feature collects the logs left in use of Controller Tester on a project basis in batch and exports them. When you contact Technical support due to an error occurred, please send us the collected compressed file so that we can solve the problem more quickly.



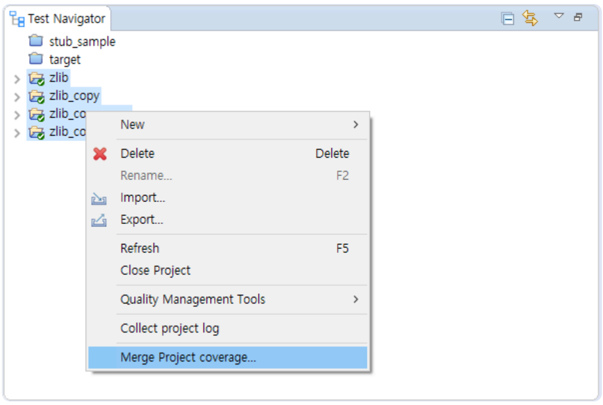
When you select and right-click a project, [Collect project log] item is indicated.

15.2.1. Merge Project Coverages

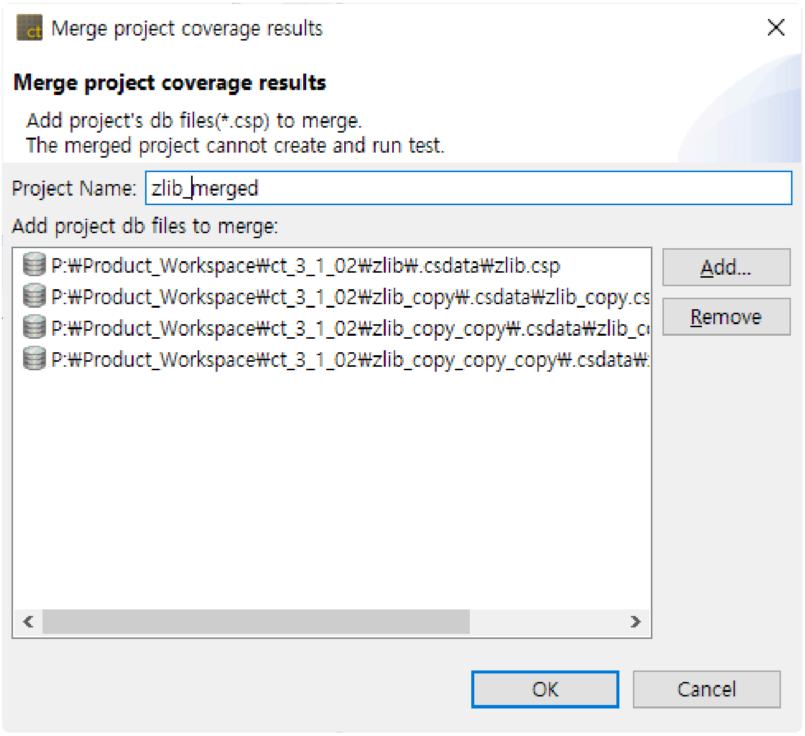
If a project size is too large to run the test at once, you can run the test by dividing it into multiple projects. [Merge Project Coverage] function runs the test by dividing one project into multiple projects and then shows the overall coverage results by merging the result of the test for these projects.

Merge Project Coverage

1. After selecting all the projects that you want to merge the coverage results, right-click it and select [Merge Project Coverage].



2. Select [Merge Project Coverage] menu to open for creating the project name. Enter the project name to be created in [Project Name].



Merge project coverage results

Merge project coverage results

Add project's db files(*.csp) to merge.
The merged project cannot create and run test.

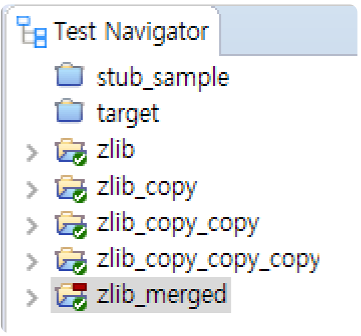
Project Name: zlib_merged

Add project db files to merge:

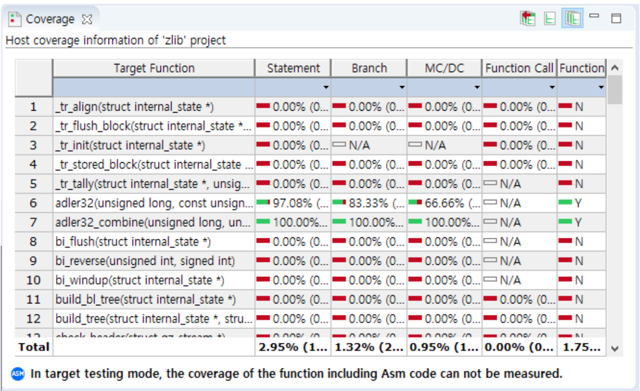
P:₩Product_Workspace₩ct_3_1_02₩zlib₩.csdata₩zlib.csp
P:₩Product_Workspace₩ct_3_1_02₩zlib_copy₩.csdata₩zlib_copy.cs
P:₩Product_Workspace₩ct_3_1_02₩zlib_copy_copy₩.csdata₩zlib_c
P:₩Product_Workspace₩ct_3_1_02₩zlib_copy_copy_copy₩.csdata₩

   - By clicking the [Add] button, you can perform a merge coverage function for projects not included in the workspace.

3. Click [OK] to check that a new project that the project results had been merged has created in the Test Navigator view. The merged project is displayed with a red mark on the upper right corner.


Test Navigator
- stub_sample
- target
- zlib
- zlib_copy
- zlib_copy_copy
- zlib_copy_copy_copy
- zlib_merged

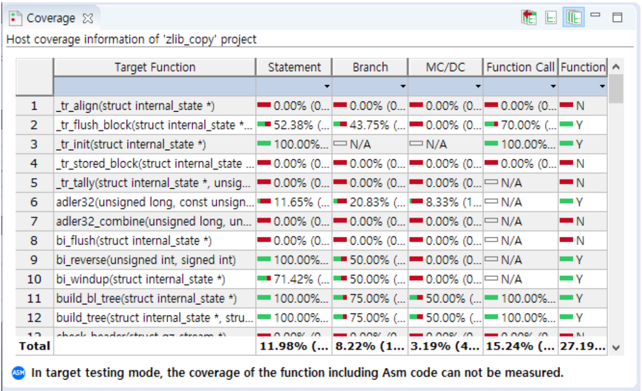
4. Select the project that the results had been merged and check the coverage view to see the overall coverages.


Coverage

Host coverage information of 'zlib' project

	Target Function	Statement	Branch	MC/DC	Function Call	Function
1	_tr_align(struct internal_state *)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
2	_tr_flush_block(struct internal_state *...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
3	_tr_init(struct internal_state *)	0.00% (0...	N/A	N/A	0.00% (0...	N
4	_tr_stored_block(struct internal_state ...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
5	_tr_tally(struct internal_state *, unsig...	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
6	adler32(unsigned long, const unsign...	97.08% (...	83.33% (...	66.66% (...	N/A	Y
7	adler32_combine(unsigned long, un...	100.00%...	100.00%...	100.00%...	N/A	Y
8	bi_flush(struct internal_state *)	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
9	bi_reverse(unsigned int, signed int)	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
10	bi_windup(struct internal_state *)	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
11	build_bl_tree(struct internal_state *)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
12	build_tree(struct internal_state *, stru...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
Total		2.95% (1...	1.32% (2...	0.95% (1...	0.00% (0...	1.75...

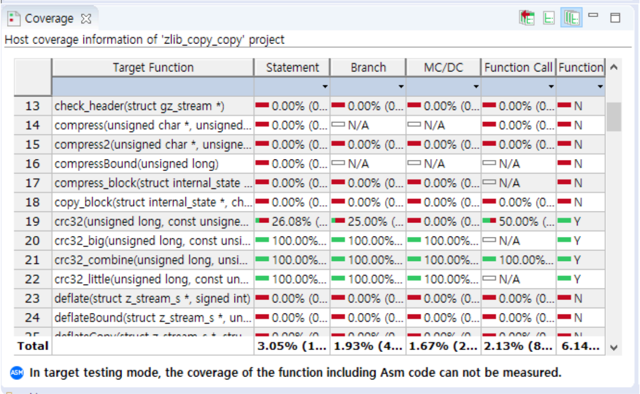
In target testing mode, the coverage of the function including Asm code can not be measured.


Coverage

Host coverage information of 'zlib_copy' project

	Target Function	Statement	Branch	MC/DC	Function Call	Function
1	_tr_align(struct internal_state *)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
2	_tr_flush_block(struct internal_state *...	52.38% (...	43.75% (...	0.00% (0...	70.00% (...	Y
3	_tr_init(struct internal_state *)	100.00%...	N/A	N/A	100.00%...	Y
4	_tr_stored_block(struct internal_state ...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
5	_tr_tally(struct internal_state *, unsig...	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
6	adler32(unsigned long, const unsign...	11.65% (...	20.83% (...	8.33% (1...	N/A	Y
7	adler32_combine(unsigned long, un...	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
8	bi_flush(struct internal_state *)	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
9	bi_reverse(unsigned int, signed int)	100.00%...	50.00% (...	0.00% (0...	N/A	Y
10	bi_windup(struct internal_state *)	71.42% (...	50.00% (...	0.00% (0...	N/A	Y
11	build_bl_tree(struct internal_state *)	100.00%...	75.00% (...	50.00% (...	100.00%...	Y
12	build_tree(struct internal_state *, stru...	100.00%...	75.00% (...	50.00% (...	100.00%...	Y
Total		11.98% (...	8.22% (1...	3.19% (4...	15.24% (...	27.19...

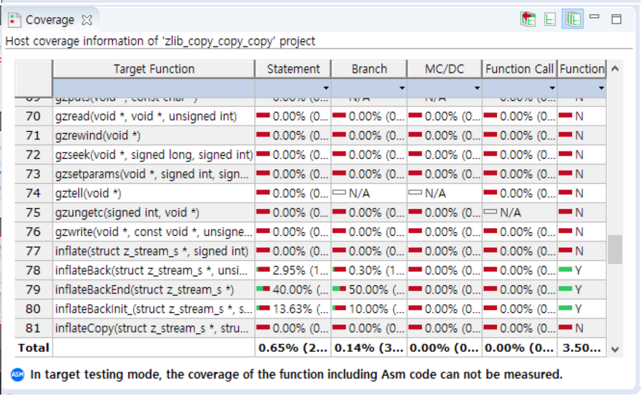
In target testing mode, the coverage of the function including Asm code can not be measured.


Coverage

Host coverage information of 'zlib_copy_copy' project

	Target Function	Statement	Branch	MC/DC	Function Call	Function
13	check_header(struct gz_stream *)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
14	compress(unsigned char *, unsigned...	0.00% (0...	N/A	N/A	0.00% (0...	N
15	compress2(unsigned char *, unsigne...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
16	compressBound(unsigned long)	0.00% (0...	N/A	N/A	N/A	N
17	compress_block(struct internal_state ...	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
18	copy_block(struct internal_state *, ch...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
19	crc32(unsigned long, const unsigne...	26.08% (...	25.00% (...	0.00% (0...	50.00% (...	Y
20	crc32_big(unsigned long, const unsi...	100.00%...	100.00%...	100.00%...	N/A	Y
21	crc32_combine(unsigned long, unsi...	100.00%...	100.00%...	100.00%...	100.00%...	Y
22	crc32_little(unsigned long, const un...	100.00%...	100.00%...	100.00%...	N/A	Y
23	deflate(struct z_stream_s *, signed int)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
24	deflateBound(struct z_stream_s *, un...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
Total		3.05% (1...	1.93% (4...	1.67% (2...	2.13% (8...	6.14...

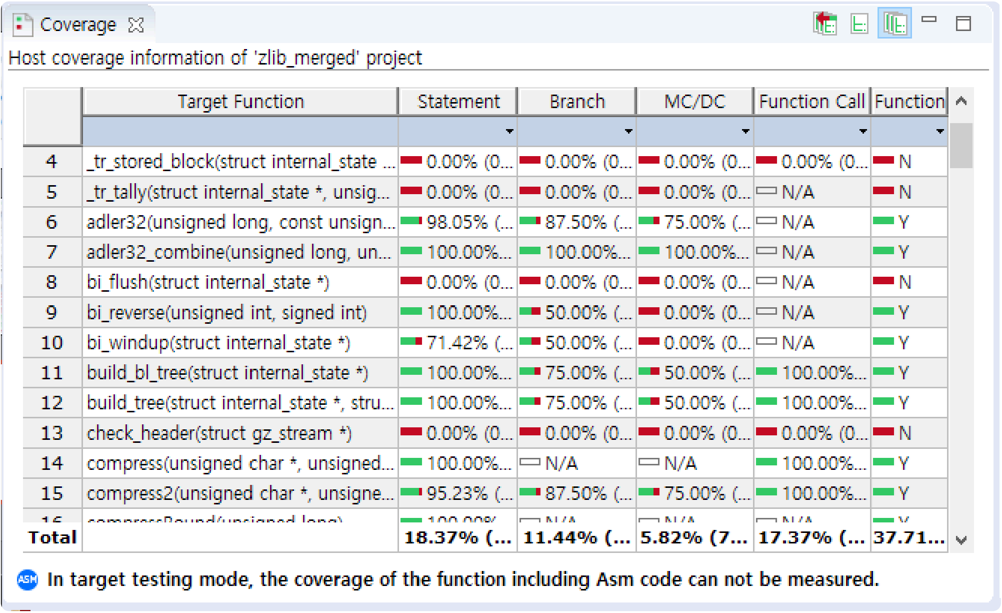
In target testing mode, the coverage of the function including Asm code can not be measured.


Coverage

Host coverage information of 'zlib_copy_copy_copy' project

	Target Function	Statement	Branch	MC/DC	Function Call	Function
70	gzread(void *, void *, unsigned int)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
71	gzrewind(void *)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
72	gzseek(void *, signed long, signed int)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
73	gzsetparams(void *, signed int, sign...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
74	gztell(void *)	0.00% (0...	N/A	N/A	0.00% (0...	N
75	gzungetc(signed int, void *)	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
76	gzwrite(void *, const void *, unsigne...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
77	inflate(struct z_stream_s *, signed int)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
78	inflateBack(struct z_stream_s *, unsi...	2.95% (1...	0.30% (1...	0.00% (0...	0.00% (0...	Y
79	inflateBackEnd(struct z_stream_s *)	40.00% (...	50.00% (...	0.00% (0...	0.00% (0...	Y
80	inflateBackInit_(struct z_stream_s *, s...	13.63% (...	10.00% (...	0.00% (0...	0.00% (0...	Y
81	inflateCopy(struct z_stream_s *, stru...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
Total		0.65% (2...	0.14% (3...	0.00% (0...	0.00% (0...	3.50...

In target testing mode, the coverage of the function including Asm code can not be measured.


Coverage

Host coverage information of 'zlib_merged' project

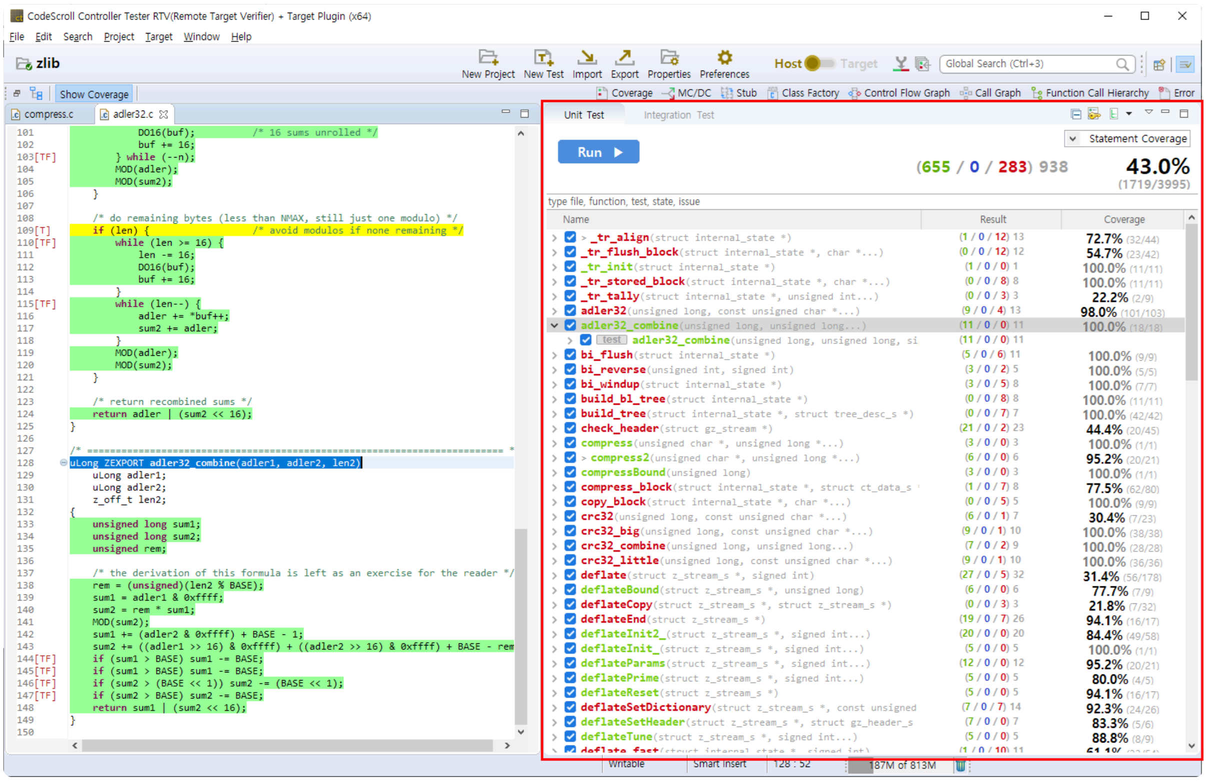
	Target Function	Statement	Branch	MC/DC	Function Call	Function
4	_tr_stored_block(struct internal_state ...	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
5	_tr_tally(struct internal_state *, unsig...	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
6	adler32(unsigned long, const unsign...	98.05% (...	87.50% (...	75.00% (...	N/A	Y
7	adler32_combine(unsigned long, un...	100.00%...	100.00%...	100.00%...	N/A	Y
8	bi_flush(struct internal_state *)	0.00% (0...	0.00% (0...	0.00% (0...	N/A	N
9	bi_reverse(unsigned int, signed int)	100.00%...	50.00% (...	0.00% (0...	N/A	Y
10	bi_windup(struct internal_state *)	71.42% (...	50.00% (...	0.00% (0...	N/A	Y
11	build_bl_tree(struct internal_state *)	100.00%...	75.00% (...	50.00% (...	100.00%...	Y
12	build_tree(struct internal_state *, stru...	100.00%...	75.00% (...	50.00% (...	100.00%...	Y
13	check_header(struct gz_stream *)	0.00% (0...	0.00% (0...	0.00% (0...	0.00% (0...	N
14	compress(unsigned char *, unsigned...	100.00%...	N/A	N/A	100.00%...	Y
15	compress2(unsigned char *, unsigne...	95.23% (...	87.50% (...	75.00% (...	100.00%...	Y
Total		18.37% (...	11.44% (...	5.82% (7...	17.37% (...	37.71...

In target testing mode, the coverage of the function including Asm code can not be measured.

! The [Merge Project Coverage] function may not work properly when two or more different functions in the project to be merged have the same function name.

15.3. Unit Test View

The Unit Test View section is located on the right of the screen. The Unit Test View combines the test and coverage information and provides it in a single view.



```
            DO16(buf);          /* 16 sums unrolled */
            buf += 16;
        } while (--n);
        MOD(adler);
        MOD(sum2);
    }

    /* do remaining bytes (less than NMAX, still just one modulo) */
    if (len) {                  /* avoid modulos if none remaining */
        while (len >= 16) {
            len -= 16;
            DO16(buf);
            buf += 16;
        }
        while (len--) {
            adler += *buf++;
            sum2 += adler;
        }
        MOD(adler);
        MOD(sum2);
    }

    /* return recombined sums */
    return adler | (sum2 << 16);
}

/* ========================================================================= *
uLong ZEXPORT adler32_combine(adler1, adler2, len2)
    uLong adler1;
    uLong adler2;
    z_off_t len2;
{
    unsigned long sum1;
    unsigned long sum2;
    unsigned rem;

    /* the derivation of this formula is left as an exercise for the reader */
    rem = (unsigned)(len2 % BASE);
    sum1 = adler1 & 0xffff;
    sum2 = rem * sum1;
    MOD(sum2);
    sum1 += (adler2 & 0xffff) + BASE - 1;
    sum2 += ((adler1 >> 16) & 0xffff) + ((adler2 >> 16) & 0xffff) + BASE - rem
    if (sum1 > BASE) sum1 -= BASE;
    if (sum1 > BASE) sum1 -= BASE;
    if (sum2 > (BASE << 1)) sum2 -= (BASE << 1);
    if (sum2 > BASE) sum2 -= BASE;
    return sum1 | (sum2 << 16);
}
```

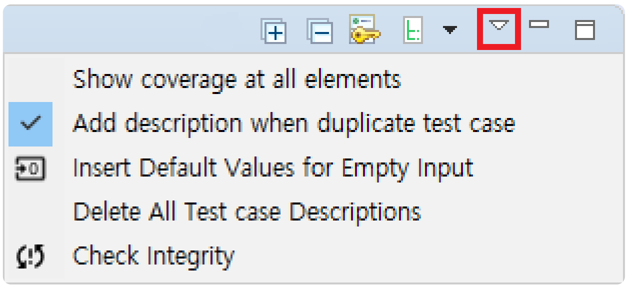
(655 / 0 / 283) 938 43.0% (1719/3995)

Name	Result	Coverage
> _tr_align(struct internal_state *)	(1 / 0 / 12) 13	72.7% (32/44)
_tr_flush_block(struct internal_state *, char *...)	(0 / 0 / 12) 12	54.7% (23/42)
_tr_init(struct internal_state *)	(1 / 0 / 0) 1	100.0% (11/11)
_tr_stored_block(struct internal_state *, char *...)	(0 / 0 / 8) 8	100.0% (11/11)
_tr_tally(struct internal_state *, unsigned int...)	(0 / 0 / 3) 3	22.2% (2/9)
adler32(unsigned long, const unsigned char *...)	(9 / 0 / 4) 13	98.0% (101/103)
adler32_combine(unsigned long, unsigned long...)	(11 / 0 / 0) 11	100.0% (18/18)
test adler32_combine(unsigned long, unsigned long, si	(11 / 0 / 0) 11	
bi_flush(struct internal_state *)	(5 / 0 / 6) 11	100.0% (9/9)
bi_reverse(unsigned int, signed int)	(3 / 0 / 2) 5	100.0% (5/5)
bi_windup(struct internal_state *)	(3 / 0 / 5) 8	100.0% (7/7)
build_bl_tree(struct internal_state *)	(0 / 0 / 8) 8	100.0% (11/11)
build_tree(struct internal_state *, struct tree_desc_s *)	(0 / 0 / 7) 7	100.0% (42/42)
check_header(struct gz_stream *)	(21 / 0 / 2) 23	44.4% (20/45)
compress(unsigned char *, unsigned long *...)	(3 / 0 / 0) 3	100.0% (1/1)
> compress2(unsigned char *, unsigned long *...)	(6 / 0 / 0) 6	95.2% (20/21)
compressBound(unsigned long)	(3 / 0 / 0) 3	100.0% (1/1)
compress_block(struct internal_state *, struct ct_data_s	(1 / 0 / 7) 8	77.5% (62/80)
copy_block(struct internal_state *, char *...)	(0 / 0 / 5) 5	100.0% (9/9)
crc32(unsigned long, const unsigned char *...)	(6 / 0 / 1) 7	30.4% (7/23)
crc32_big(unsigned long, const unsigned char *...)	(9 / 0 / 1) 10	100.0% (38/38)
crc32_combine(unsigned long, unsigned long...)	(7 / 0 / 2) 9	100.0% (28/28)
crc32_little(unsigned long, const unsigned char *...)	(9 / 0 / 1) 10	100.0% (36/36)
deflate(struct z_stream_s *, signed int)	(27 / 0 / 5) 32	31.4% (56/178)
deflateBound(struct z_stream_s *, unsigned long)	(6 / 0 / 0) 6	77.7% (7/9)
deflateCopy(struct z_stream_s *, struct z_stream_s *)	(0 / 0 / 3) 3	21.8% (7/32)
deflateEnd(struct z_stream_s *)	(19 / 0 / 7) 26	94.1% (16/17)
deflateInit2_(struct z_stream_s *, signed int...)	(20 / 0 / 0) 20	84.4% (49/58)
deflateInit_(struct z_stream_s *, signed int...)	(5 / 0 / 0) 5	100.0% (1/1)
deflateParams(struct z_stream_s *, signed int...)	(12 / 0 / 0) 12	95.2% (20/21)
deflatePrime(struct z_stream_s *, signed int...)	(5 / 0 / 0) 5	80.0% (4/5)
deflateReset(struct z_stream_s *)	(5 / 0 / 0) 5	94.1% (16/17)
deflateSetDictionary(struct z_stream_s *, const unsigned	(7 / 0 / 7) 14	92.3% (24/26)
deflateSetHeader(struct z_stream_s *, struct gz_header_s	(7 / 0 / 0) 7	83.3% (5/6)
deflateTune(struct z_stream_s *, signed int...)	(5 / 0 / 0) 5	88.8% (8/9)

Toolbar menu in the Unit Test View

Toolbar icon	Description
Expand All	Shows all test view tree.
Collapse All	Hides all test view trees.
Show as Unique Test Name	Displays by unique test name.
Total	Displays all the tests.
Failure/Error	Displays only the tests that the test result is Failure/Error.
Failure	Displays only the tests that the test result is Failure.
Error	Displays only the tests that the test result is Error.
Success	Displays only the tests that the test result is Success.
Function changed	Displays only the tests that the function to be tested has been changed.
Run not guaranteed	Displays only the tests that the test execution is not ensured.
Host/Target result different	Displays only the test that the host result and the target result are different.

Pull-down menu(▽) in the Unit Test View


Show coverage at all elements
Add description when duplicate test case
Insert Default Values for Empty Input
Delete All Test case Descriptions
Check Integrity

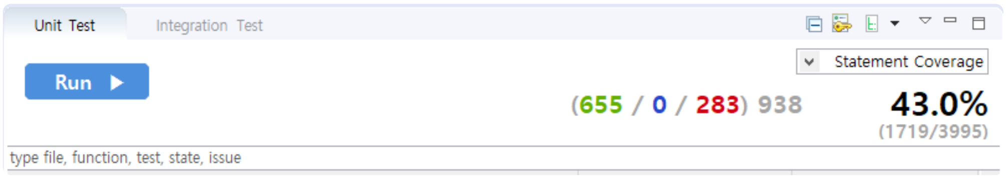
Menu name	Description
Show coverage at all elements	Displays the coverage in all items. (function, test, test case)
Add description when duplicate test case	Adds original test case number on duplicated test case.
Insert Default Values for Empty Input	When input data are empty, inserts default values.
Delete All Test case Descriptions	Delete test case descriptions all together.
Check Integrity	Checks integrity about functions and stubs. Then, reset test if it needs.

- Insert Default Values for Empty Input

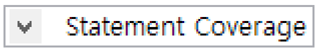
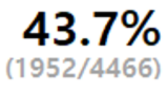
Variable type	Default value
string	*(empty string)*
without string	0

For [Test reconfiguration], refer to [Source Code Modification and Test Reconfiguration]

Dashboard in the Unit Test View

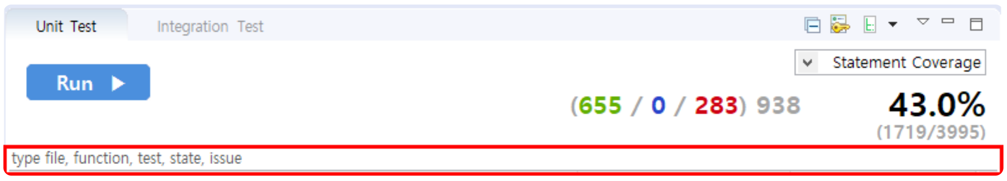


Menu	Description
Run ▶	Runs unit tests.
(878 / 0 / 359) 1237	Shows success, failure, error and total of test case.

	Selects the coverage type to be displayed in the Unit Test View. (statement, branch, MC/DC, function call)
	Shows the selected kind of full coverage.

Search

In the Unit Test View, you can search functions, tests and test cases by file, function, test, status (success, failure, error) and issue name.



Status search keyword

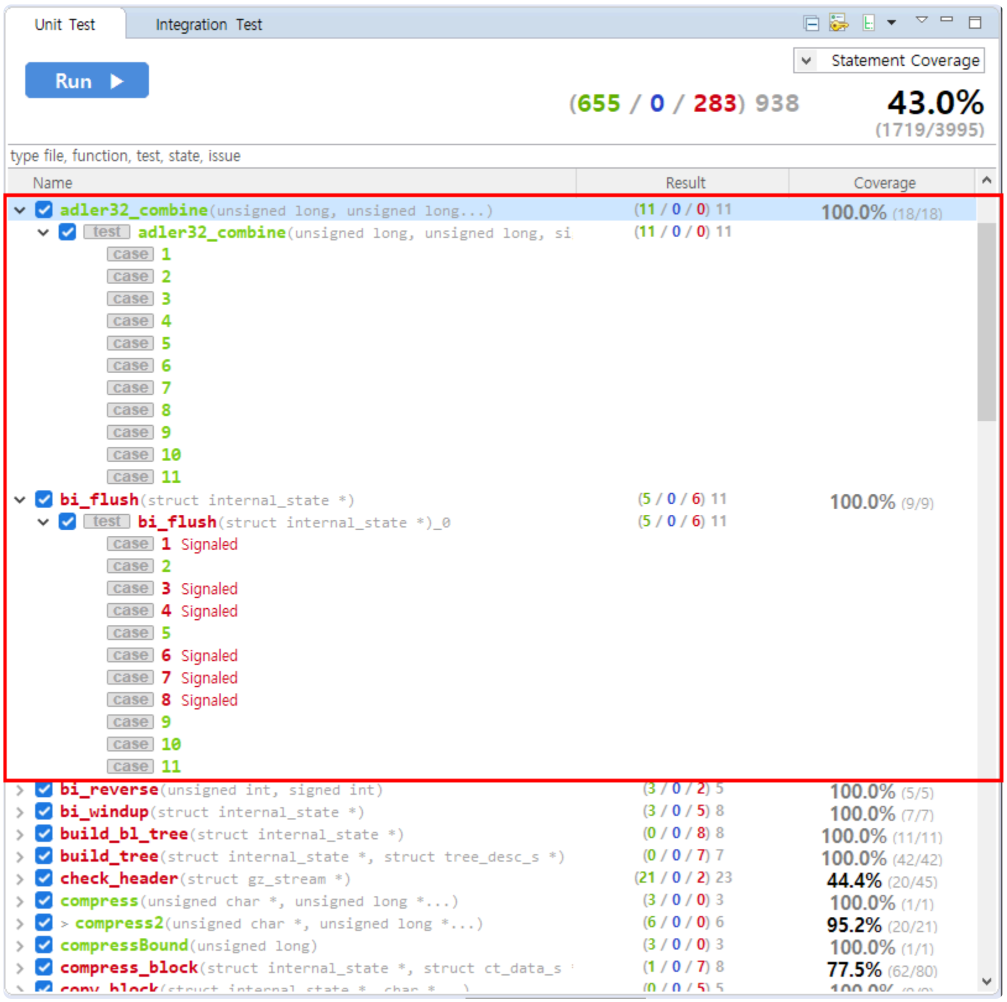
In the Unit Test View, you can filter the tests that are displayed by the status search keyword. It provides searchable keyword recommendation and auto-complete function.

Keyword	Description
`%TEST_SUCCESS%`	Test success
`%TEST_FAILURE% %TEST_ERROR%`	Test failure/error
`%TEST_FAILURE%`	Test failure
`%TEST_ERROR%`	Test error
`%TEST_HAS_NOT_FUNCTION%`	Function changed
`%TEST_NOT_GUARANTEE%`	Run not guaranteed
`%TEST_RESULT_DIFFERENT%`	Host/Target result different

✻ ‘Run not guaranteed’ is a case where test code is generated, but there is no guarantee that it will run normally. This is the case when using a type that is difficult to specify as a parameter or return value.

Structure of the Unit Test View

The Unit Test View presents the hierarchy structure of [Function] > [Test] > [Test case]. If there are more than 100 test cases in a test, they are grouped in groups of 100 to represent a group.



```
(655 / 0 / 283) 938                                  43.0%
                                                  (1719/3995)

Name                                                  Result           Coverage
adler32_combine(unsigned long, unsigned long...)      (11 / 0 / 0) 11  100.0% (18/18)
  test adler32_combine(unsigned long, unsigned long, si (11 / 0 / 0) 11
    case 1
    case 2
    case 3
    case 4
    case 5
    case 6
    case 7
    case 8
    case 9
    case 10
    case 11
bi_flush(struct internal_state *)                     (5 / 0 / 6) 11   100.0% (9/9)
  test bi_flush(struct internal_state *)_0            (5 / 0 / 6) 11
    case 1 Signaled
    case 2
    case 3 Signaled
    case 4 Signaled
    case 5
    case 6 Signaled
    case 7 Signaled
    case 8 Signaled
    case 9
    case 10
    case 11
bi_reverse(unsigned int, signed int)                  (3 / 0 / 2) 5    100.0% (5/5)
bi_windup(struct internal_state *)                    (3 / 0 / 5) 8    100.0% (7/7)
build_bl_tree(struct internal_state *)                (0 / 0 / 8) 8    100.0% (11/11)
build_tree(struct internal_state *, struct tree_desc_s *) (0 / 0 / 7) 7 100.0% (42/42)
check_header(struct gz_stream *)                      (21 / 0 / 2) 23  44.4% (20/45)
compress(unsigned char *, unsigned long *...)         (3 / 0 / 0) 3    100.0% (1/1)
> compress2(unsigned char *, unsigned long *...)      (6 / 0 / 0) 6    95.2% (20/21)
compressBound(unsigned long)                          (3 / 0 / 0) 3    100.0% (1/1)
compress_block(struct internal_state *, struct ct_data_s (1 / 0 / 7) 8 77.5% (62/80)
```

Item icons in the Unit Test View

Item icon	Description
None	Function
test	Test
case	Test case, Test case group

Item status color in the Unit Test View

The execution information of functions, tests, and test cases in the Unit Test View is represented by colors.

Color	Description
Green	Function/Test: If the execution result of all the test cases under it is success. Test case: The result of execution is success.
Blue	Function/Test: If only test cases with failure and no test cases with errors exist under it. Test case: The result of execution is failure.
Red	Function/Test: If test cases with error exist under it. Test case: The result of execution is error.

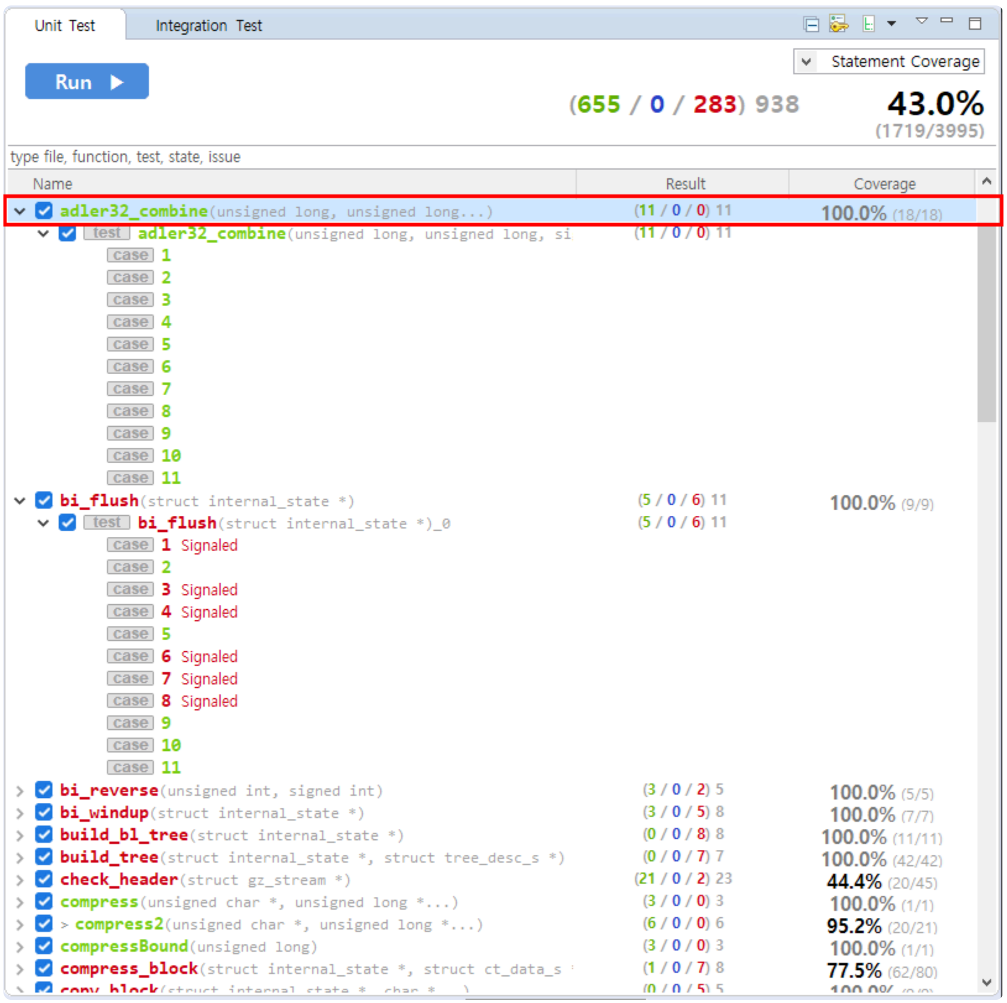
Orange	Function/Test: All test cases have not been executed under it and test cases that are not guaranteed to run exist. Test case: Run not guaranteed.
Black	Function/Test: All test cases under it have not been executed. Test case: Not been executed.

Function

The functions provide the function name, the coverage and the test case execution results (success, failure, error and total).

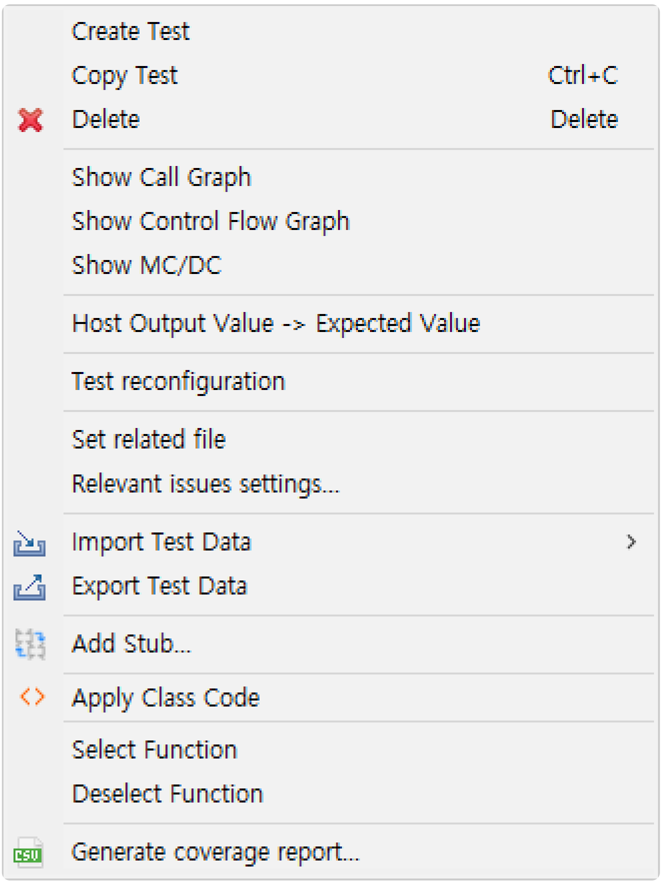
For the coverage for each function, the test execution result of the other function may be applied depending on the call relationship between functions.

Double-click on a function to check the location of the function in the Source Code Editor.



```
(655 / 0 / 283) 938                                         43.0%
                                                       (1719/3995)
type file, function, test, state, issue
Name                                                       Result            Coverage
adler32_combine(unsigned long, unsigned long...)           (11 / 0 / 0) 11   100.0% (18/18)
  test adler32_combine(unsigned long, unsigned long, si    (11 / 0 / 0) 11
       case 1
       case 2
       case 3
       case 4
       case 5
       case 6
       case 7
       case 8
       case 9
       case 10
       case 11
bi_flush(struct internal_state *)                          (5 / 0 / 6) 11    100.0% (9/9)
  test bi_flush(struct internal_state *)_0                 (5 / 0 / 6) 11
       case 1 Signaled
       case 2
       case 3 Signaled
       case 4 Signaled
       case 5
       case 6 Signaled
       case 7 Signaled
       case 8 Signaled
       case 9
       case 10
       case 11
bi_reverse(unsigned int, signed int)                       (3 / 0 / 2) 5     100.0% (5/5)
bi_windup(struct internal_state *)                         (3 / 0 / 5) 8     100.0% (7/7)
build_bl_tree(struct internal_state *)                     (0 / 0 / 8) 8     100.0% (11/11)
build_tree(struct internal_state *, struct tree_desc_s *)  (0 / 0 / 7) 7     100.0% (42/42)
check_header(struct gz_stream *)                           (21 / 0 / 2) 23   44.4% (20/45)
compress(unsigned char *, unsigned long *...)              (3 / 0 / 0) 3     100.0% (1/1)
> compress2(unsigned char *, unsigned long *...)           (6 / 0 / 0) 6     95.2% (20/21)
compressBound(unsigned long)                               (3 / 0 / 0) 3     100.0% (1/1)
compress_block(struct internal_state *, struct ct_data_s   (1 / 0 / 7) 8     77.5% (62/80)
copy_block(struct internal_state *, char *, ...)           (0 / 0 / 5) 5     100.0%
```

Context menu of the function



Context menu	Description
Create Test	Creates a test of the selected function.
Copy Test	Copies tests of the selected function.
Delete	Deletes tests and test cases of the selected function.
Show call graph	Shows the function call graph of the selected function.
Show Control Flow Graph	Shows the control flow graph of the selected function.
Show MC/DC	Shows MC/DC of the selected function.
Host Output Value -> Expected Value	Pastes the host output value to the expected value.
Test reconfiguration	Reconfigure test information.
Set related file	Selects the files containing that test.
Relevant issues settings	Associates the selected test with the issue of the management tool.
Import Test Data	Imports the test data saved in local.
Export Test Data	Exports the test data to local.
Add Stub	Adds the stub to the selected test.
Apply Class Code	Apply the class code generated in the Class Factory View to the

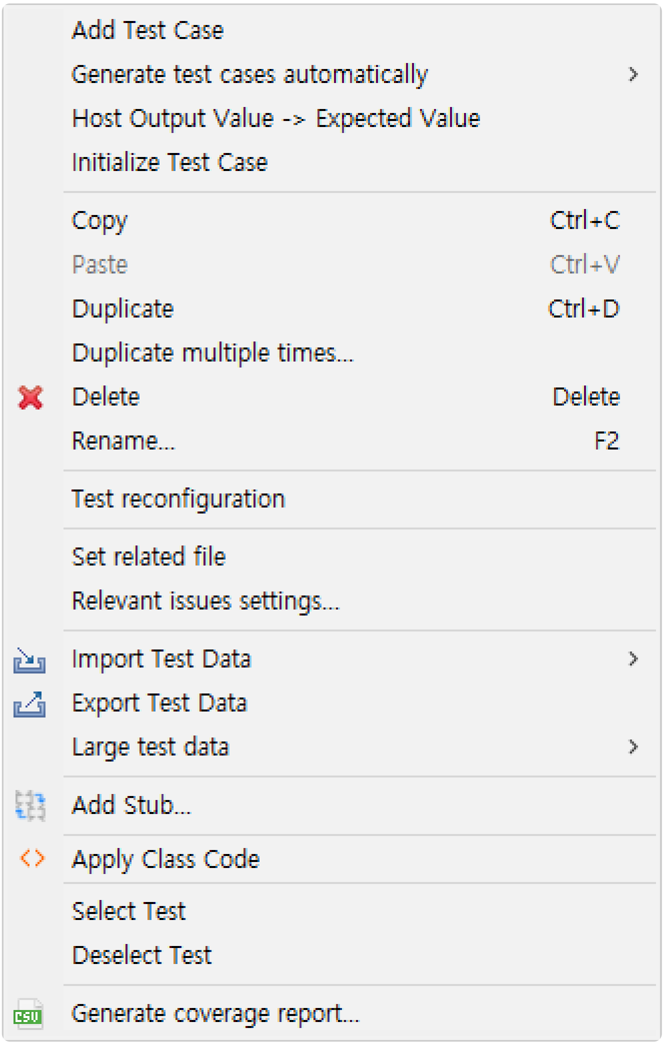
	function.
Select Function	Selects the checkbox of all the functions selected by a mouse.
Deselect Function	Deselects the checkbox of all functions selected by a mouse.
Generate coverage report	Exports the selected test coverage to the selected path.

For [Test reconfiguration], refer to [Source Code Modification and Test Reconfiguration]

Test

The test provides coverage, test case execution results(success, failure, error, total).
Double-click on a test to open its Test Editor.

Context menu of the test



Context menu	Description
Add Test Case	Adds the test case to the unit test selected.
Generate test cases	Creates the test case in various ways.

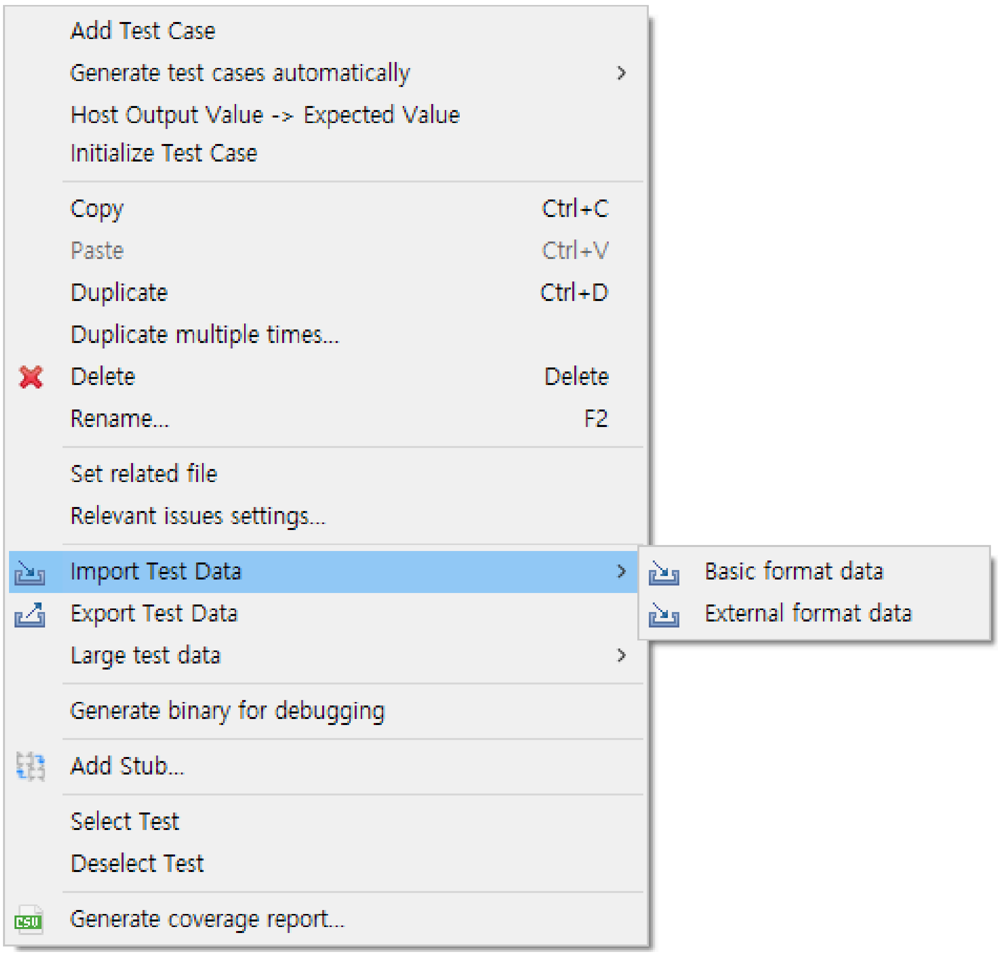
automatically	
Host Output Value -> Expected Value	Pastes the host output value to the expected value.
Initialize Test case	Delete all the test cases.
Copy	Copies the test and test case.
Paste	Pastes the test and test case.
Duplicate	Duplicates the test and test case.
Duplicate multiple times	Duplicates tests and test cases as many as the number entered.
Delete	Deletes the test and test case.
Rename	Modifies the test name.
Test reconfiguration	Reconfigure test information.
Set related file	Selects the files containing that test.
Relevant issues settings	Associates the selected test with the issue of the management tool.
Import Test Data	Imports the test data saved in local.
Export Test Data	Exports the test data in local.
Large test data	Exports it locally or registers the file written by the user to the target test as a test case.
Add Stub	Adds the stub to the selected test.
Apply Class Code	Apply the class code generated in the Class Factory View to the test.
Select Test	Checks all checkbox of the tests selected.
Deselect Test	Checks all checkbox of the tests selected.
Generate coverage report	Exports the selected test coverage to the selected path.

- Rule for importing test data
  When importing the test data, if you select multiple test data numbered with the test name, it imports those files by merging them.

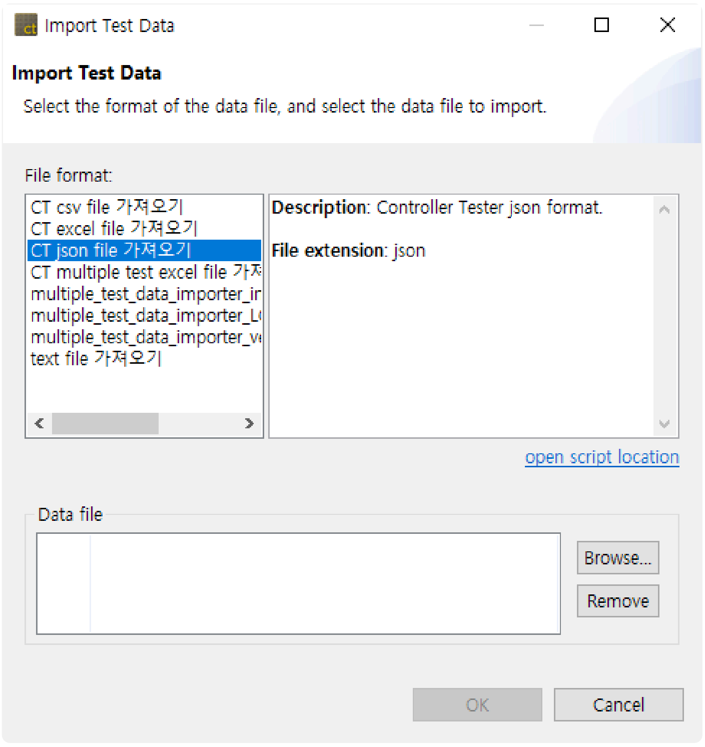
For [Test reconfiguration], refer to [Source Code Modification and Test Reconfiguration]

Import test data

You can import the test data in various formats (csv, xlsx, txt, json).



1. In the context menu of the Unit Test View, click [Import Test Data] and select either [Basic format data] or [External format data].
2. If you select [Basic format data], the test data with the format (csv) exported from the Controller Tester is imported.
3. If you select [External format data], the test data is imported from the files in various formats (csv, xlsx, txt, json).



Import Test Data

Import Test Data

Select the format of the data file, and select the data file to import.

File format:

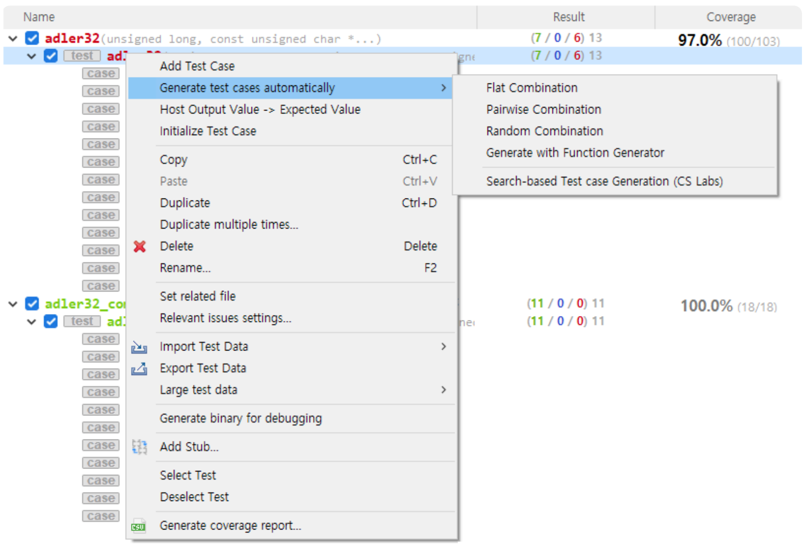
CT csv file 가져오기
CT excel file 가져오기
CT json file 가져오기
CT multiple test excel file 가져
multiple_test_data_importer_ir
multiple_test_data_importer_L
multiple_test_data_importer_v
text file 가져오기

Description: Controller Tester json format.

File extension: json

Generate test cases automatically

It creates a test case by using [Flat/Pairwise/Random combination], [Generates with Function Generator], and [Search-based Test case Generation (CS Labs)].

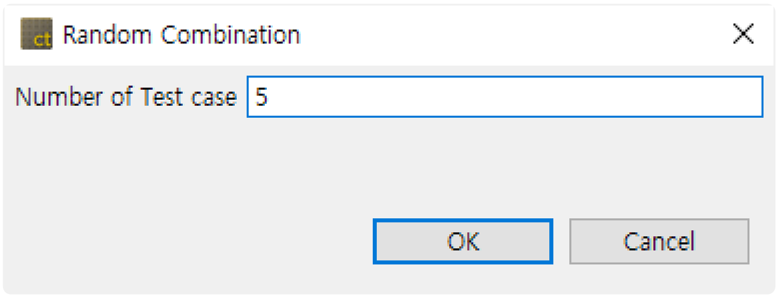


1. In the context menu of the Unit or the Integration Test View, click [Generate test cases automatically] and select one among [Flat Combination], [Pairwise Combination], [Random Combination], [Generate with Function Generator] and [Search-based Test case Generation (CS Labs)].

Method	Description
Flat	Combines simply based on variables having the largest number of test data.
Pairwise	Combines so that each selected parameter data is paired at least once with the

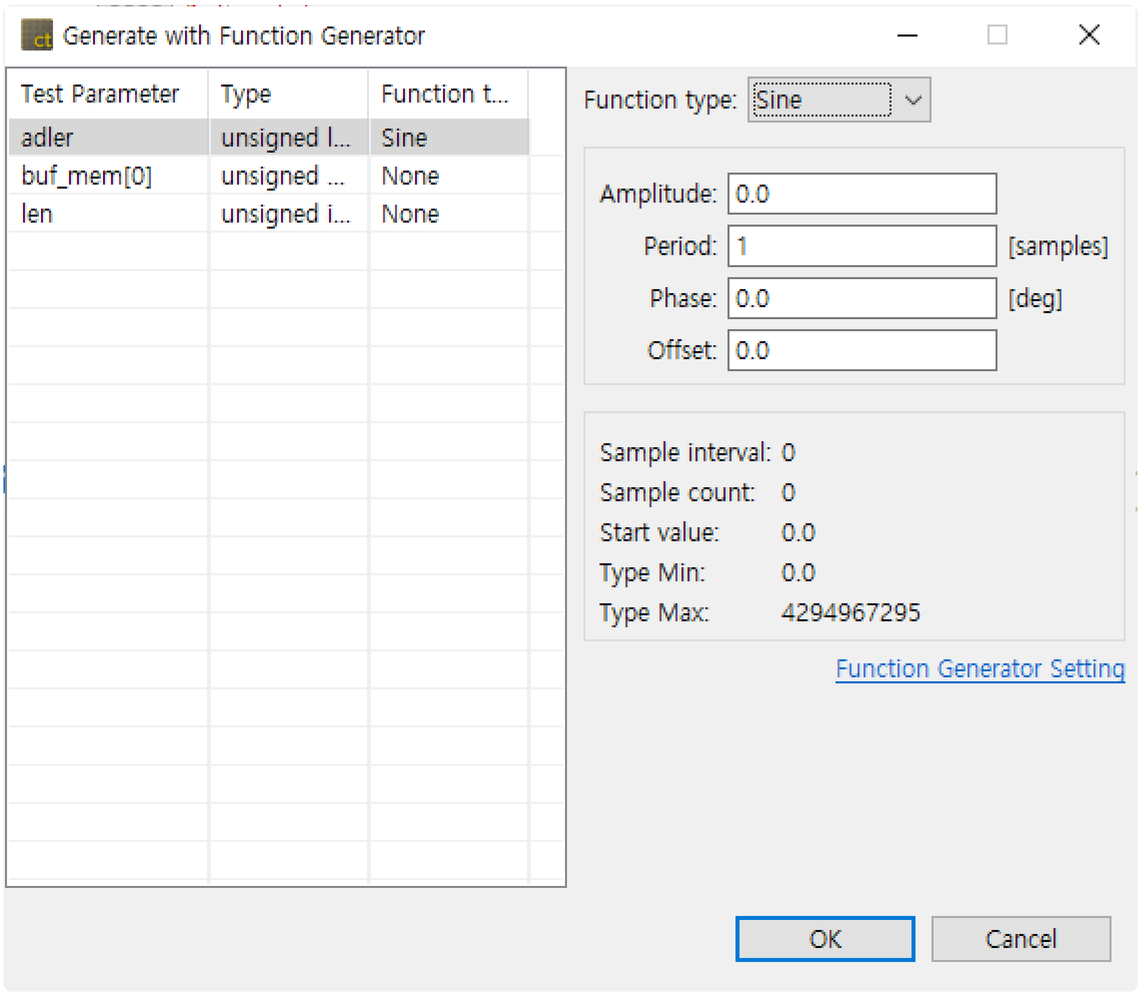
	parameter data other than itself. ※ The number of variable partitions must be more than 2 and less than 52.
Random	Combines the test data as many as the number of test cases that the user defines any value between the minimum value and the maximum value for the variable partition of input parameters.
Generate with Function Generator	Creates a test case by using six function types. (Ramps, Random, Range, Sine, Toggle, and Single Value)
Search-based Test case Generation (CS Labs)	Creates a test case by using AVM, which is a local search algorithm. ※ Currently, only C language is supported.

2. If you select [Random combination], the Random combination window is displayed so that the user can enter the number of test cases.



Number of Test case: 5

3. If you select [Generate with Function generator], you can select the function type (Ramps, Sine, Random, Toggle, Range, Single value and None) and change the settings of the function selected via the settings of the function generator. In the properties window of the project, you can set the function generator information in [Test] > [Generate test cases automatically] > [Function Generator].



Test Parameter	Type	Function t...
adler	unsigned l...	Sine
buf_mem[0]	unsigned ...	None
len	unsigned i...	None

Function type: Sine

Amplitude: 0.0
Period: 1 [samples]
Phase: 0.0 [deg]
Offset: 0.0

Sample interval: 0
Sample count: 0
Start value: 0.0
Type Min: 0.0
Type Max: 4294967295

a. Common settings

You can change the value in [Project] > [Properties] with the setting value common to each function.

Setting	Description
Sample interval	The interval of samples to be sampled from the function.
Number of sample	The number of samples to be sampled from the function(The number of test cases).
Start value	The default value at which the function is started (the values are created based on the start value).
Minimum value of type	The minimum value of variable partition. (If the return value of the function is less than the minimum value of type, the minimum value of type is returned.)
Maximum value of type	The maximum value of variable partition. (If the return value of the function is greater than the maximum value of type, the maximum value of type is returned.)

b. Ramps function

It is a function that creates a pulse by using Pre, Post and Hold values. If the number of samples is greater than the period of the function, the function is called recursively.

Setting	Description
Pre delay	The time to last Pre/Post sample value.
Rise samples	The time to rise from Pre/Post sample value to Hold sample value.
Hold samples	The time to last Hold sample value.
Fall samples	The time to fall from Hold sample value to Pre/Post sample value.
Post delay	The time to last Pre/Post sample value.
Pre/Post delay value	Pre/Post delay sample value.
Hold value	Hold sample value.

c. Random function

It is a function that creates a random value between the minimum value (Min) and the maximum value (Max).

Setting	Description
Min	The minimum value of random range.
Max	The maximum value of random range.

d. Range function

It is a function that creates values that increments or decrements by a certain interval (Step Size) between the minimum value of type and the maximum value of type.

Setting	Description
Step size	The size of increment or decrement value.
Hold	The number of times that the Step size holds.
Rising	The function type that rises by the Step size. Ex) if the step size is 30, 0,30,60……
Falling	The function type that falls by the Step size. Ex) if the step size is 30, 100,70,40……
Alternate	If the result value of function meets the minimum/maximum value of type, the function type that changes to rise or fall. Ex) if the step size is 30 and the maximum/minimum value are 0~100, 0,30,60,90,60,30,0……

e. Sine function

It is a function that creates Sine value. If the number of samples is greater than the period of the function, the function is called recursively.

Setting	Description
Amplitude	The amplitude of Sine function.
Period	The period of Sine function.
Phase	The phase of Sine function.
Offset	The offset of Sine function.

f. Toggle function

It is a function that creates FirstValue and SecondValue repeatedly.

Setting	Description
First value	The first value that is repeated in Toggle function.
Second value	The second value that is repeated in Toggle function.

g. SingleValue function

It is a function that returns only a constant single value.

Setting	Description
Value	The value to be created.

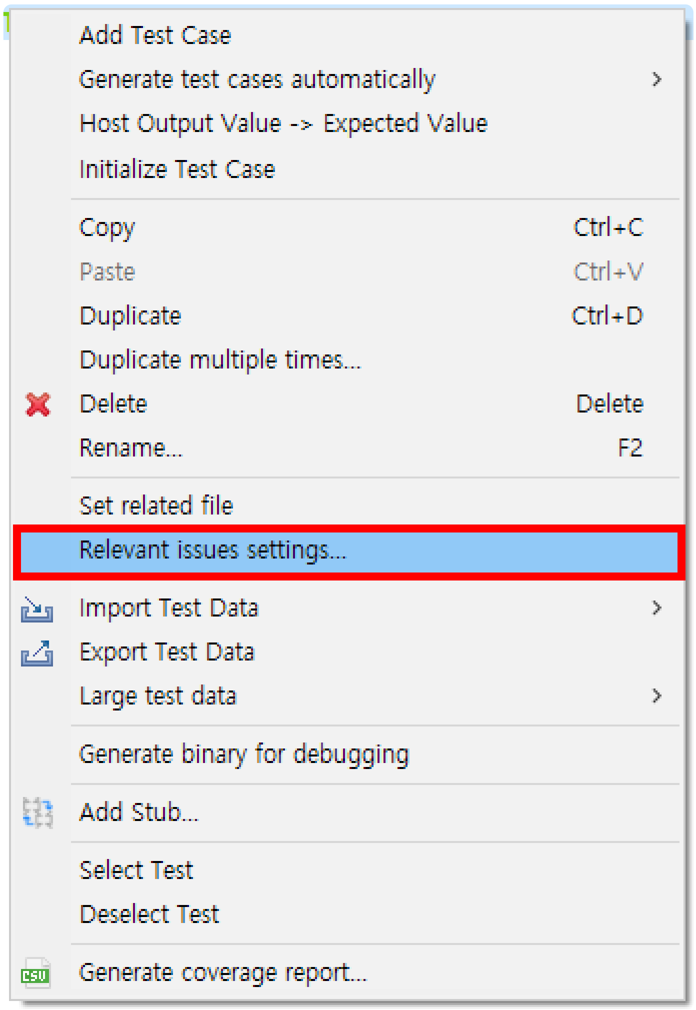
h. None

It does not create a function.

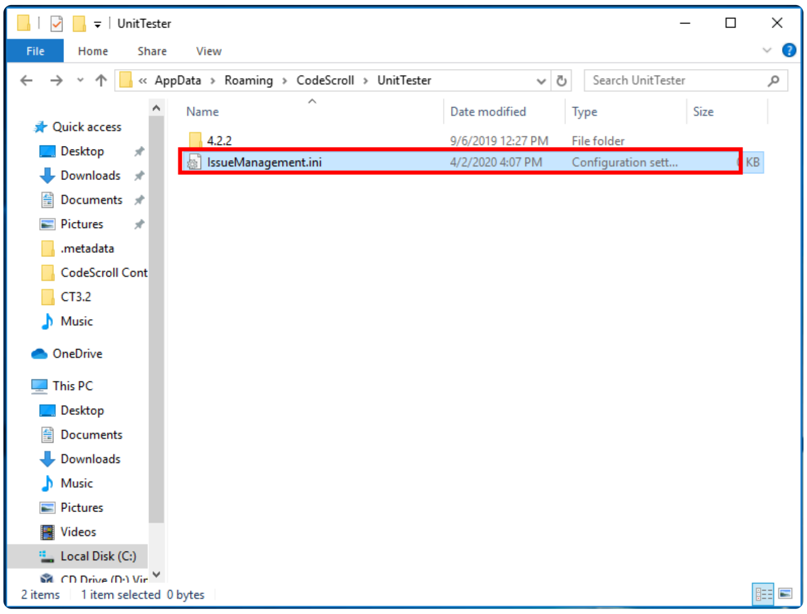
Relevant issues settings

It associates the selected test with the issue in the issue management tool registered. The Controller Tester supports the following issue management tools: JIRA, Trac, Redmine, Mantis, Bugzilla.

1. In the context menu of Unit Test View, click [Relevant issues settings…].



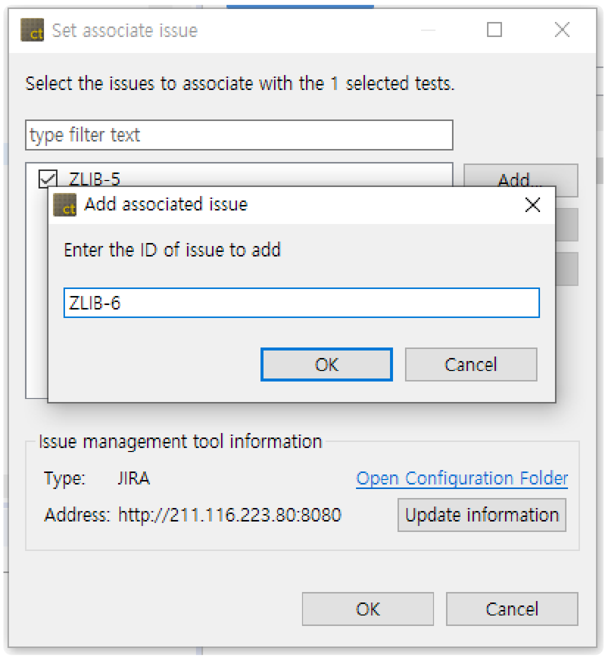
2. Enter the information of the issue management tool in the configuration file (IssueManagement.ini).



Name	Date modified	Type	Size
4.2.2	9/6/2019 12:27 PM	File folder	
IssueManagement.ini	4/2/2020 4:07 PM	Configuration sett...	KB

2 items 1 item selected 0 bytes

3. Add the issues to be associated with the test.



Set associate issue

Select the issues to associate with the 1 selected tests.

type filter text

☑ ZLIB-5

Add associated issue

Enter the ID of issue to add

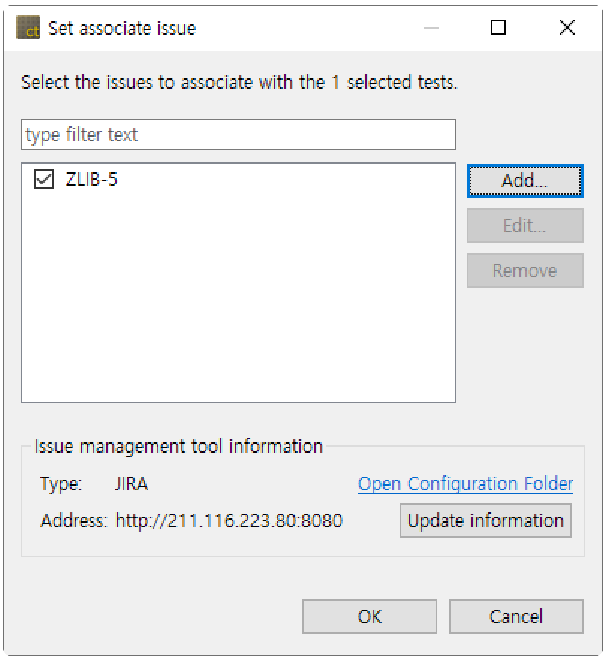
ZLIB-6

Issue management tool information

Type: JIRA

Address: http://211.116.223.80:8080

4. Check the checked issue list and click [OK].



Set associate issue

Select the issues to associate with the 1 selected tests.

type filter text

☑ ZLIB-5

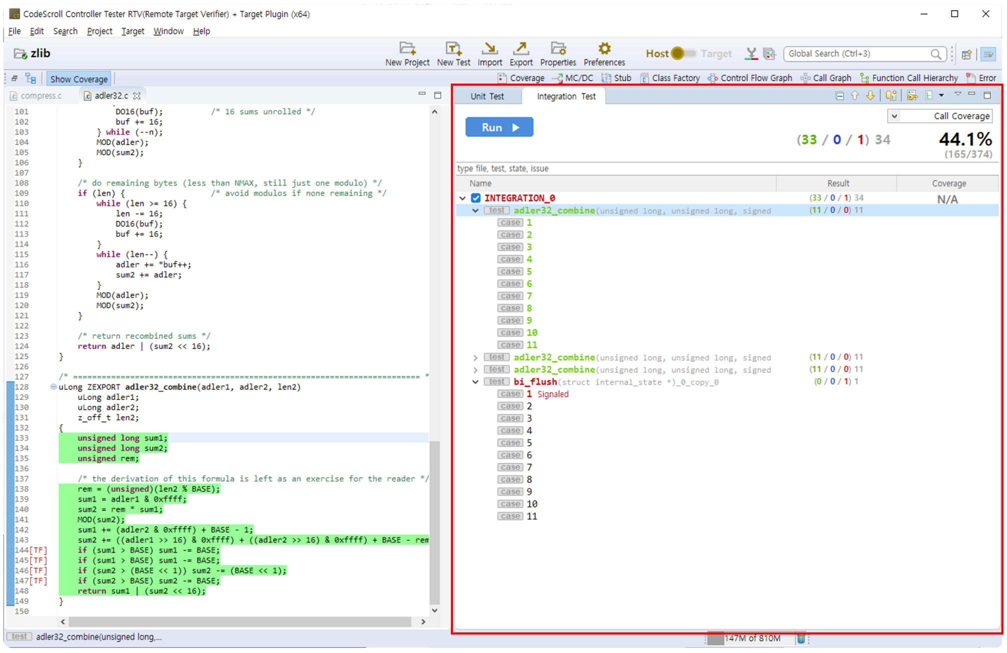
Issue management tool information

Type: JIRA

Address: http://211.116.223.80:8080

15.4. Integration Test View

The Integration Test View provides the integration test unit that can group the unit tests. The unit tests under the integration test run in order with the context maintained.


CodeScroll Controller Tester RTV(Remote Target Verifier) + Target Plugin (x64)
File Edit Search Project Target Window Help
zlib
New Project New Test Import Export Properties Preferences
Host Target
Global Search (Ctrl+3)
Show Coverage
Coverage MC/DC Stub Class Factory Control Flow Graph Call Graph Function Call Hierarchy Error
compress.c adler32.c
Unit Test Integration Test
Run
Call Coverage
147M of 810M

```
            DO16(buf);          /* 16 sums unrolled */
            buf += 16;
        } while (--n);
        MOD(adler);
        MOD(sum2);
    }

    /* do remaining bytes (less than NMAX, still just one modulo) */
    if (len) {                  /* avoid modulos if none remaining */
        while (len >= 16) {
            len -= 16;
            DO16(buf);
            buf += 16;
        }
        while (len--) {
            adler += *buf++;
            sum2 += adler;
        }
        MOD(adler);
        MOD(sum2);
    }

    /* return recombined sums */
    return adler | (sum2 << 16);
}

/* ========================================================================= *
uLong ZEXPORT adler32_combine(adler1, adler2, len2)
    uLong adler1;
    uLong adler2;
    z_off_t len2;
{
    unsigned long sum1;
    unsigned long sum2;
    unsigned rem;

    /* the derivation of this formula is left as an exercise for the reader */
    rem = (unsigned)(len2 % BASE);
    sum1 = adler1 & 0xffff;
    sum2 = rem * sum1;
    MOD(sum2);
    sum1 += (adler2 & 0xffff) + BASE - 1;
    sum2 += ((adler1 >> 16) & 0xffff) + ((adler2 >> 16) & 0xffff) + BASE - rem
    if (sum1 > BASE) sum1 -= BASE;
    if (sum1 > BASE) sum1 -= BASE;
    if (sum2 > (BASE << 1)) sum2 -= (BASE << 1);
    if (sum2 > BASE) sum2 -= BASE;
    return sum1 | (sum2 << 16);
}
```

test adler32_combine(unsigned long,...

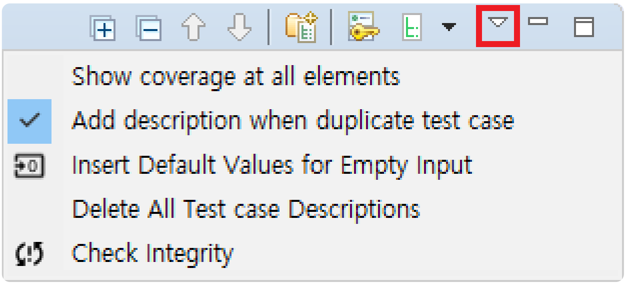
```
(33 / 0 / 1) 34                                   44.1%
                                                  (165/374)
type file, test, state, issue
Name                                                    Result            Coverage
INTEGRATION_0                                           (33 / 0 / 1) 34   N/A
  test adler32_combine(unsigned long, unsigned long, signed   (11 / 0 / 0) 11
    case 1
    case 2
    case 3
    case 4
    case 5
    case 6
    case 7
    case 8
    case 9
    case 10
    case 11
  test adler32_combine(unsigned long, unsigned long, signed   (11 / 0 / 0) 11
  test adler32_combine(unsigned long, unsigned long, signed   (11 / 0 / 0) 11
  test bi_flush(struct internal_state *)_0_copy_0             (0 / 0 / 1) 1
    case 1 Signaled
    case 2
    case 3
    case 4
    case 5
    case 6
    case 7
    case 8
    case 9
    case 10
    case 11
```

Toolbar menu in the Integration Test View

Toolbar icon	Description
Expand All	Shows all test view tree nodes.
Collapse All	Hides all test view tree nodes.
Move Up Test	Moves the selected test up.
Move Down Test	Moves the selected test down.
Create	Creates an integration test.
Shows as Unique Test Name	Displays with unique test name.
Total	Displays all the tests.
Failure/Error	Displays only the tests that the test result is Failure/Error.
Failure	Displays only the tests that the test result is Failure.
Error	Displays only the tests that the test result is Error.
Success	Displays only the tests that the test result is Success.
Function changed	Displays only the tests that the function to be tested has been changed.
Run not guaranteed	Displays only the tests that the test execution is not ensured.

Host/Target result different	Displays only the test that the host result and the target result are different.

Pull-down menu(▽) in the Integration Test View


Show coverage at all elements
✓ Add description when duplicate test case
Insert Default Values for Empty Input
Delete All Test case Descriptions
Check Integrity

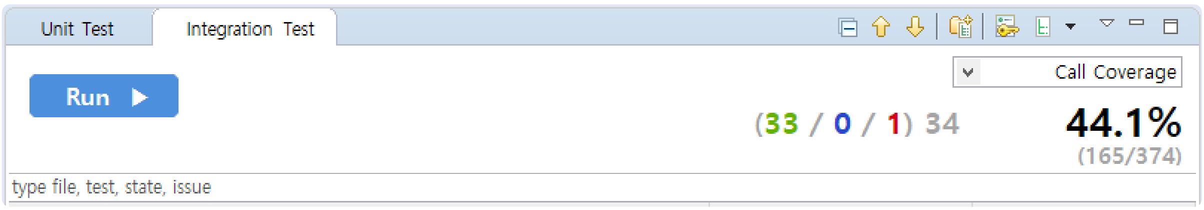
Menu name	Description
Show coverage at all elements	Displays the coverage in all items.(integration test, test, test case)
Add description when duplicate test case	Adds original test case number on duplicated test case.
Insert Default Values for Empty Input	When input data are empty, inserts default values.
Delete All Test case Descriptions	Delete test case descriptions all together.
Check Integrity	Checks integrity about functions and stubs. Then, reset test if it needs.

- Insert Default Values for Empty Input

Variable type	Default value
string	(empty string)
without string	0

For [Test reconfiguration], refer to [Source Code Modification and Test Reconfiguration]

Dashboard in the Integration Test View

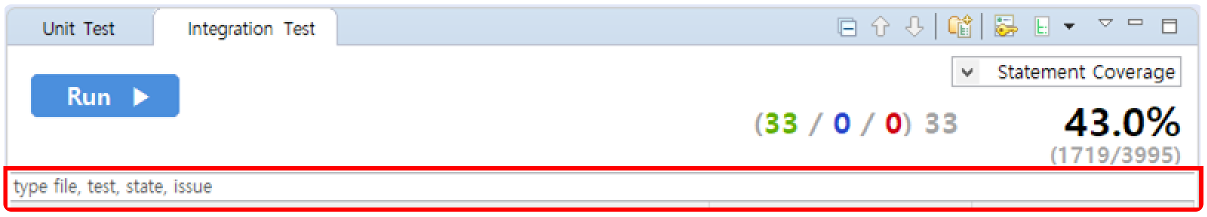


Menu	Description

Run ▶	Runs integration tests.
(878 / 0 / 359) 1237	Shows success, failure, error and total of test case.
Statement Coverage	Selects the coverage type to be displayed in the Integration Test View. (statement, branch, MC/DC, function call)
43.7% (1952/4466)	Shows the selected kind of full coverage.

Search

In the Integration Test View, you can search the integration tests, tests and test cases by file, function, test, status (success, failure, error) and issue name.



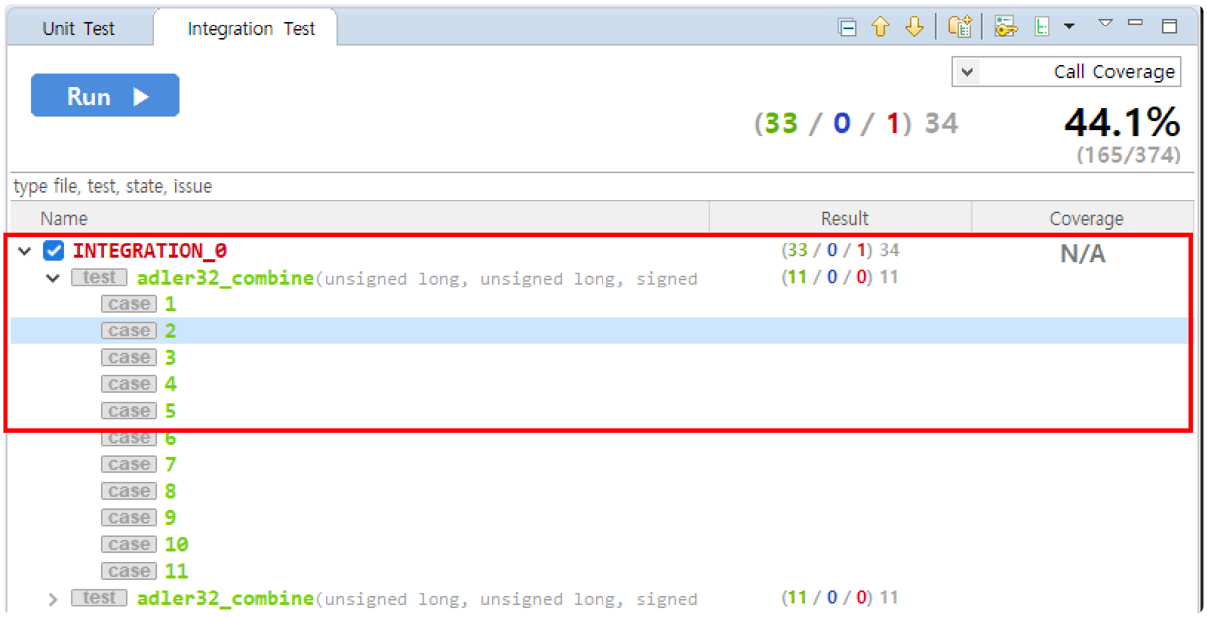
Status search keyword

In the Integration Test View, you can filter the tests displayed by the status search keyword. It provides searchable keyword recommendation and auto-complete function.

Keyword	Description
`%TEST_SUCCESS%`	Test success
`%TEST_FAILURE% %TEST_ERROR%`	Test failure/error
`%TEST_FAILURE%`	Test failure
`%TEST_ERROR%`	Test error
`%TEST_HAS_NOT_FUNCTION%`	Function changed
`%TEST_NOT_GUARANTEE%`	Run not guaranted
`%TEST_RESULT_DIFFERENT%`	Host/Target result different

Structure of the Integration Test View

The Integration Test View presents the hierarchy structure of [Integartion tes] > [Test] > [Test case].



```
INTEGRATION_0                                                        (33 / 0 / 1) 34    N/A
  test adler32_combine(unsigned long, unsigned long, signed          (11 / 0 / 0) 11
    case 1
    case 2
    case 3
    case 4
    case 5
    case 6
    case 7
    case 8
    case 9
    case 10
    case 11
  test adler32_combine(unsigned long, unsigned long, signed          (11 / 0 / 0) 11
```

Item icons in the Integration Test View

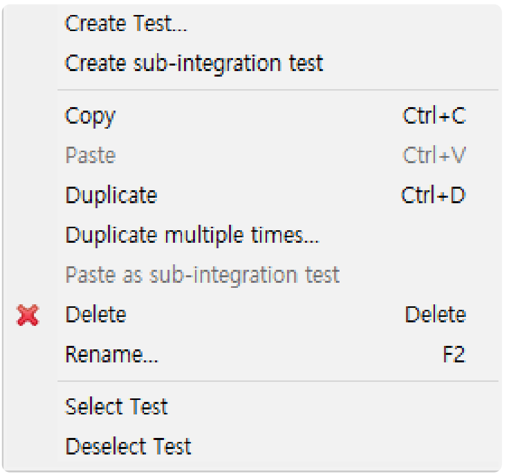
Item icon	Description
None	Integration Test
test	Test
test●	Global variable test
case	Test case, Test case group

Item status color in the Integration Test View

The execution information of functions, tests, and test cases in the Integration Test View is represented by colors.

Color	Description
Green	Integration Test/Test: If the execution result of all the test cases under it is success. Test case: If the result of execution is success.
Blue	Function/Test: If only test cases with failure and no test cases with errors exist under it. Test case: If the result of execution is failure.
Red	Function/Test: If test cases with error exist under it. Test case: If the result of execution is error.
Orange	Function/Test: All test cases have not been executed under it and test cases that are not guaranteed to run exist. Test case: Run not guaranteed
Black	Function/Test: All test cases under it have not been executed. Test case: Not been executed

Context menu in the Integration Test View

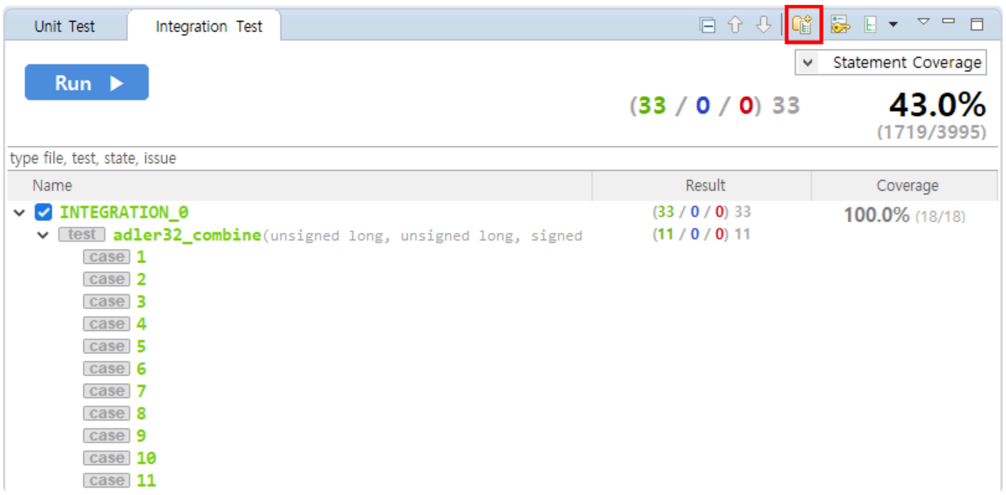


Context menu	Description
Create Test	Creates the dialog for creating a test
Create sub-integration test	Creates a sub-integration test
Copy	Copies the test and test case
Paste	Pastes the test and test case
Duplicate	Duplicates the test and test case
Duplicate multiple times	Duplicates tests and test cases as many as the number entered
Paste as sub-integration test	Pastes the integration test copied into the integration test selected as a sub-integration test
Delete	Deletes the test and test case
Rename	Modifies the test name
Select tests	Checks all checkbox of the tests selected
Deselect tests	Checks all checkbox of the tests selected

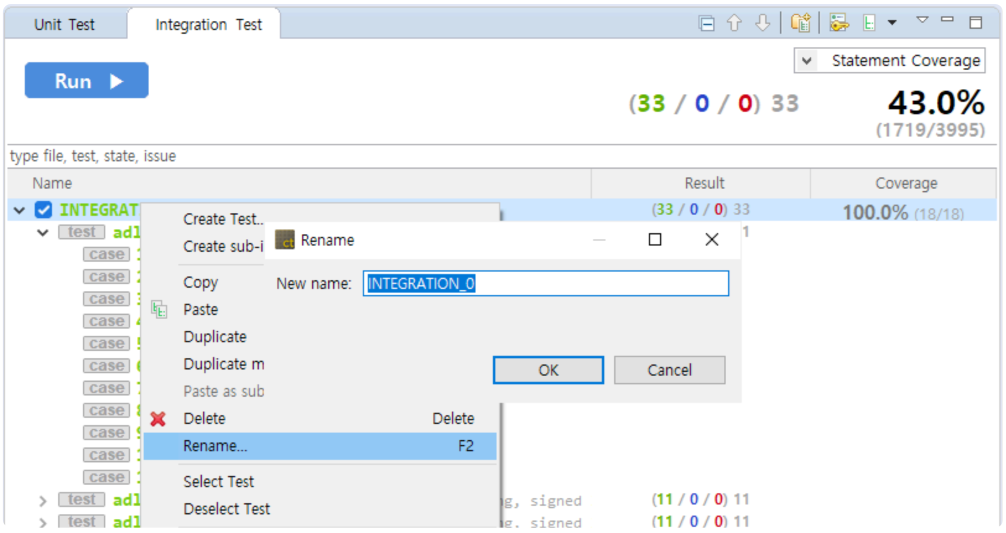
Create Integration test and Rename

The integration test can be created in the toolbar menu. The name of the integration test is assigned automatically and can be changed by using [Rename] context menu.

- Create

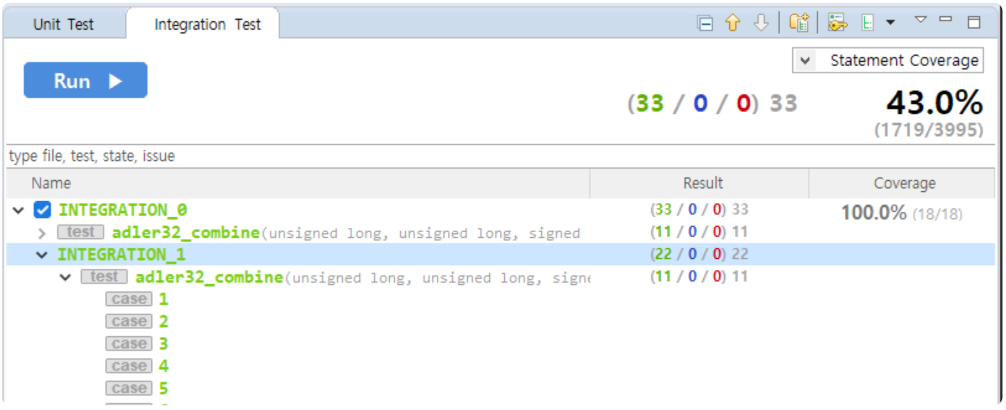


- Rename



Sub-integration test

You can create a sub-integration test under the integration test by using [Create sub-integration test] context menu or pasting an existing integration test into other integration test using [Paste as sub-integration test] context menu.



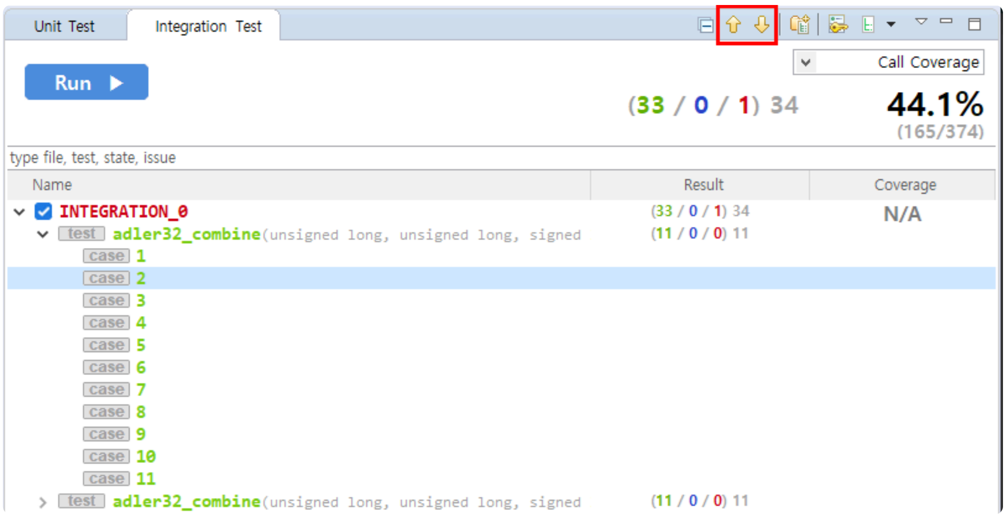
Add a test and change the order of run

There are four ways to add tests to the integration test.

1. You can select an integration test and create it by using [Create Test…] context menu.
2. You can add by dragging and dropping the test in the Unit Test View to the integration test.
3. You can select the test of the Integration Test View and copy/paste it by using the context menu.
4. You can select the test in the Unit Test View and copy/paste it by using the context menu.

There are two ways to change the execution sequence for the test.

1. You can select a test or test case and change it by moving with a mouse.
2. You can select a test or test case and change it by selecting either [Move Up Test] or [Move Down Test] in the toolbar.



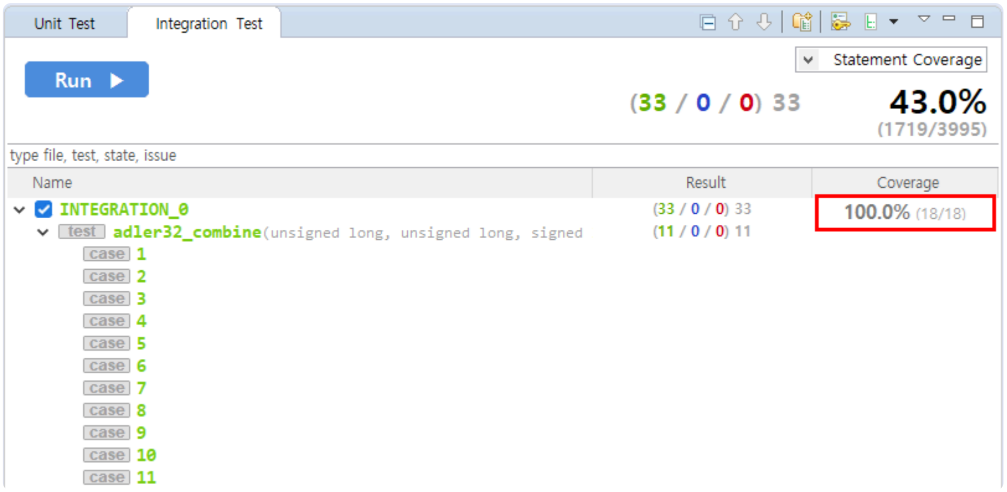
(33 / 0 / 1) 34 44.1% (165/374)

type file, test, state, issue

Name	Result	Coverage
INTEGRATION_0	(33 / 0 / 1) 34	N/A
test adler32_combine(unsigned long, unsigned long, signed	(11 / 0 / 0) 11	
case 1		
case 2		
case 3		
case 4		
case 5		
case 6		
case 7		
case 8		
case 9		
case 10		
case 11		
test adler32_combine(unsigned long, unsigned long, signed	(11 / 0 / 0) 11	

The coverage result of integration test

If you select the integration test, the result can be checked in the Coverage.



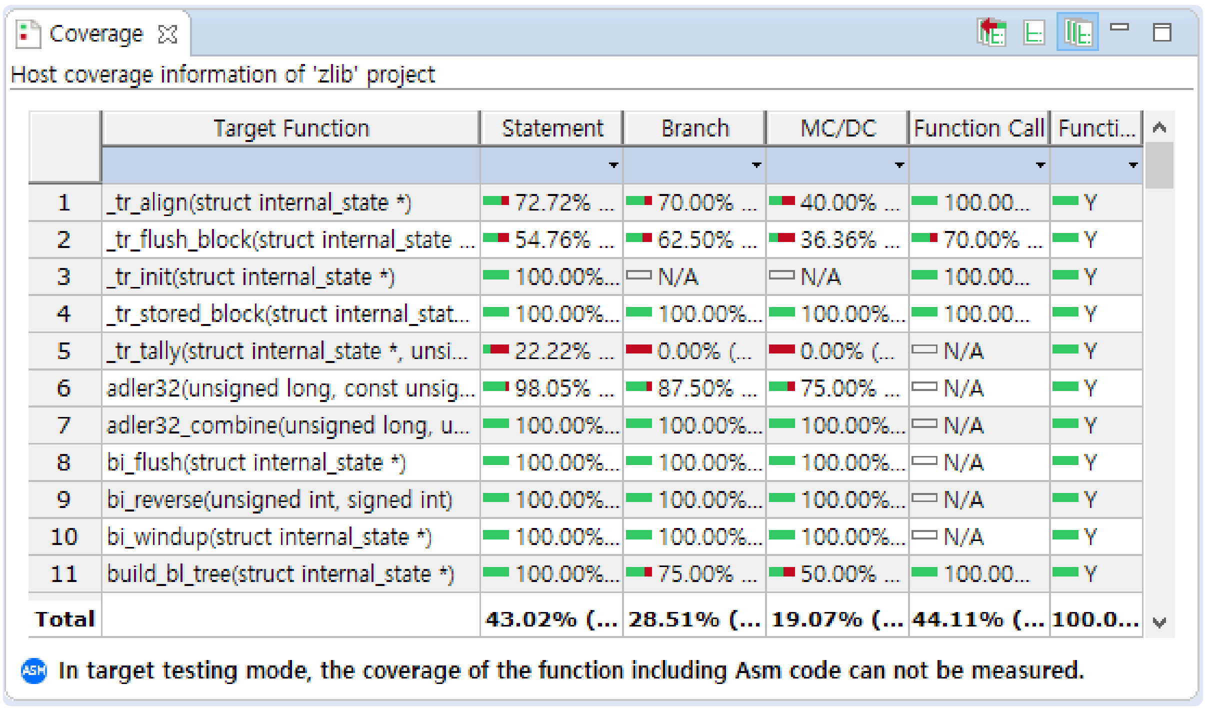
(33 / 0 / 0) 33 43.0% (1719/3995)

type file, test, state, issue

Name	Result	Coverage
INTEGRATION_0	(33 / 0 / 0) 33	100.0% (18/18)
test adler32_combine(unsigned long, unsigned long, signed	(11 / 0 / 0) 11	
case 1		
case 2		
case 3		
case 4		
case 5		
case 6		
case 7		
case 8		
case 9		
case 10		
case 11		

15.5. Coverage View

It shows the coverage of the function to be tested after test has been run as a percentage.



Coverage

Host coverage information of 'zlib' project

	Target Function	Statement	Branch	MC/DC	Function Call	Functi...
1	_tr_align(struct internal_state *)	72.72% ...	70.00% ...	40.00% ...	100.00...	Y
2	_tr_flush_block(struct internal_state ...	54.76% ...	62.50% ...	36.36% ...	70.00% ...	Y
3	_tr_init(struct internal_state *)	100.00%...	N/A	N/A	100.00...	Y
4	_tr_stored_block(struct internal_stat...	100.00%...	100.00%...	100.00%...	100.00...	Y
5	_tr_tally(struct internal_state *, unsi...	22.22% ...	0.00% (...	0.00% (...	N/A	Y
6	adler32(unsigned long, const unsig...	98.05% ...	87.50% ...	75.00% ...	N/A	Y
7	adler32_combine(unsigned long, u...	100.00%...	100.00%...	100.00%...	N/A	Y
8	bi_flush(struct internal_state *)	100.00%...	100.00%...	100.00%...	N/A	Y
9	bi_reverse(unsigned int, signed int)	100.00%...	100.00%...	100.00%...	N/A	Y
10	bi_windup(struct internal_state *)	100.00%...	100.00%...	100.00%...	N/A	Y
11	build_bl_tree(struct internal_state *)	100.00%...	75.00% ...	50.00% ...	100.00...	Y
Total		**43.02% (...**	**28.51% (...**	**19.07% (...**	**44.11% (...**	**100.0...**

In target testing mode, the coverage of the function including Asm code can not be measured.

Coverage type provided in Controller Tester

Coverage	Description
Statement	Percentage of source code statement executed by the test.
Branch	Percentage of branch executed by the test. 100% branch coverage includes 100% decision coverage and 100% statement coverage.
MC/DC	Coverage considering the condition coverage and the decision coverage complexly(described in MC/DC view).
Function call	Percentage of the function called by the test among all the functions.
Function	Percentage of functions that have been called at least once in all functions.

Label icon in the Coverage View

Icon	Description
⚠	Function changed.
Ⓐ	Function containing Asm code.

Toolbar menu in the Coverage View

Toolbar icon	Description
	Shows coverage for each test.
	Shows full coverage.
	Shows full coverage(including the external coverage).

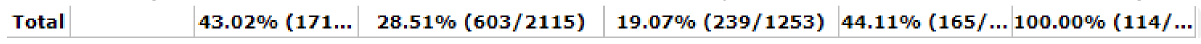
Show Coverage

You can check the coverage of the tests in the Coverage View or in the Source Code Editor.

Show coverage in the Coverage View

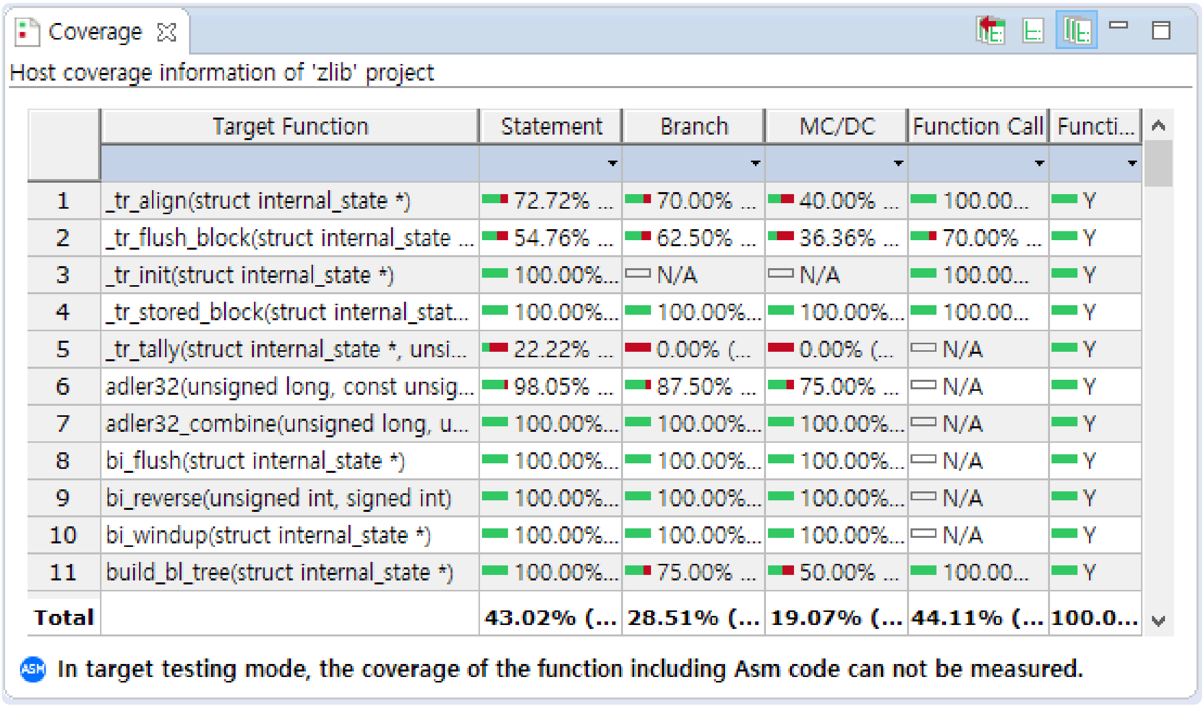
The Coverage View shows the coverage information of the test or test case selected in the Unit Test View and Integration Test View. If you click [Show full coverage], the coverage information for all tests can be checked by merging them. And if you click [Show full coverage (Include External Coverage)], it shows also the coverage imported externally by merging them.

The coverage for the items selected in the tree is displayed at the bottom of the Coverage View.



Total		43.02% (171...	28.51% (603/2115)	19.07% (239/1253)	44.11% (165/...	100.00% (114/...

In the Coverage View, the coverage for each function is displayed for the items selected in the Unit or Integration Test View.



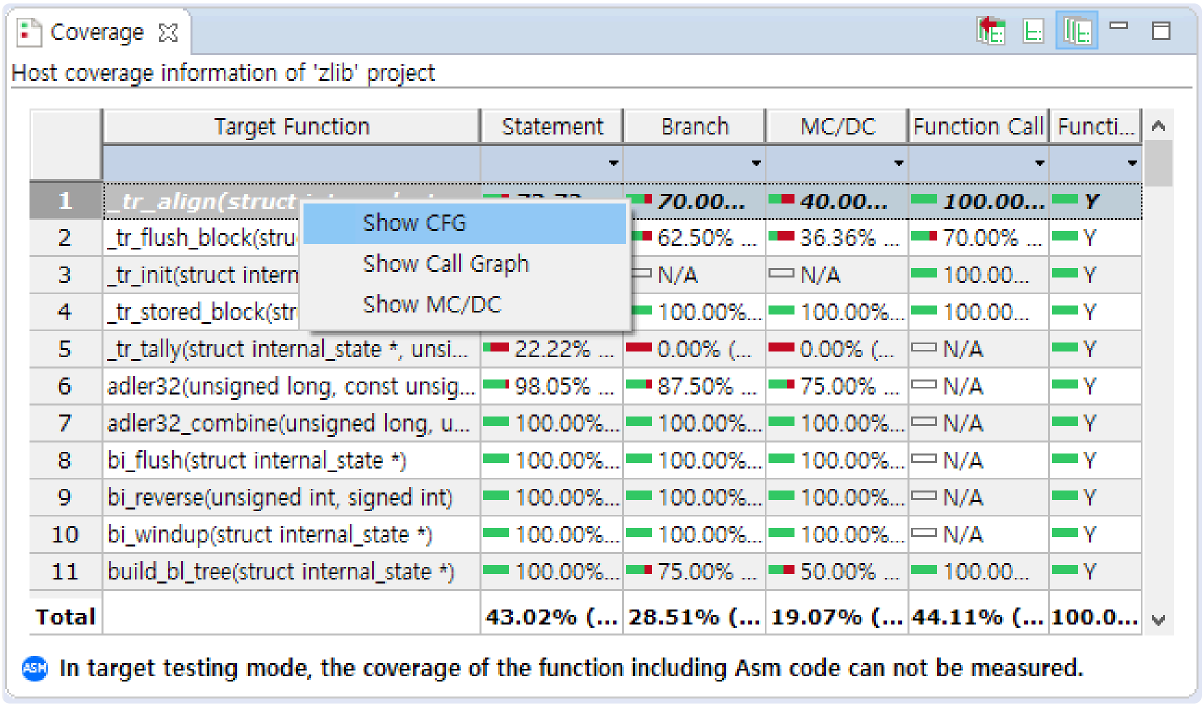
Coverage

Host coverage information of 'zlib' project

	Target Function	Statement	Branch	MC/DC	Function Call	Functi...
1	_tr_align(struct internal_state *)	72.72% ...	70.00% ...	40.00% ...	100.00...	Y
2	_tr_flush_block(struct internal_state ...	54.76% ...	62.50% ...	36.36% ...	70.00% ...	Y
3	_tr_init(struct internal_state *)	100.00%...	N/A	N/A	100.00...	Y
4	_tr_stored_block(struct internal_stat...	100.00%...	100.00%...	100.00%...	100.00...	Y
5	_tr_tally(struct internal_state *, unsi...	22.22% ...	0.00% (...	0.00% (...	N/A	Y
6	adler32(unsigned long, const unsig...	98.05% ...	87.50% ...	75.00% ...	N/A	Y
7	adler32_combine(unsigned long, u...	100.00%...	100.00%...	100.00%...	N/A	Y
8	bi_flush(struct internal_state *)	100.00%...	100.00%...	100.00%...	N/A	Y
9	bi_reverse(unsigned int, signed int)	100.00%...	100.00%...	100.00%...	N/A	Y
10	bi_windup(struct internal_state *)	100.00%...	100.00%...	100.00%...	N/A	Y
11	build_bl_tree(struct internal_state *)	100.00%...	75.00% ...	50.00% ...	100.00...	Y
Total		**43.02% (...**	**28.51% (...**	**19.07% (...**	**44.11% (...**	**100.0...**

In target testing mode, the coverage of the function including Asm code can not be measured.

In the Coverage View table, you can the control flow graph, the function call graph and MC/DC for each function via the context menu.



Coverage

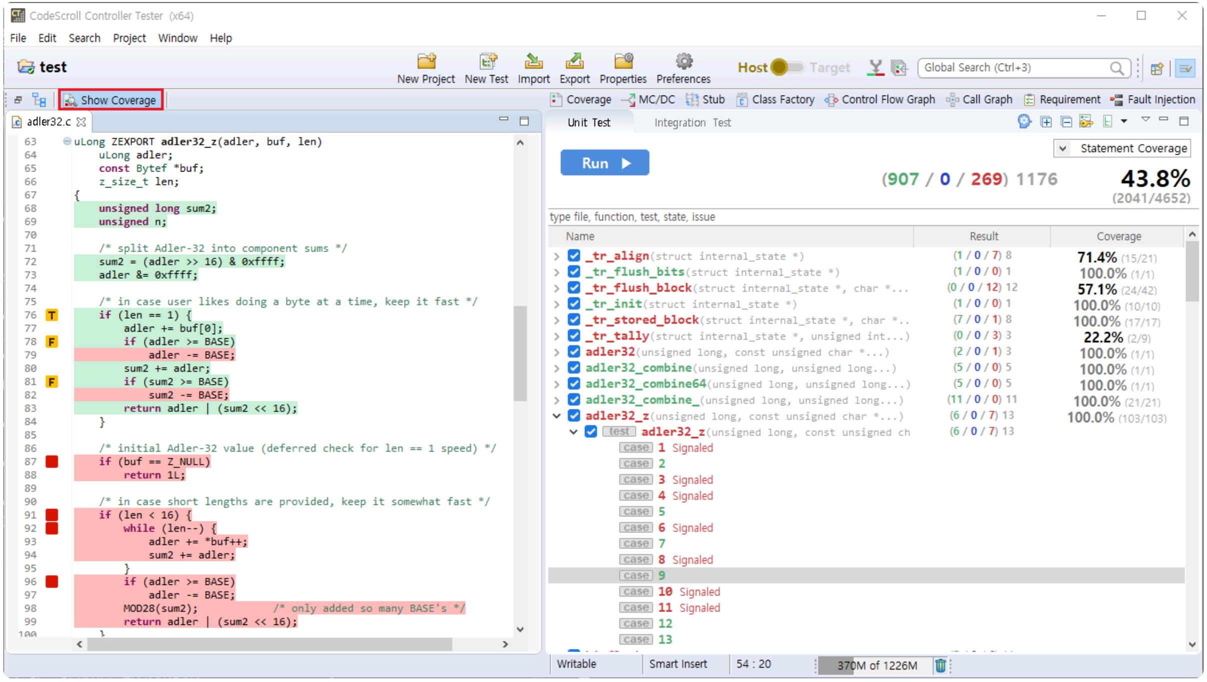
Host coverage information of 'zlib' project

	Target Function	Statement	Branch	MC/DC	Function Call	Functi...
1	_tr_align(struct		70.00...	40.00...	100.00...	Y
2	_tr_flush_block(stru		62.50% ...	36.36% ...	70.00% ...	Y
3	_tr_init(struct intern		N/A	N/A	100.00...	Y
4	_tr_stored_block(str		100.00%...	100.00%...	100.00...	Y
5	_tr_tally(struct internal_state *, unsi...	22.22% ...	0.00% (...	0.00% (...	N/A	Y
6	adler32(unsigned long, const unsig...	98.05% ...	87.50% ...	75.00% ...	N/A	Y
7	adler32_combine(unsigned long, u...	100.00%...	100.00%...	100.00%...	N/A	Y
8	bi_flush(struct internal_state *)	100.00%...	100.00%...	100.00%...	N/A	Y
9	bi_reverse(unsigned int, signed int)	100.00%...	100.00%...	100.00%...	N/A	Y
10	bi_windup(struct internal_state *)	100.00%...	100.00%...	100.00%...	N/A	Y
11	build_bl_tree(struct internal_state *)	100.00%...	75.00% ...	50.00% ...	100.00...	Y
Total		43.02% (...	28.51% (...	19.07% (...	44.11% (...	100.0...

In target testing mode, the coverage of the function including Asm code can not be measured.

Show coverage in the Source Code Editor

If you enable [Show Coverage] icon in the main toolbar and click the wanted fucntion/test/test case in the Unit/Integration Test View, it shows which part of the source code is covered by using the color information. The green color indicates that the code is covered, the red color indicates that the code is not covered, and yellow color indicates that the portion of the code is covered only.



CodeScroll Controller Tester (x64)
File Edit Search Project Window Help
test
New Project New Test Import Export Properties Preferences
Host Target
Global Search (Ctrl+3)
Show Coverage
Coverage MC/DC Stub Class Factory Control Flow Graph Call Graph Requirement Fault Injection
adler32.c
Unit Test Integration Test
Run
Statement Coverage
type file, function, test, state, issue
Writable Smart Insert 54 : 20 370M of 1226M

```
uLong ZEXPORT adler32_z(adler, buf, len)
    uLong adler;
    const Bytef *buf;
    z_size_t len;
{
    unsigned long sum2;
    unsigned n;

    /* split Adler-32 into component sums */
    sum2 = (adler >> 16) & 0xffff;
    adler &= 0xffff;

    /* in case user likes doing a byte at a time, keep it fast */
T   if (len == 1) {
        adler += buf[0];
F       if (adler >= BASE)
            adler -= BASE;
        sum2 += adler;
F       if (sum2 >= BASE)
            sum2 -= BASE;
        return adler | (sum2 << 16);
    }

    /* initial Adler-32 value (deferred check for len == 1 speed) */
    if (buf == Z_NULL)
        return 1L;

    /* in case short lengths are provided, keep it somewhat fast */
    if (len < 16) {
        while (len--) {
            adler += *buf++;
            sum2 += adler;
        }
        if (adler >= BASE)
            adler -= BASE;
        MOD28(sum2);            /* only added so many BASE's */
        return adler | (sum2 << 16);
    }
```

(907 / 0 / 269) 1176 43.8% (2041/4652)

Name	Result	Coverage
_tr_align(struct internal_state *)	(1 / 0 / 7) 8	71.4% (15/21)
_tr_flush_bits(struct internal_state *)	(1 / 0 / 0) 1	100.0% (1/1)
_tr_flush_block(struct internal_state *, char *...	(0 / 0 / 12) 12	57.1% (24/42)
_tr_init(struct internal_state *)	(1 / 0 / 0) 1	100.0% (10/10)
_tr_stored_block(struct internal_state *, char *..	(7 / 0 / 1) 8	100.0% (17/17)
_tr_tally(struct internal_state *, unsigned int...)	(0 / 0 / 3) 3	22.2% (2/9)
adler32(unsigned long, const unsigned char *...)	(2 / 0 / 1) 3	100.0% (1/1)
adler32_combine(unsigned long, unsigned long...)	(5 / 0 / 0) 5	100.0% (1/1)
adler32_combine64(unsigned long, unsigned long...)	(5 / 0 / 0) 5	100.0% (1/1)
adler32_combine_(unsigned long, unsigned long...)	(11 / 0 / 0) 11	100.0% (21/21)
adler32_z(unsigned long, const unsigned char *...)	(6 / 0 / 7) 13	100.0% (103/103)
test adler32_z(unsigned long, const unsigned ch	(6 / 0 / 7) 13	
case 1 Signaled		
case 2		
case 3 Signaled		
case 4 Signaled		
case 5		
case 6 Signaled		
case 7		
case 8 Signaled		
case 9		
case 10 Signaled		
case 11 Signaled		
case 12		
case 13		

In the vertical column on the left of the Source Code Editor, the marker indicate whether the branch statement is true or false.

Marker	Description
T	The branch is only covered as true.
F	The branch is only covered as false.

🟩	The branches are all covered.
🟥	The branch is not covered.
🟨	A line with multiple branches partially covered.

15.6. MC/DC View

The [MC/DC] view shows the information of MC/DC coverage(Modified Condition/Decision Coverage).

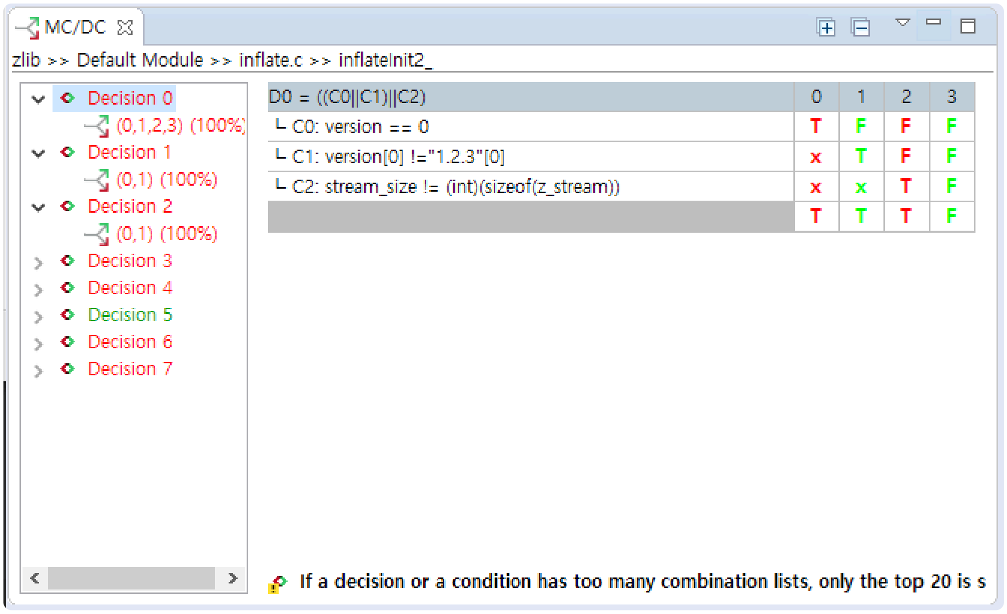
MC/DC coverage

MC/DC is the improved condition/decision coverage allowing each individual conditional expression to independently affect the result of the whole conditional expression without being affected by the other individual conditional expressions and it is stronger than the conditional/decision coverage.
If there is no change in the other conditions and it affects the result when the own state has changed, the state can be said to satisfy MC/DC, and the conditions for creating the truth table are as follows.

- The state of decision(decision statement) must satisfy at least once all possible results(true, false).
- All individual conditional expressions belonging to the decision must satisfy at least once all possible results(true, false).
- Each conditional expression belonging to the decision affects independently the result value of decision it belongs to without being affected by the other individual conditional expressions.

MC/DC view table

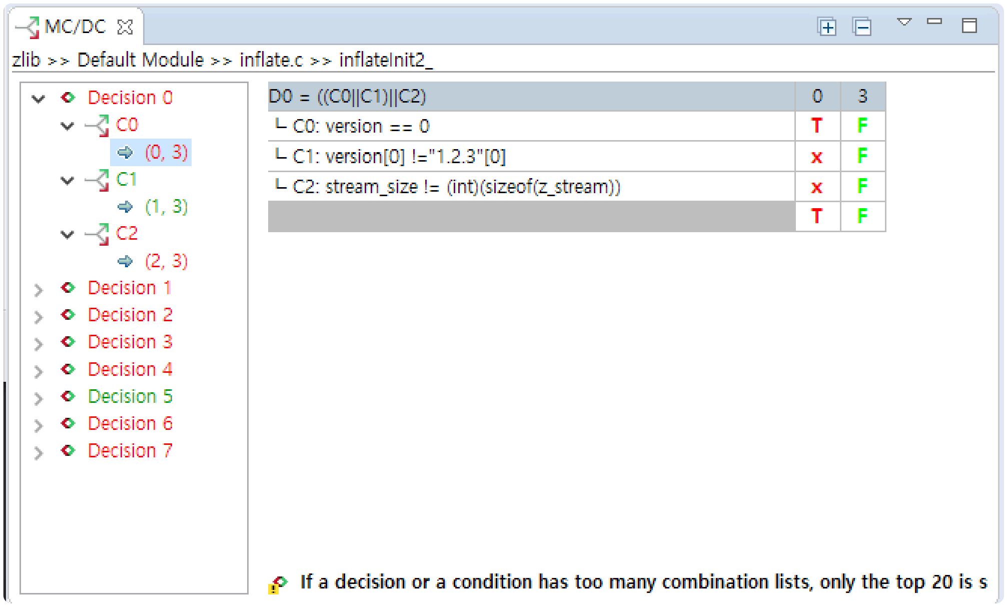
- View combination lists satisfying the target coverage
  The following figure is a view that can identify easily the combinations which need to be covered to achieve the target coverage.
  The left section shows the list of Decisions for the selected functions, below which the list of combinations satisfying the target coverage are displayed.
  The right section shows the truth table of the selected Decision or combinations and whether or not it is covered. The covered combination is displayed in green and the uncovered combination is displayed in red.
  In the Preferences page, you can change the target coverage rate and the screen view mode. And you can select all for the truth table and use 'Ctrl + C' or Copy clipboard function from the context menu.



D0 = ((C0||C1)||C2)	0	1	2	3
└ C0: version == 0	T	F	F	F
└ C1: version[0] !="1.2.3"[0]	x	T	F	F
└ C2: stream_size != (int)(sizeof(z_stream))	x	x	T	F
	T	T	T	F

If a decision or a condition has too many combination lists, only the top 20 is s

- View combination lists satisfying the coverage for each condition
  The following figure is a view that can identify a one-pair combination satisfying one condition. The left section shows the list of combinations that satisfies the coverage for each condition. The right section shows the truth table for the selected combinations and whether or not it is covered.



D0 = ((C0||C1)||C2)	0	3
└ C0: version == 0	T	F
└ C1: version[0] !="1.2.3"[0]	x	F
└ C2: stream_size != (int)(sizeof(z_stream))	x	F
	T	F

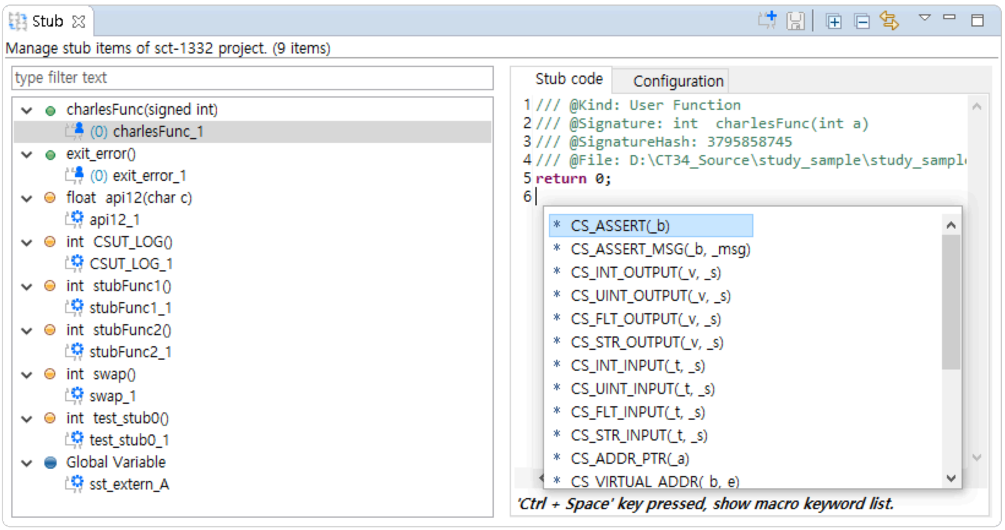
If a decision or a condition has too many combination lists, only the top 20 is s

15.7. Stub View

In Controller Tester, if there are no libraries used in the target function when executing a test, if the libraries are not yet developed, or if the variables not declared are used, it creates automatically the stubs instead. The stubs are created when running the test and the body is not implemented.

You can add stubs directly in addition to the stubs created in Controller Tester. Multiple stubs can be created for the same function and the stubs created can be linked to each test.

You can control the behavior of each stub by using user macro within the stub. The value used in the user-entered macro can be controlled in Edit a test case tab for the test linked.



```
charlesFunc(signed int)
    (0) charlesFunc_1
exit_error()
    (0) exit_error_1
float  api12(char c)
    api12_1
int  CSUT_LOG()
    CSUT_LOG_1
int  stubFunc1()
    stubFunc1_1
int  stubFunc2()
    stubFunc2_1
int  swap()
    swap_1
int  test_stub0()
    test_stub0_1
Global Variable
    sst_extern_A
```

```
/// @Kind: User Function
/// @Signature: int  charlesFunc(int a)
/// @SignatureHash: 3795858745
/// @File: D:\CT34_Source\study_sample\study_sampl
return 0;
```

```
* CS_ASSERT(_b)
* CS_ASSERT_MSG(_b, _msg)
* CS_INT_OUTPUT(_v, _s)
* CS_UINT_OUTPUT(_v, _s)
* CS_FLT_OUTPUT(_v, _s)
* CS_STR_OUTPUT(_v, _s)
* CS_INT_INPUT(_t, _s)
* CS_UINT_INPUT(_t, _s)
* CS_FLT_INPUT(_t, _s)
* CS_STR_INPUT(_t, _s)
* CS_ADDR_PTR(_a)
* CS_VIRTUAL_ADDR(_b, _e)
```

'Ctrl + Space' key pressed, show macro keyword list.

Function type

Type	Description
● Function	Function without deficition
● Function	Function with definition
● Variable	Global variable

Stub type

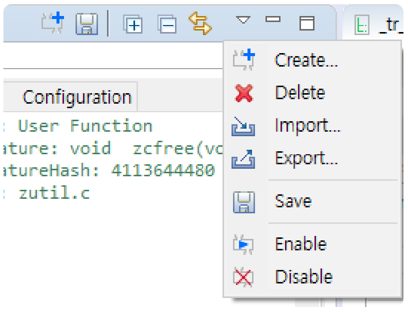
Type	Description
User stub	User-defined stub
Build stub	Auto-created stub
Old version stub	Stub with 2.3 or less version

Menu

Menu	Description
Create	Creates stubs.
Delete	Deletes stubs.
Import	Imports the stub file exported.
Export	Exports a stub file.
Save	Saves the change stub information.
Enable	Enables stubs.
Disable	Disables stubs.

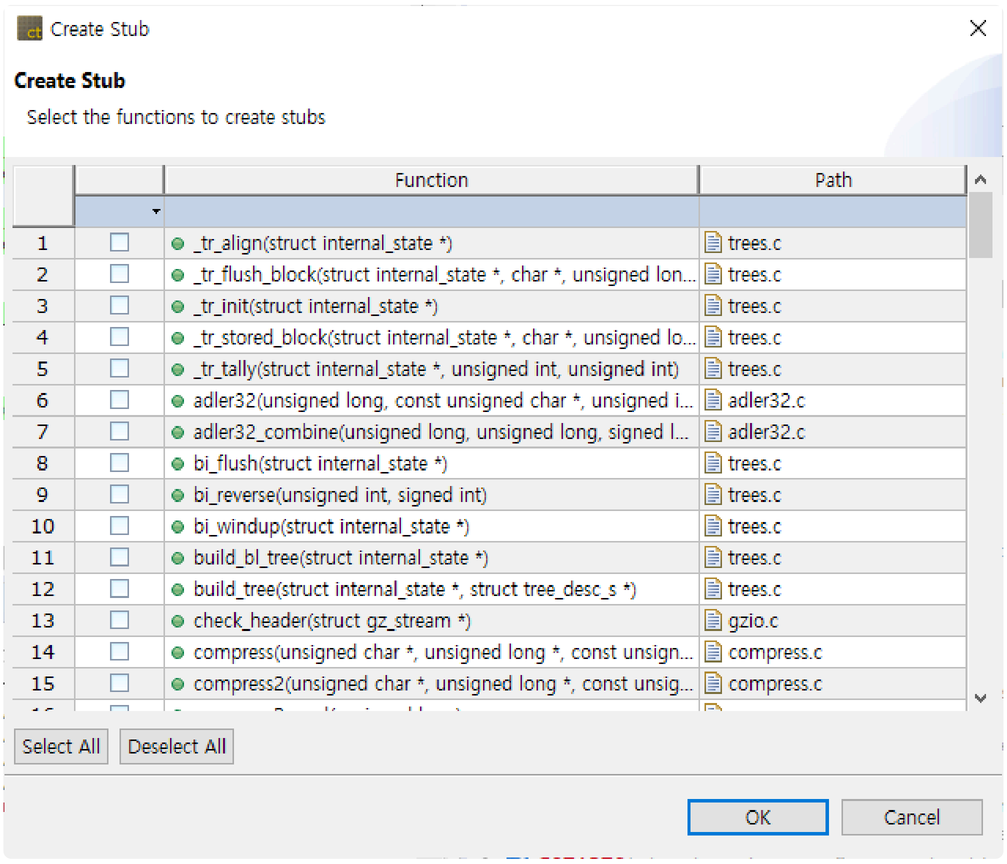
Create stubs

- Create stubs in Stub view
    1. Click the pull-down menu (▽) in Stub view and click [Create] menu.



```
: User Function
ıture: void  zcfree(vo
ıtureHash: 4113644480
: zutil.c
```

    2. Check the functions to be created as stubs and select [OK].

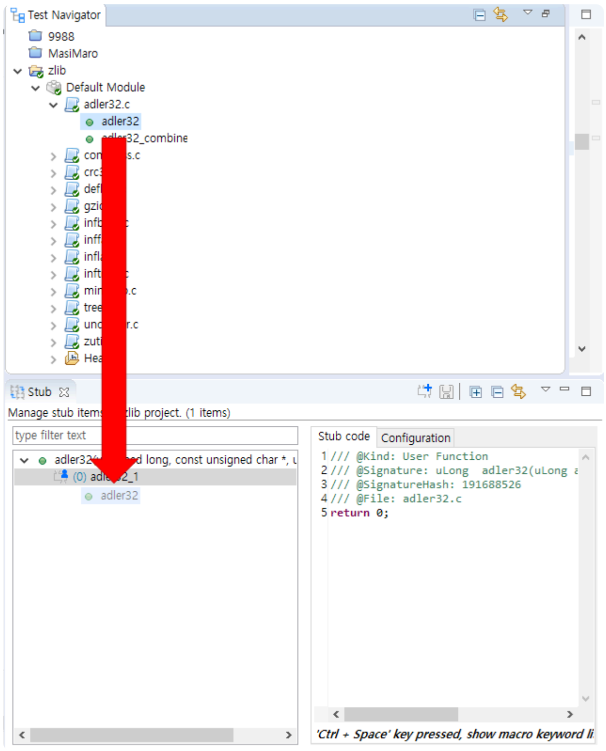


Create Stub

Select the functions to create stubs

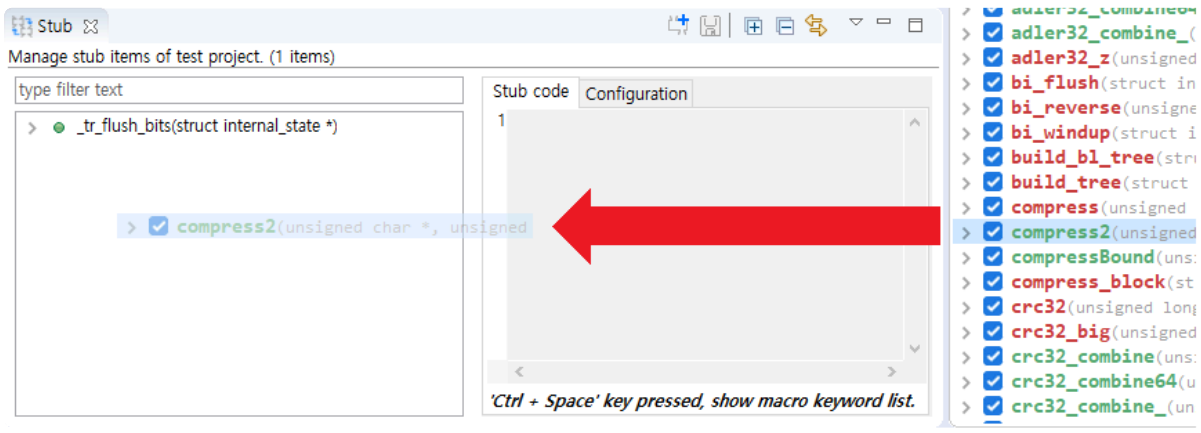
		Function	Path
1	☐	_tr_align(struct internal_state *)	trees.c
2	☐	_tr_flush_block(struct internal_state *, char *, unsigned lon...	trees.c
3	☐	_tr_init(struct internal_state *)	trees.c
4	☐	_tr_stored_block(struct internal_state *, char *, unsigned lo...	trees.c
5	☐	_tr_tally(struct internal_state *, unsigned int, unsigned int)	trees.c
6	☐	adler32(unsigned long, const unsigned char *, unsigned i...	adler32.c
7	☐	adler32_combine(unsigned long, unsigned long, signed l...	adler32.c
8	☐	bi_flush(struct internal_state *)	trees.c
9	☐	bi_reverse(unsigned int, signed int)	trees.c
10	☐	bi_windup(struct internal_state *)	trees.c
11	☐	build_bl_tree(struct internal_state *)	trees.c
12	☐	build_tree(struct internal_state *, struct tree_desc_s *)	trees.c
13	☐	check_header(struct gz_stream *)	gzio.c
14	☐	compress(unsigned char *, unsigned long *, const unsign...	compress.c
15	☐	compress2(unsigned char *, unsigned long *, const unsig...	compress.c

- Create stubs by drag-and-drop from Test Navigator view to Stub view.



```
/// @Kind: User Function
/// @Signature: uLong  adler32(uLong a
/// @SignatureHash: 191688526
/// @File: adler32.c
return 0;
```

- Create stubs by drag-and-drop from Unit Test view to Stub view.



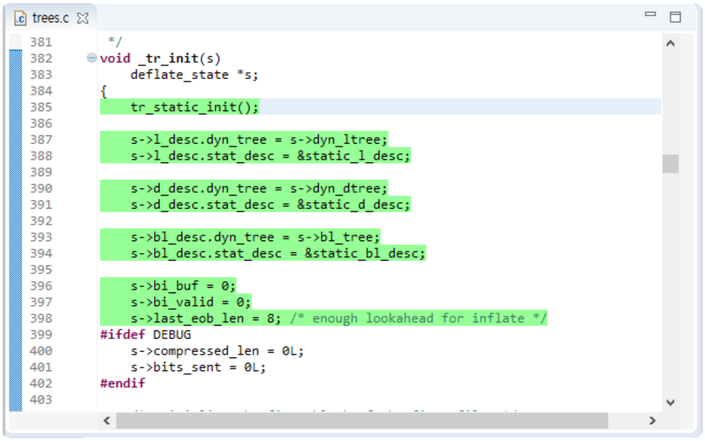
Manage stub items of test project. (1 items)

type filter text

_tr_flush_bits(struct internal_state *)

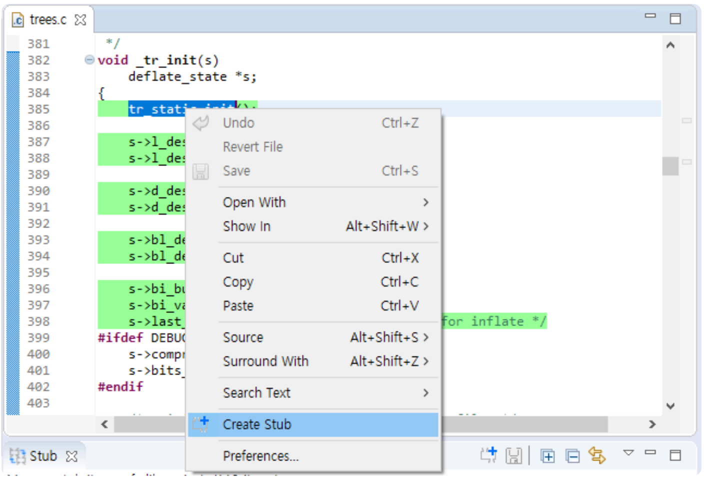
'Ctrl + Space' key pressed, show macro keyword list.

- Create stubs in source code editor
  1. Select the functions to be created as stubs.

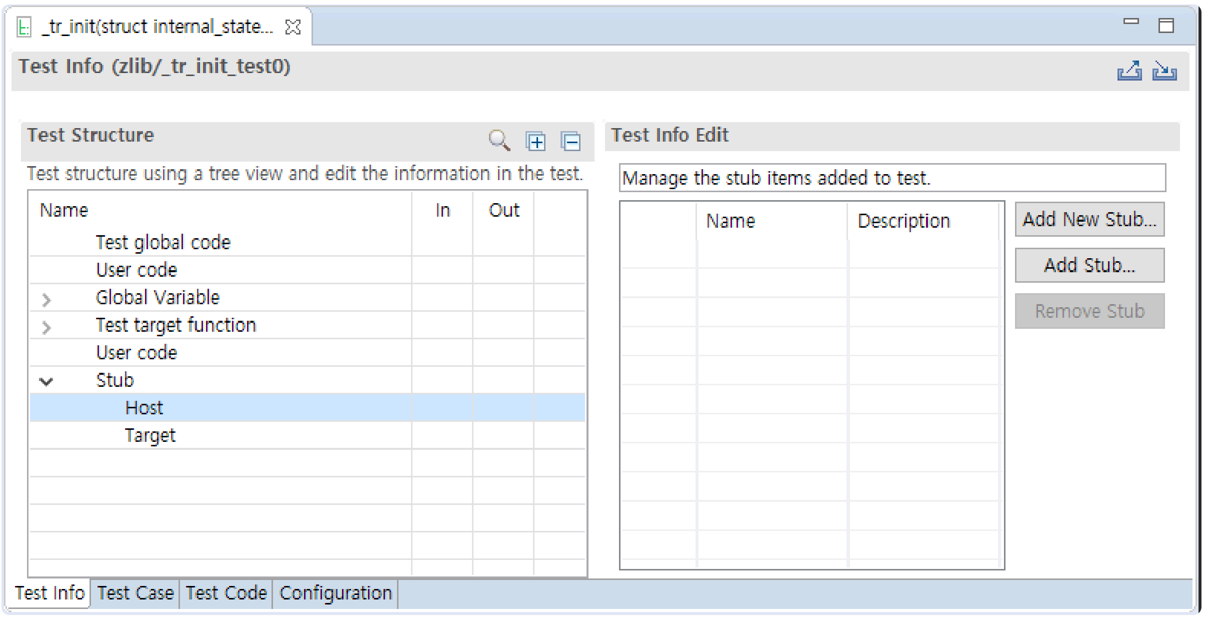


```
*/
void _tr_init(s)
    deflate_state *s;
{
    tr_static_init();

    s->l_desc.dyn_tree = s->dyn_ltree;
    s->l_desc.stat_desc = &static_l_desc;

    s->d_desc.dyn_tree = s->dyn_dtree;
    s->d_desc.stat_desc = &static_d_desc;

    s->bl_desc.dyn_tree = s->bl_tree;
    s->bl_desc.stat_desc = &static_bl_desc;

    s->bi_buf = 0;
    s->bi_valid = 0;
    s->last_eob_len = 8; /* enough lookahead for inflate */
#ifdef DEBUG
    s->compressed_len = 0L;
    s->bits_sent = 0L;
#endif
```

  2. Right-click it and select [Create Stub] context menu.



- Create and Link in Test Editor
  1. In the test structure of Test Editor, select the stubs or sub nodes.
  2. Select [Add New Stub…] button on the right section.



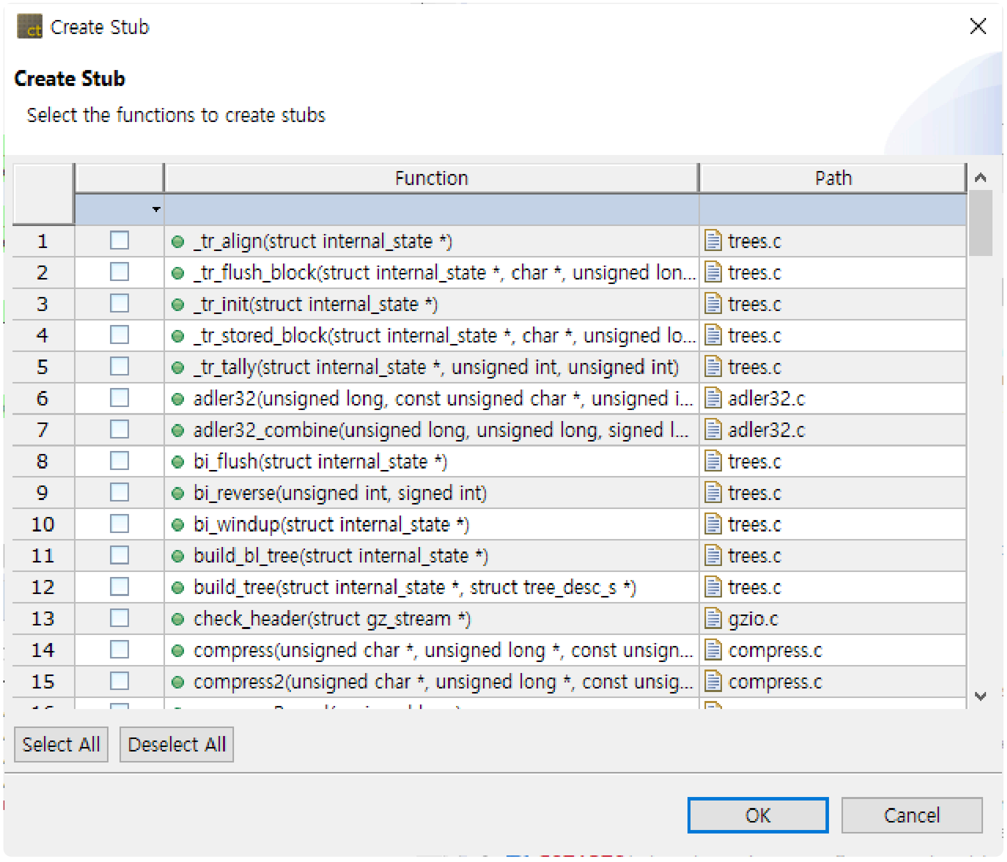
Test structure using a tree view and edit the information in the test.

Name	In	Out
Test global code		
User code		
› Global Variable		
› Test target function		
User code		
⌄ Stub		
Host		
Target		

Manage the stub items added to test.

	Name	Description

3. Check the functions to be created as stubs and select [OK].

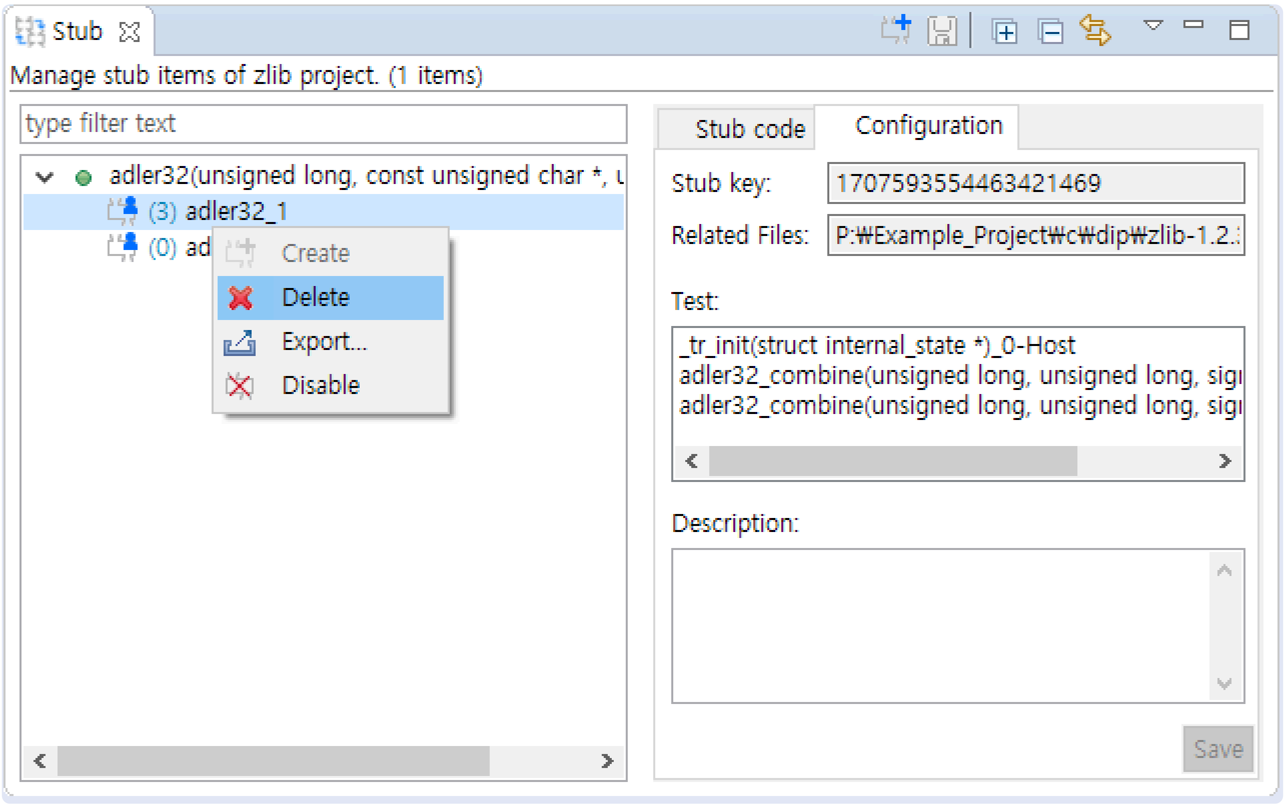


Select the functions to create stubs

		Function	Path
1	☐	_tr_align(struct internal_state *)	trees.c
2	☐	_tr_flush_block(struct internal_state *, char *, unsigned lon...	trees.c
3	☐	_tr_init(struct internal_state *)	trees.c
4	☐	_tr_stored_block(struct internal_state *, char *, unsigned lo...	trees.c
5	☐	_tr_tally(struct internal_state *, unsigned int, unsigned int)	trees.c
6	☐	adler32(unsigned long, const unsigned char *, unsigned i...	adler32.c
7	☐	adler32_combine(unsigned long, unsigned long, signed l...	adler32.c
8	☐	bi_flush(struct internal_state *)	trees.c
9	☐	bi_reverse(unsigned int, signed int)	trees.c
10	☐	bi_windup(struct internal_state *)	trees.c
11	☐	build_bl_tree(struct internal_state *)	trees.c
12	☐	build_tree(struct internal_state *, struct tree_desc_s *)	trees.c
13	☐	check_header(struct gz_stream *)	gzio.c
14	☐	compress(unsigned char *, unsigned long *, const unsign...	compress.c
15	☐	compress2(unsigned char *, unsigned long *, const unsig...	compress.c

Delete stubs

- Select and right-click unnecessary stubs and select [Delete] menu.



Stub key: 1707593554463421469

Related Files: P:₩Example_Project₩c₩dip₩zlib-1.2.

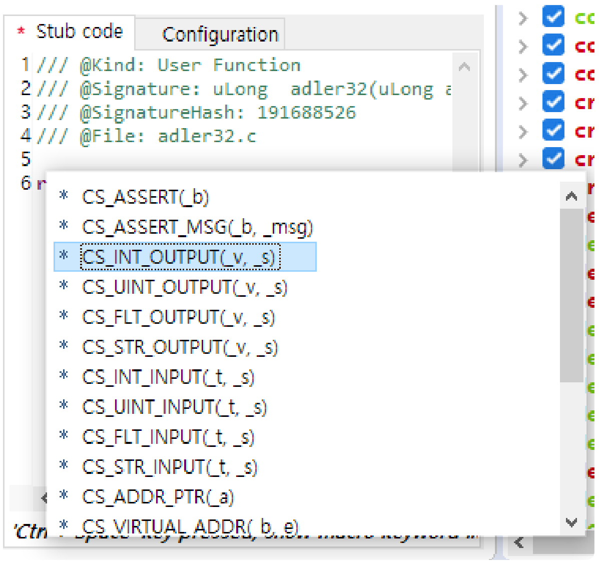
Test:

_tr_init(struct internal_state *)_0-Host
adler32_combine(unsigned long, unsigned long, sig
adler32_combine(unsigned long, unsigned long, sig

Description:

Edit stubs

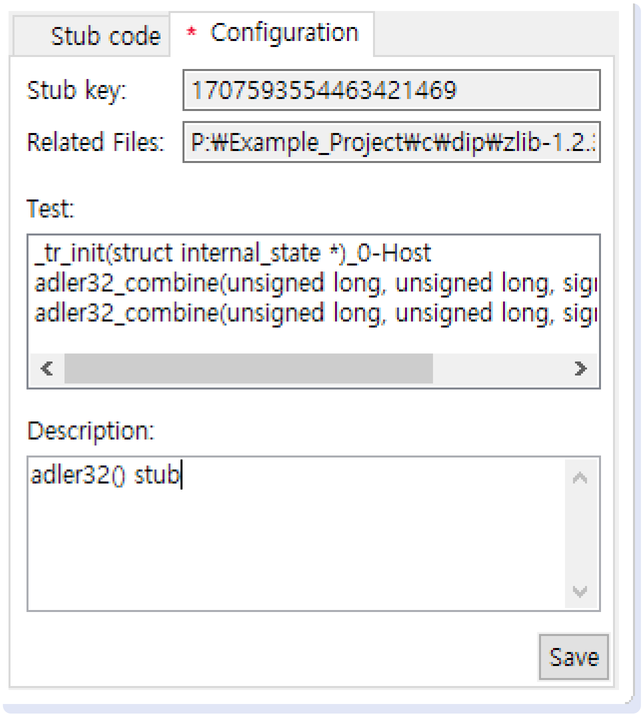
- You can check the macro information by pressing ‘Ctrl + Space’ in the Stub Code screen. After editing the stub code, press ‘Ctrl + S’ or [Save] button in the toolbar to save it.



```
/// @Kind: User Function
/// @Signature: uLong  adler32(uLong a
/// @SignatureHash: 191688526
/// @File: adler32.c
```

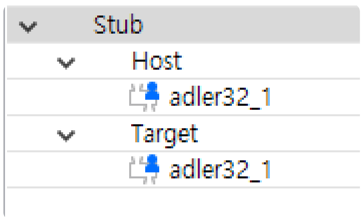
```
CS_ASSERT(_b)
CS_ASSERT_MSG(_b, _msg)
CS_INT_OUTPUT(_v, _s)
CS_UINT_OUTPUT(_v, _s)
CS_FLT_OUTPUT(_v, _s)
CS_STR_OUTPUT(_v, _s)
CS_INT_INPUT(_t, _s)
CS_UINT_INPUT(_t, _s)
CS_FLT_INPUT(_t, _s)
CS_STR_INPUT(_t, _s)
CS_ADDR_PTR(_a)
CS_VIRTUAL_ADDR(_b, _e)
```

- In the stub setting screen, the description can be edited.


Stub key: 1707593554463421469
Related Files: P:₩Example_Project₩c₩dip₩zlib-1.2.
Test:
_tr_init(struct internal_state *)_0-Host
adler32_combine(unsigned long, unsigned long, sig
adler32_combine(unsigned long, unsigned long, sig
Description:
adler32() stub

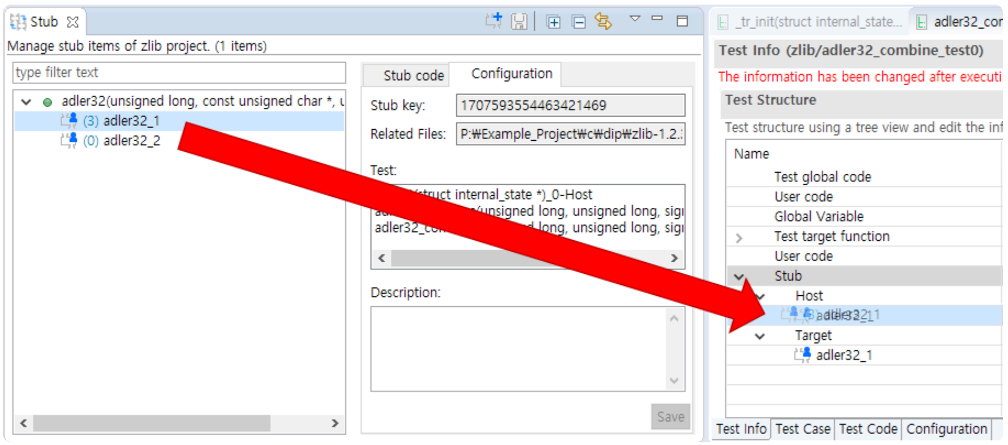
Link between stubs and tests

Each stub can be linked to the host/target test.
If you select "Stub" in the test structure editor, you can edit all the stubs included in the host and the target.



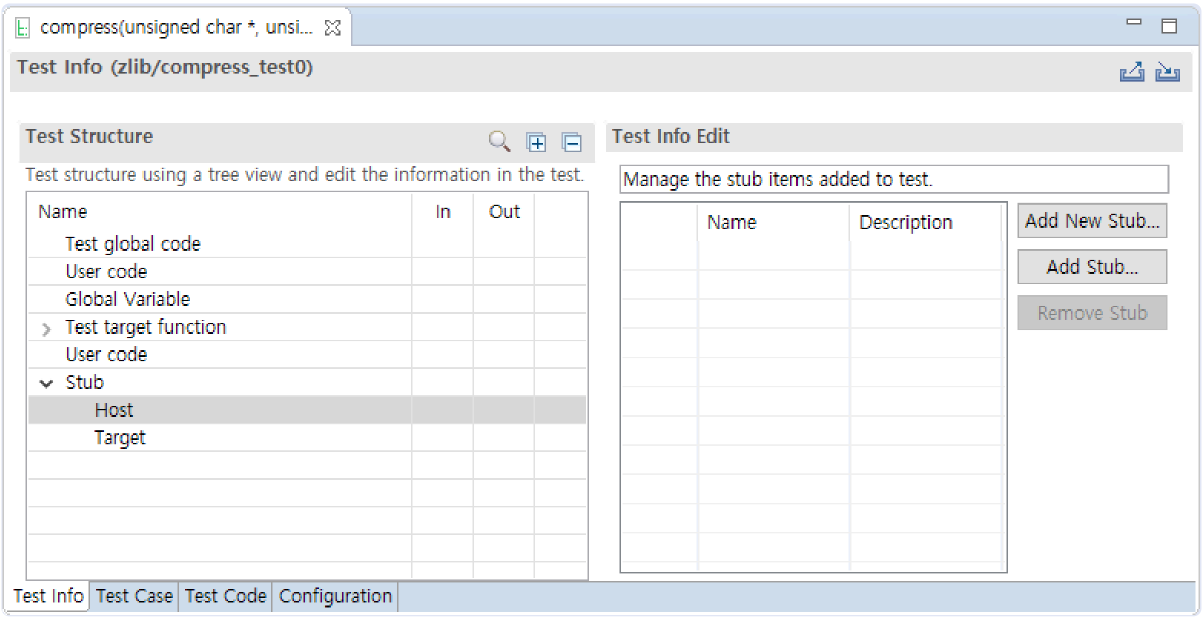
If you select "Host" or "Target", you can only edit the stubs in the selected test environment.

- Dragging and dropping into the test editor in Stub view


Manage stub items of zlib project. (1 items)
adler32(unsigned long, const unsigned char *, u
(3) adler32_1
(0) adler32_2
Stub key: 1707593554463421469
Related Files: P:₩Example_Project₩c₩dip₩zlib-1.2.
Test Info (zlib/adler32_combine_test0)
The information has been changed after executi
Test Structure
Test structure using a tree view and edit the inf

If linked by drag & drop, it is linked to all the targets and all the hosts.

- Link with [Add Stub…] button in Test Editor.
    1. Select stubs from the test structure in Test Editor.
    2. Select [Add Stub…] button on the right section.



compress(unsigned char *, unsi...

Test Info (zlib/compress_test0)

Test Structure

Test structure using a tree view and edit the information in the test.

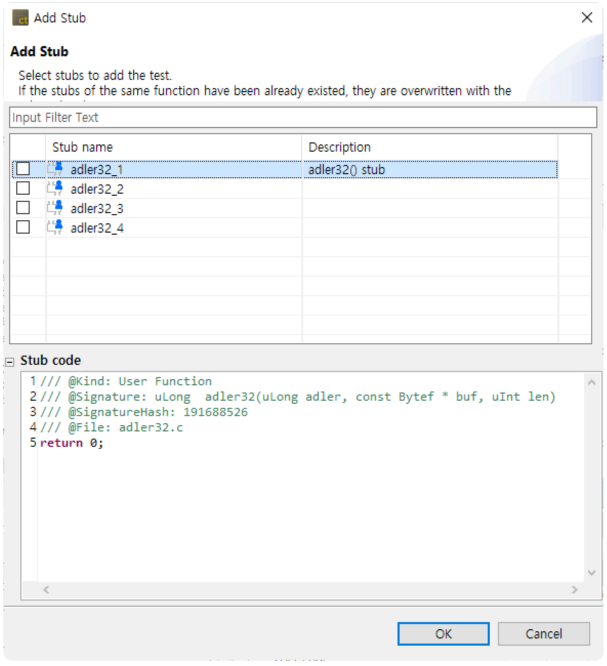
Name	In	Out
Test global code		
User code		
Global Variable		
› Test target function		
User code		
⌄ Stub		
Host		
Target		

Test Info Edit

Manage the stub items added to test.

Name	Description

3. Among the existing stub list, check the stubs to be linked and select [OK].



Add Stub

Add Stub

Select stubs to add the test.
If the stubs of the same function have been already existed, they are overwritten with the

Input Filter Text

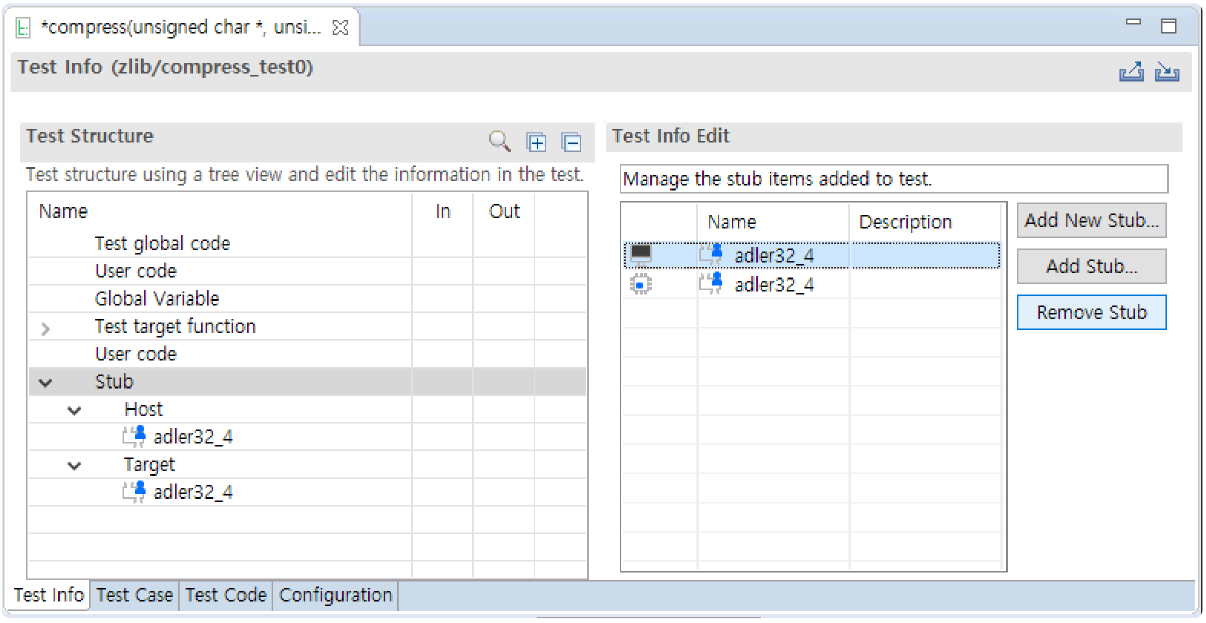
	Stub name	Description
☐	adler32_1	adler32() stub
☐	adler32_2	
☐	adler32_3	
☐	adler32_4	

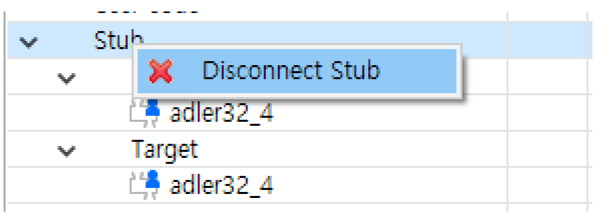
Stub code

```
/// @Kind: User Function
/// @Signature: uLong  adler32(uLong adler, const Bytef * buf, uInt len)
/// @SignatureHash: 191688526
/// @File: adler32.c
return 0;
```

Unlink between stubs and tests

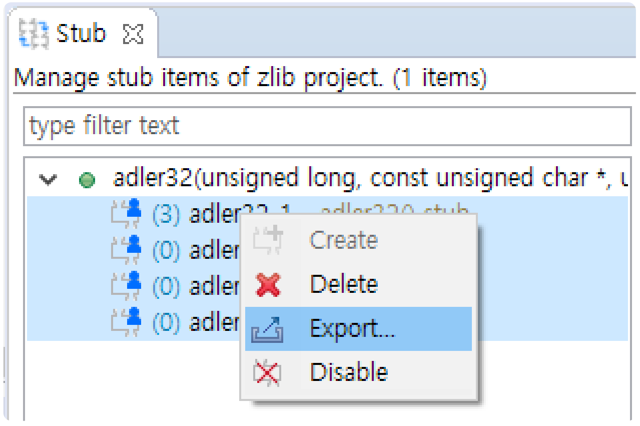
Select the stubs linked in the Test editor and select [Remove Stub] button or select the stubs in the test structure tree and right-click it to unlink them.



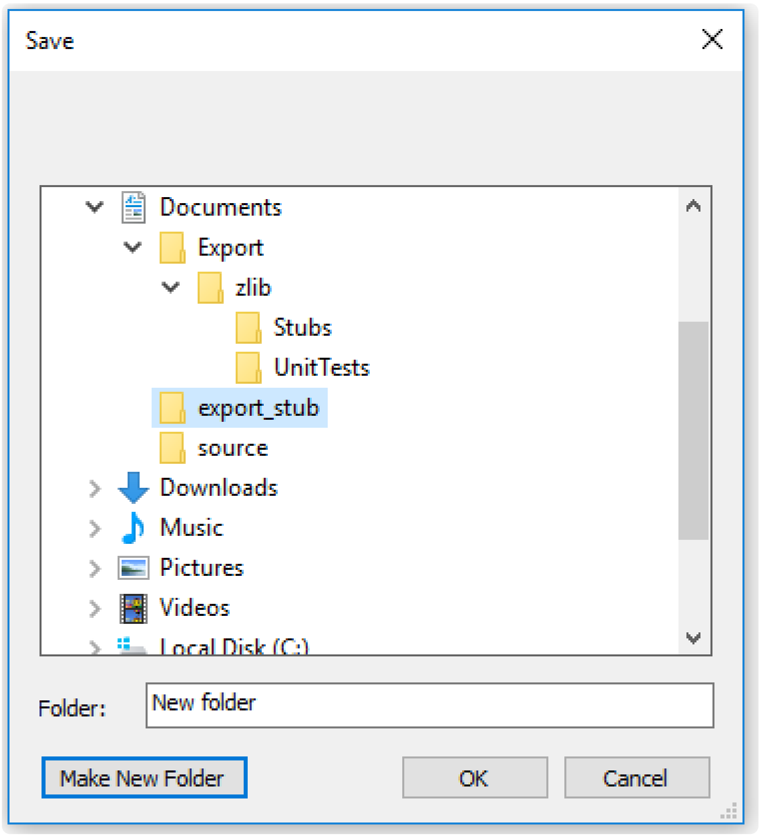


Export stubs

1. Select and the stubs to be exported and right-click and select [Export…] menu.


Stub
Manage stub items of zlib project. (1 items)
type filter text
adler32(unsigned long, const unsigned char *, u
(3) adler32_1
(0) adler
(0) adler
(0) adler
Create
Delete
Export...
Disable

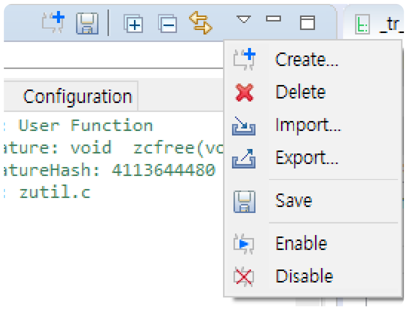
2. Specify the saving location of the stub file in the directory dialog and select [OK].



Folder: New folder

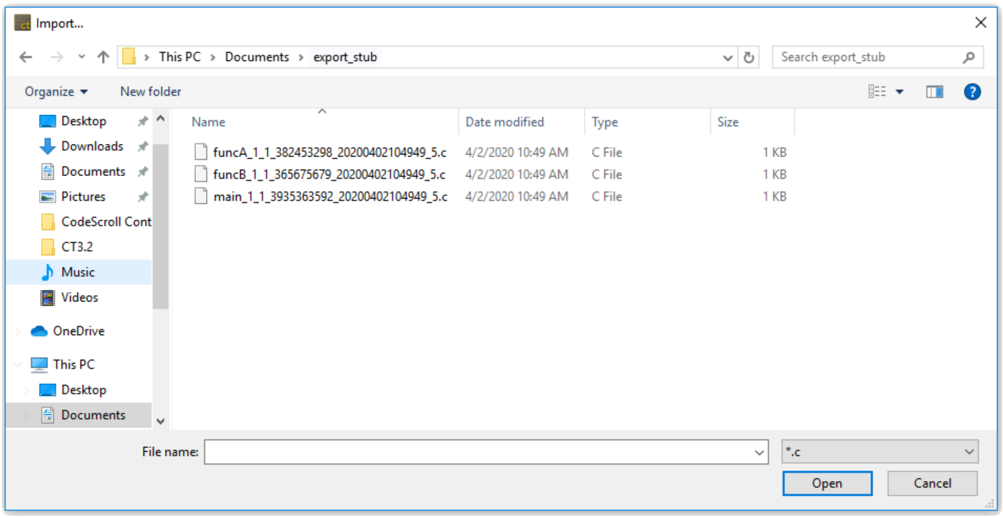
Import stubs

1. Select [Import…] menu from the pull-down menu (▽) in Stub view.



```
: User Function
ature: void  zcfree(vc
atureHash: 4113644480
: zutil.c
```

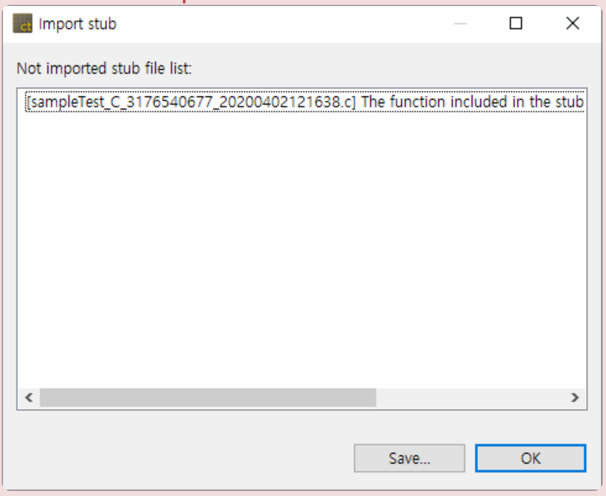
2. Select the stub file to be imported and select the [Open] button.



Name	Date modified	Type	Size
funcA_1_1_382453298_20200402104949_5.c	4/2/2020 10:49 AM	C File	1 KB
funcB_1_1_365675679_20200402104949_5.c	4/2/2020 10:49 AM	C File	1 KB
main_1_1_3935363592_20200402104949_5.c	4/2/2020 10:49 AM	C File	1 KB

File name: *.c

! The old version stubs or the stubs that are the same as build stubs existed in the project cannot be imported.



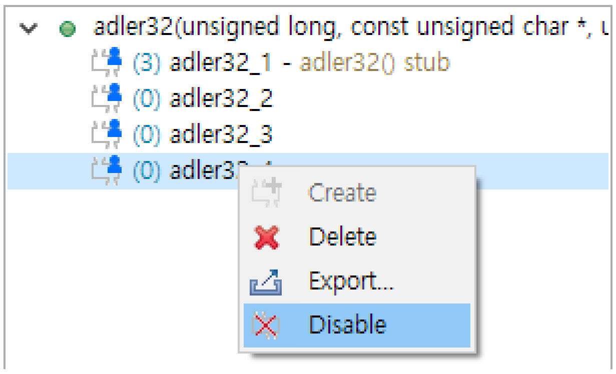
Not imported stub file list:

[sampleTest_C_3176540677_20200402121638.c] The function included in the stub

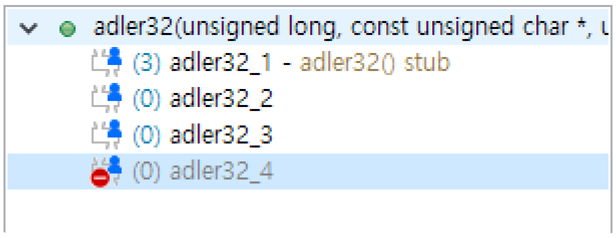
Use/Not use stubs

You can set whether to use the created stubs.

1. Select the stubs and right-click and select [Disable] menu.

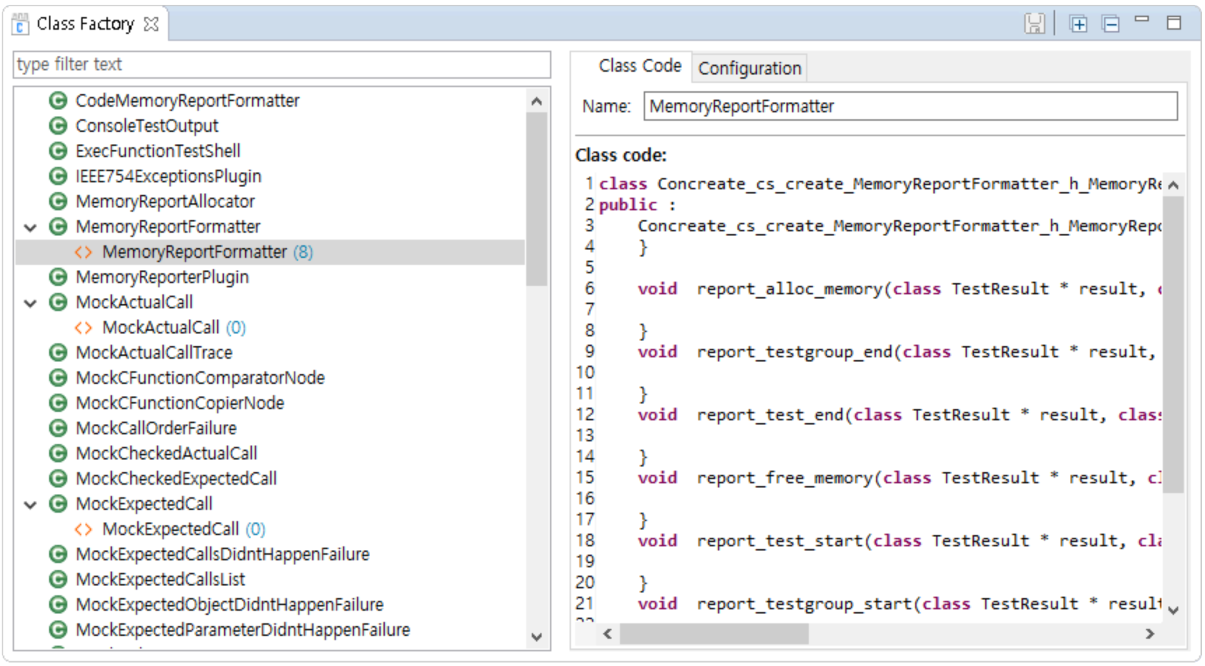

adler32(unsigned long, const unsigned char *, u
(3) adler32_1 - adler32() stub
(0) adler32_2
(0) adler32_3
(0) adler32_4
Create
Delete
Export...
Disable

2. The stub image decorator is added and the color of the stub name changes to gray as shown in figure below.


adler32(unsigned long, const unsigned char *, u
(3) adler32_1 - adler32() stub
(0) adler32_2
(0) adler32_3
(0) adler32_4

15.8. Class Factory View

When testing C++ source code, you can use class code to create class objects. Since abstract classes cannot be instantiated, Controller Tester automatically generates instantiable class code.



Name: MemoryReportFormatter

Class code:

```
class Concreate_cs_create_MemoryReportFormatter_h_MemoryRe
public :
    Concreate_cs_create_MemoryReportFormatter_h_MemoryRepo
    }

    void  report_alloc_memory(class TestResult * result, c

    }
    void  report_testgroup_end(class TestResult * result,

    }
    void  report_test_end(class TestResult * result, clas

    }
    void  report_free_memory(class TestResult * result, cl

    }
    void  report_test_start(class TestResult * result, cla

    }
    void  report_testgroup_start(class TestResult * resul
```

- On the left side of the [Class Factory view], you can see the classes included in the project and the class code for instantiating the class in a tree structure.
- On the right side of the [Class Factory View], you can edit the class code and name in the [Class code] tab, and see the connected tests in the [Configuration] tab.

Toolbar menu of Class Factory view

Item	Description
Save	Save modification of the class code.
Expand All	Expand all class tree in Class Factory view.
Collapse All	Collapse all class tree in Class Factory view

Icon of Class Factory view

Icon	Description
Class	Class included in the project.
Class code	Class code that create class objects to use in tests.

Context menu of class

Item	Description

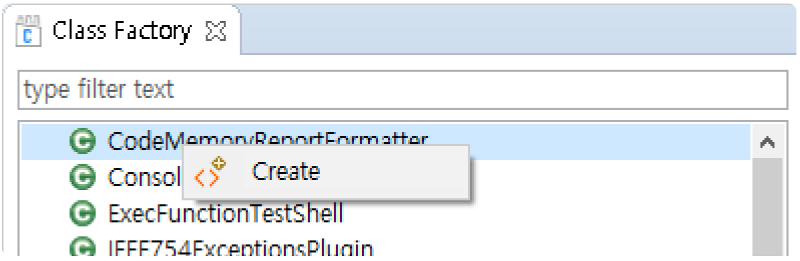
Create	Create a class code of the selected class.

Context menu of class code

Item	Description
Delete	Delete selected class codes.

Create a class code

When analyze the project, a list of all class included in source codes appears in Class Factory view. Controller Tester automatically generates class codes of abstract classes. You can also manually create class code from the context menu of class.

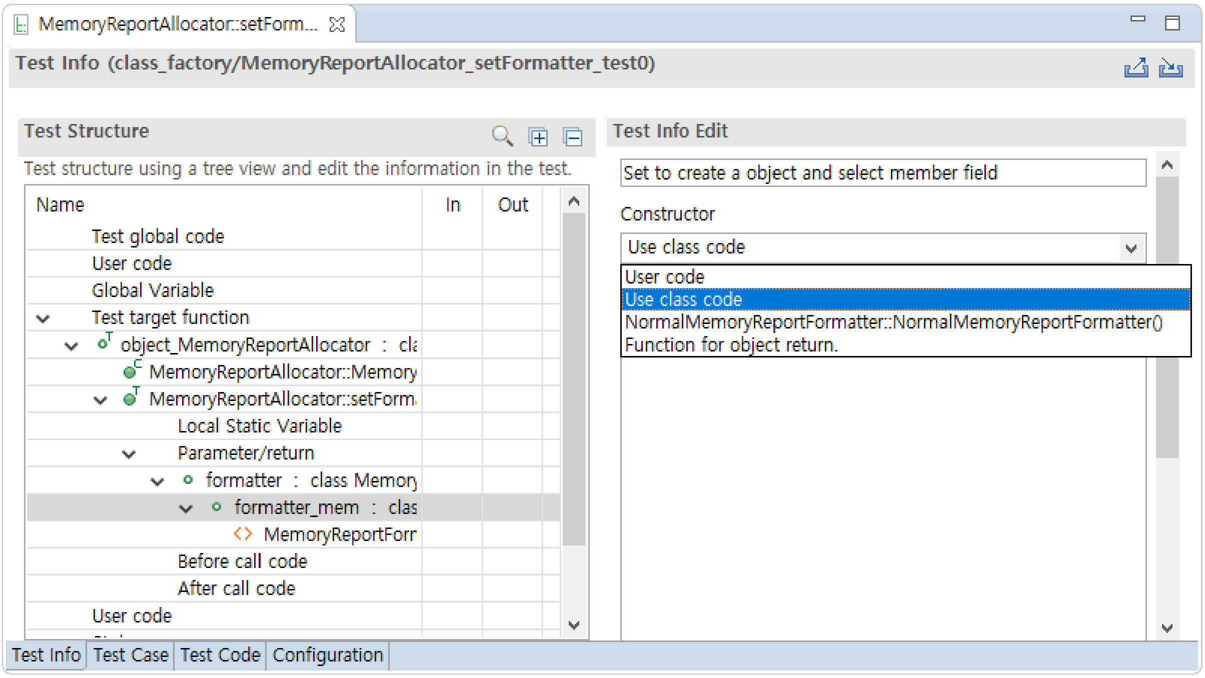


Apply class code

There are three ways to apply the class code to test.

Apply in Test Editor

1. Open the test editor by double-clicking on the test that you want to apply the class code. In the [Test Info] tab, expand the test structure, select the object to which the class code is to be applied, and select [Use class code] in [Test Info Edit] – [Constructor] on the right.



MemoryReportAllocator::setForm...

Test Info (class_factory/MemoryReportAllocator_setFormatter_test0)

Test Structure

Test structure using a tree view and edit the information in the test.

Name	In	Out
Test global code		
User code		
Global Variable		
Test target function		
object_MemoryReportAllocator : cla		
MemoryReportAllocator::Memory		
MemoryReportAllocator::setForm		
Local Static Variable		
Parameter/return		
formatter : class Memory		
formatter_mem : clas		
MemoryReportForr		
Before call code		
After call code		
User code		

Test Info Edit

Set to create a object and select member field

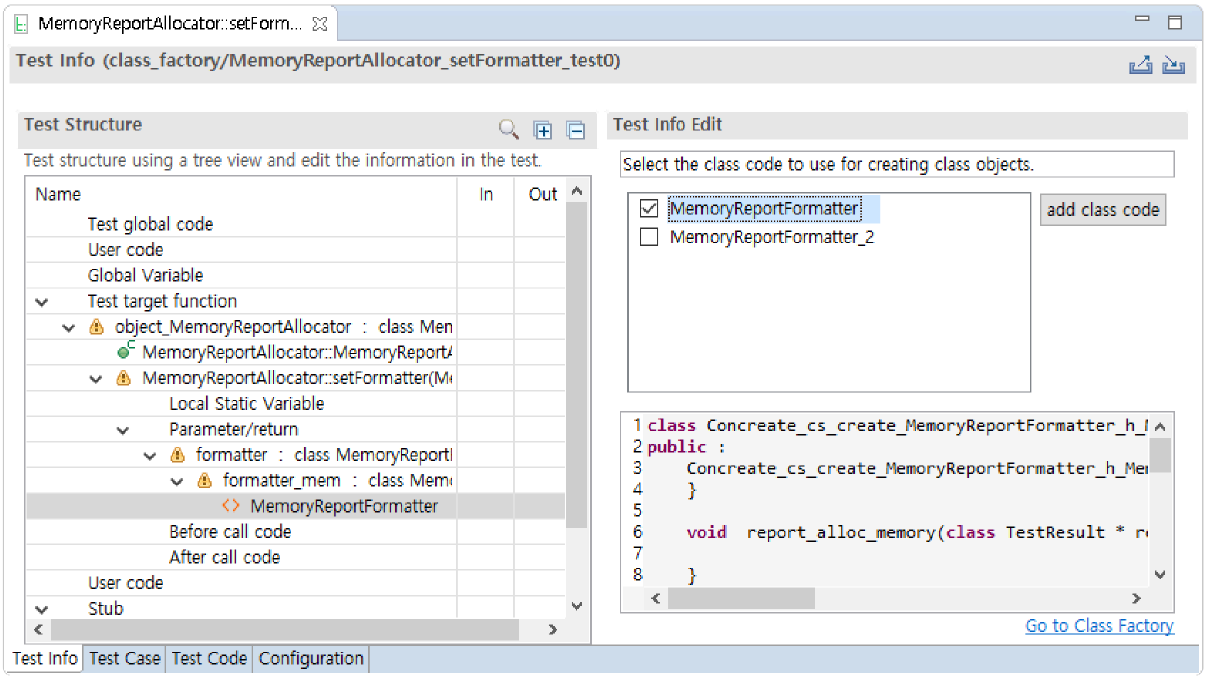
Constructor

Use class code

User code
Use class code
NormalMemoryReportFormatter::NormalMemoryReportFormatter()
Function for object return.

Test Info | Test Case | Test Code | Configuration

2. Select class code in [Test Structure]. In [Test Info Edit], check the class code to be applied and save. Select the class code to see the code.


MemoryReportAllocator::setForm...

Test Info (class_factory/MemoryReportAllocator_setFormatter_test0)

Test Structure

Test structure using a tree view and edit the information in the test.

Name	In	Out
Test global code		
User code		
Global Variable		
Test target function		
object_MemoryReportAllocator : class Men		
MemoryReportAllocator::MemoryReportA		
MemoryReportAllocator::setFormatter(M		
Local Static Variable		
Parameter/return		
formatter : class MemoryReportI		
formatter_mem : class Mem		
MemoryReportFormatter		
Before call code		
After call code		
User code		
Stub		

Test Info Edit

Select the class code to use for creating class objects.

[✓] MemoryReportFormatter
[ ] MemoryReportFormatter_2

add class code

```
class Concreate_cs_create_MemoryReportFormatter_h_I
public :
    Concreate_cs_create_MemoryReportFormatter_h_Me
    }

    void  report_alloc_memory(class TestResult * r

    }
```

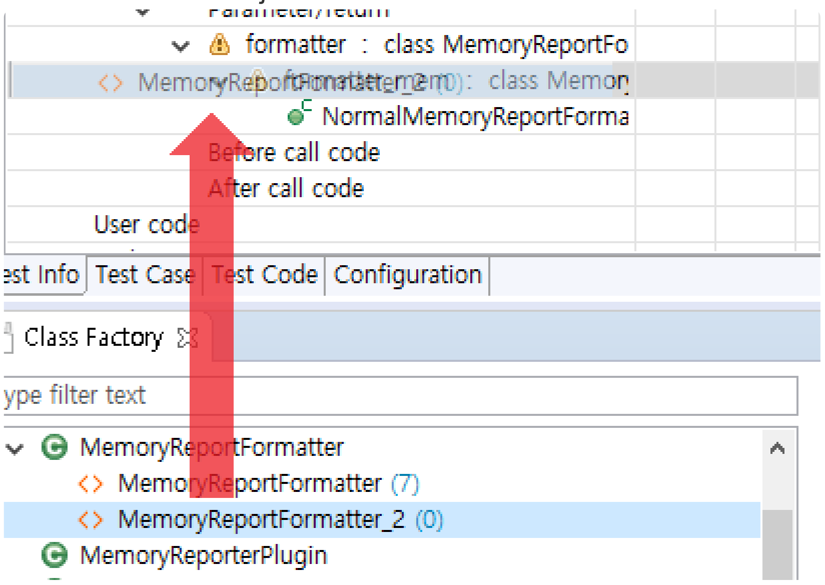
Go to Class Factory

Test Info | Test Case | Test Code | Configuration

- Select [Go to Class Factory] to open the class code in Class Factory view.
- Click [Add Class code] to add new class code.

Apply by drag-and-drop

You can apply the class code by dragging and dropping the class code to be applied from Class Factory view to the class object in Test Editor.


Parameter/return
formatter : class MemoryReportFo
MemoryReportFormatter_2 (0)
formatter_mem : class Memor
NormalMemoryReportForma
Before call code
After call code
User code

est Info | Test Case | Test Code | Configuration

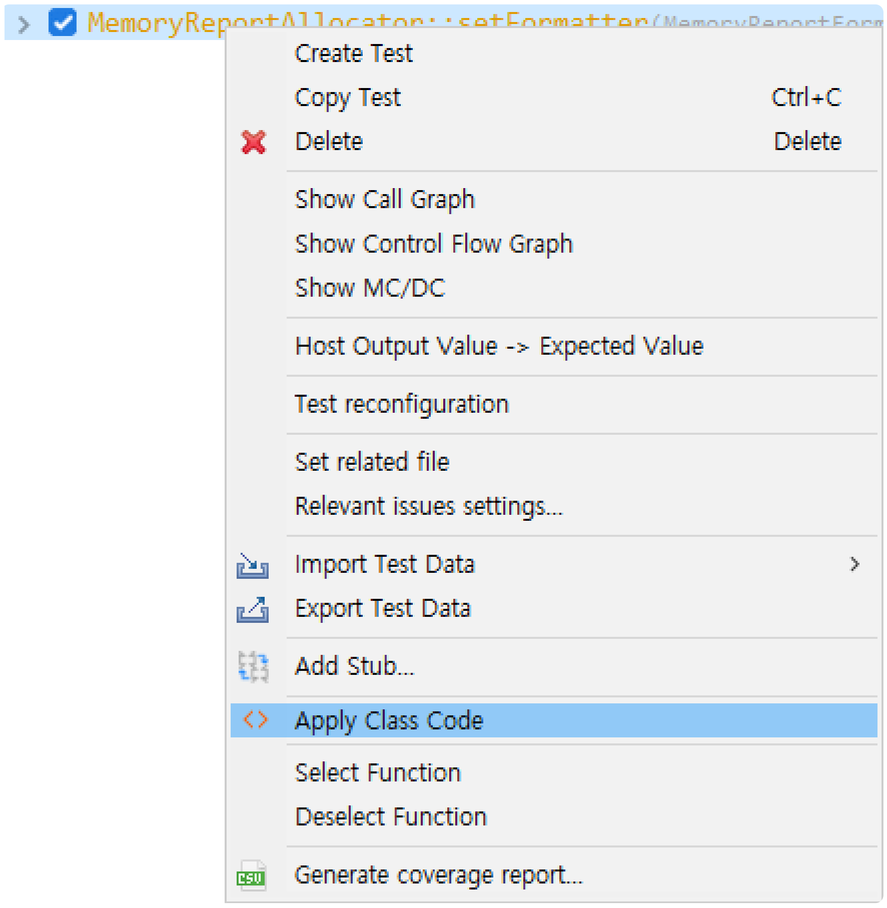
Class Factory

ype filter text

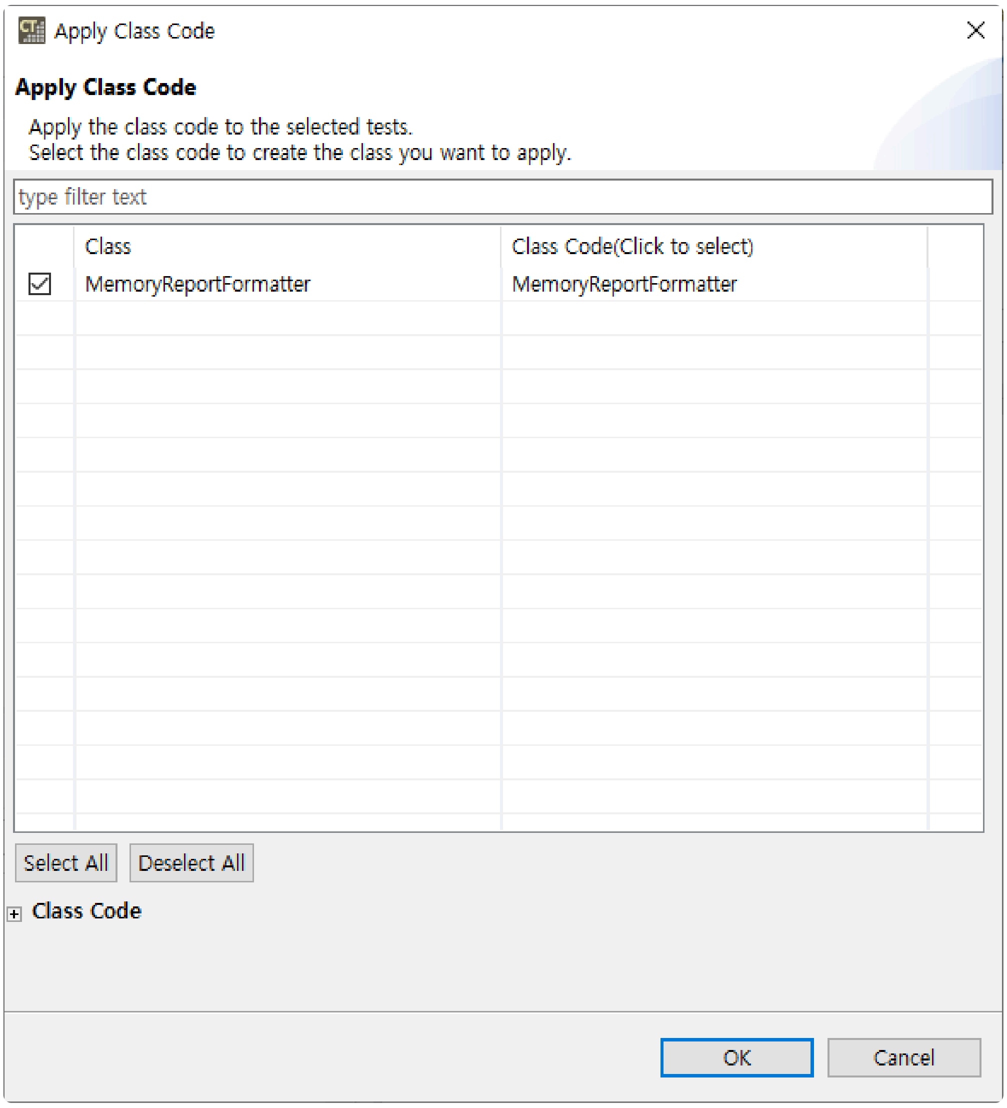
MemoryReportFormatter
MemoryReportFormatter (7)
MemoryReportFormatter_2 (0)
MemoryReporterPlugin

Apply using context menu in Test view

1. In Test view, select [Apply Class code] in context menu of functions or tests.



2. In [Apply Class code] dialog, select the class code to apply to selected tests and click [Ok]. Expand [Class code] at bottom to see the selected class code.


Apply Class Code

Apply Class Code

Apply the class code to the selected tests.
Select the class code to create the class you want to apply.

type filter text

	Class	Class Code(Click to select)
☑	MemoryReportFormatter	MemoryReportFormatter

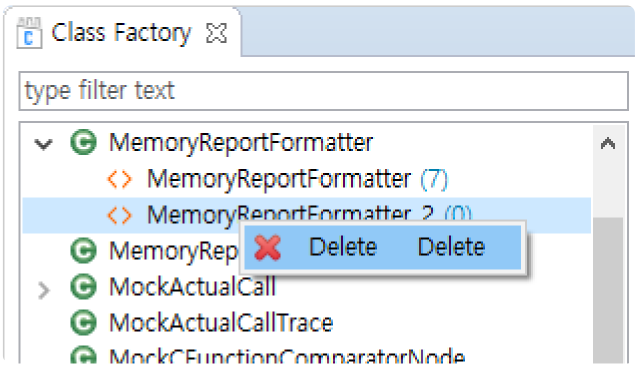
With [Apply Class code] feature, the same class code is applied wherever the class code can be applied.

Modify class code

You can modify the class code on [Class code] tab of Class Factory view. The modified class code is reflected in all connected tests.

Delete class code

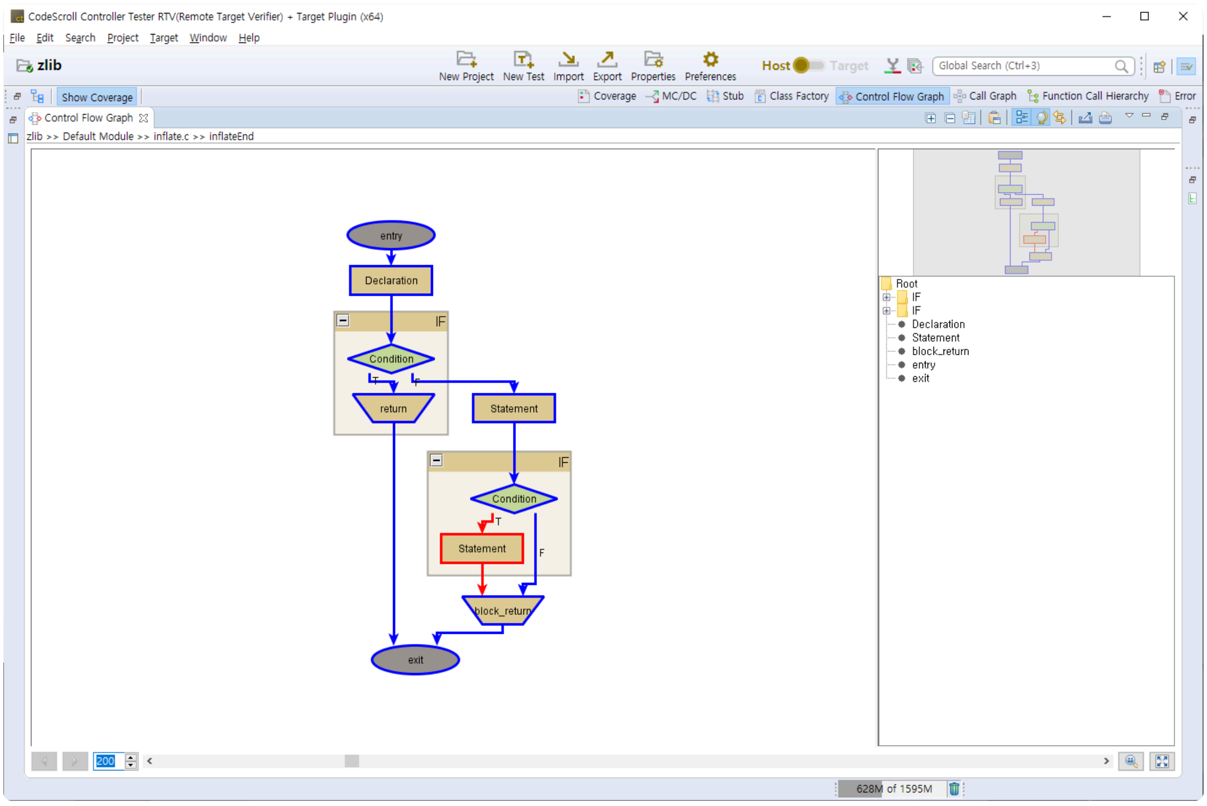
You can delete class code in context menu of Class Factory view.



! It is impossible to delete the class code while it is connected to the test. Before deleting the class code, all connections with the test must be disconnected.

15.9. Control Flow Graph View

The [Control Flow Graph] view shows the control flow information for the function selected in graph format.
If you click [Show Coverage] button in the main toolbar, the covered section is displayed in blue color and the uncovered section is displayed in red color.


CodeScroll Controller Tester RTV(Remote Target Verifier) + Target Plugin (x64)
File Edit Search Project Target Window Help
zlib
New Project New Test Import Export Properties Preferences
Host Target
Global Search (Ctrl+3)
Show Coverage
Coverage MC/DC Stub Class Factory Control Flow Graph Call Graph Function Call Hierarchy Error
Control Flow Graph
zlib >> Default Module >> inflate.c >> inflateEnd
entry
Declaration
IF
Condition
T
F
return
Statement
IF
Condition
T
Statement
F
block_return
exit
Root
IF
IF
Declaration
Statement
block_return
entry
exit
200
628M of 1595M

Toolbar menu

Menu	Description
Unfold All	Shows all group nodes.
Fold All	Hide all group nodes.
Show Legend	Shows the legend(the node type in the currently displayed graph).
Copy to System Clipboard	Copies the currently displayed graph into clipboard.
Show Outline	Displays the graphs in a tree format.
Show Overview	Shows the overview of a graph.
Link with Editor	Shows the selected items in the graph in the editor by one-click.
Export View Content	Exports the contents of view in a report.
Print View Content	Prints the contents of view.

Pull-down menu

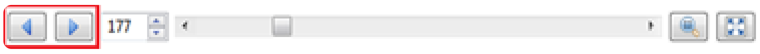
Menu	Description
Unfold All	Shows all group nodes.
Fold All	Hides all group nodes.
Show Call Graph	Shows the function call graph for the function selected in the current view.
Show Legend	Shows the legend(the node type in the currently displayed graph).
Show Outline	Displays the graphs in a tree format.
Show Overview	Shows the overview of a graph.
Link with Editor	Shows the selected items in the graph in the editor by one-click.
Export View Content	Exports the contents of view in a report.
Save as Graph Format	Creates the graph model file for the graph displayed on the current screen. Four kinds of formats supported: • Graph Modeling Language XML (*.xgml) • Graph Modeling Language(*.gml) • yWorks Binary Graph Format(.ygf) • Trivial Graph Format(*.tgf)
Save as Image Format	Saves the currently displayed graph as an image format file(jpg, gif).
Copy to System Clipboard	Copies the currently displayed graph into clipboard.
Preferences	Opens the preferences.

Node Pop-up menu

Menu	Description
Show Call Graph	Shows the function call graph for the function selected in the current view.

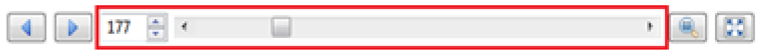
History function

The node that had been selected in the current graph can be seen again by using the arrow button(Go back, Go forward) in the lower-left corner of the view.



Zoom out/in function

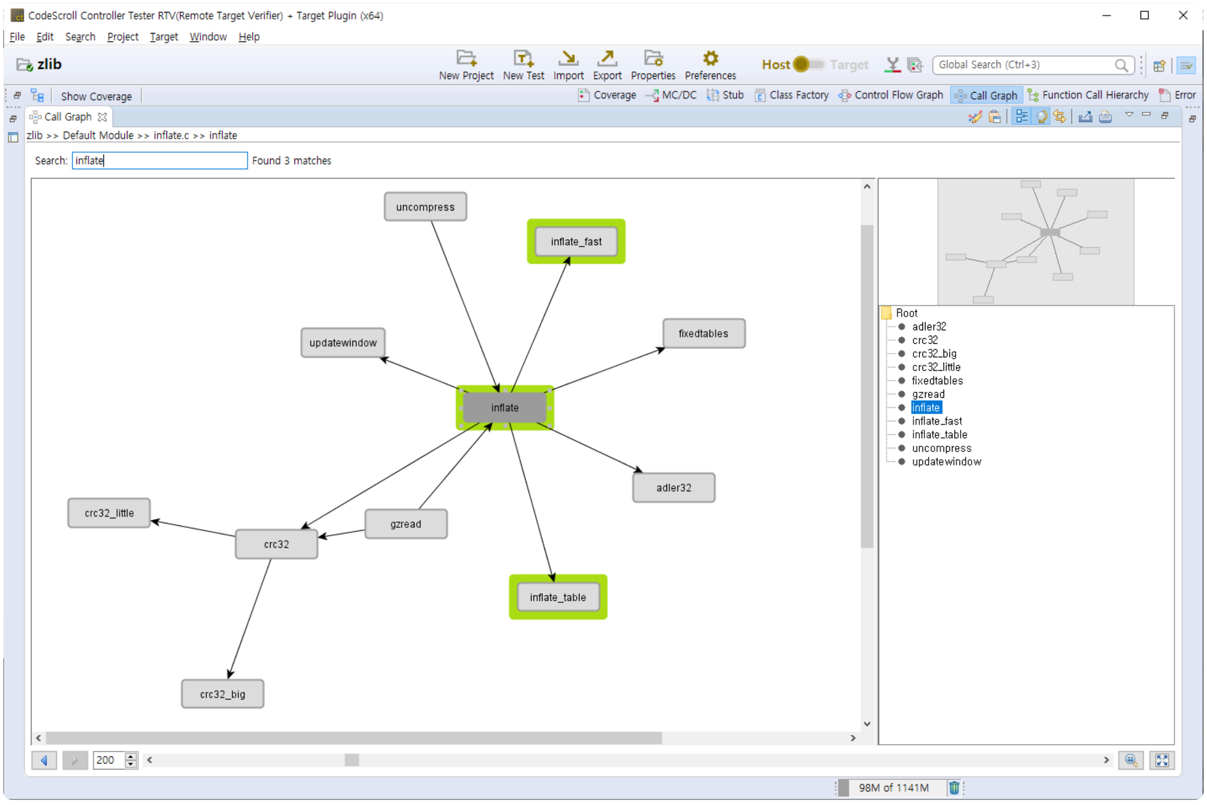
You can change the zoom out/in ratio by entering a number at the bottom of the view or by adjusting the slider.



You can reset the zoom out/in ratio by using [Initialize zoom out/in ratio] button at the lower right corner of the view, and change the zoom out/in ratio accordingly to the view size by using [Fit to view size] button.

15.10. Call Graph View

The [Call Graph] view shows the function call information for the selected function in a report format. (Ex: When calling function 'B' from function 'A', it is expressed 'edge from node 'A' to node 'B', and it is represented as one edge even if called multiple times.
If you select the node (function), it shows the function call information for that node.


CodeScroll Controller Tester RTV(Remote Target Verifier) + Target Plugin (x64)
File Edit Search Project Target Window Help
zlib
New Project New Test Import Export Properties Preferences
Host Target
Global Search (Ctrl+3)
Show Coverage
Coverage MC/DC Stub Class Factory Control Flow Graph Call Graph Function Call Hierarchy Error
Call Graph
zlib >> Default Module >> inflate.c >> inflate
Search: inflate
Found 3 matches
uncompress
inflate_fast
updatewindow
fixedtables
inflate
adler32
crc32_little
gzread
crc32
inflate_table
crc32_big
Root
adler32
crc32
crc32_big
crc32_little
fixedtables
gzread
inflate
inflate_fast
inflate_table
uncompress
updatewindow
200
98M of 1141M

Toolbar menu

Menu	Description
Edit Layout	Changes to make the node position of graph modifiable(it cannot be automatically edited when the graph is updated).
Copy to System Clipboard	Copies the currently displayed graph into clipboard.
Show Outline	Displays the graphs in a tree format.
Show Overview	Shows the overview of a graph.
Link with Editor	Shows the selected items in the graph in the editor by one-click.
Export View Content	Exports the contents of view in a report.
Print View Content	Prints the contents of view.

Pull-down menu

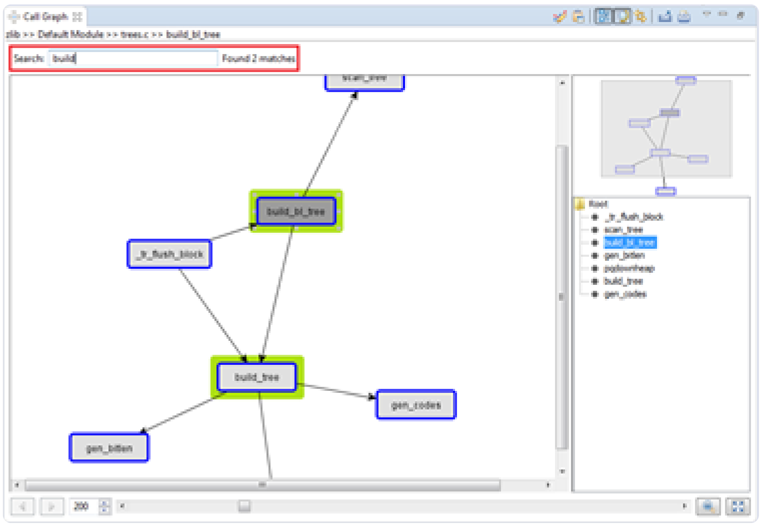
Menu	Description
Show CFG	Shows the control flow graph for the function selected in the current view.
Show Outline	Displays the graphs in a tree format.
Show Overview	Shows the overview of a graph.
Link with Editor	Shows the selected items in the graph in the editor by one-click.
Save as Graph Format	Creates the graph model file for the graph displayed in the current screen. Four kinds of formats supported: • Graph Modeling Language XML (*.xgml) • Graph Modeling Language(*.gml) • yWorks Binary Graph Format(.ygf) • Trivial Graph Format(*.tgf)
Save as Image Format	Saves the currently displayed graph as an image format file(jpg, gif).
Copy to System Clipboard	Copies the currently displayed graph into clipboard.
Preferences	Opens the preferences.

Node Pop-up menu

Menu	Description
Show CFG	Shows the control flow graph for the function node selected.
Expand	Shows the call relationship after the selected function one more step.
Collapse	Hides the call relationship after the selected function.
Set to Start Node	Specifies the start function for checking the call path for two functions.
Set to End Node	Specifies the end function for checking the call path for two functions. Shows all paths possible in the current graph.

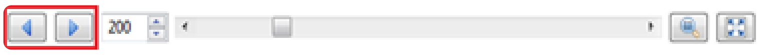
Search function

When you enter a search word in the top of the view, the functions with the name containing the entered search word are highlighted.



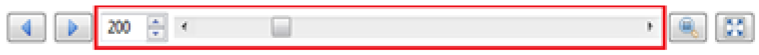
History function

The node that had been selected in the current graph can be seen again by using the arrow button(Go back, Go forward) in the lower-left corner of the view.



Zoom out/in function

You can change the zoom out/in ratio by entering a number at the bottom of the view or by adjusting the slider.



You can reset the zoom out/in ratio by using [Initialize zoom out/in ratio] button at the lower right corner of the view, and change the zoom out/in ratio accordingly to the view size by using [Fit to view size] button.

Show/Hide function

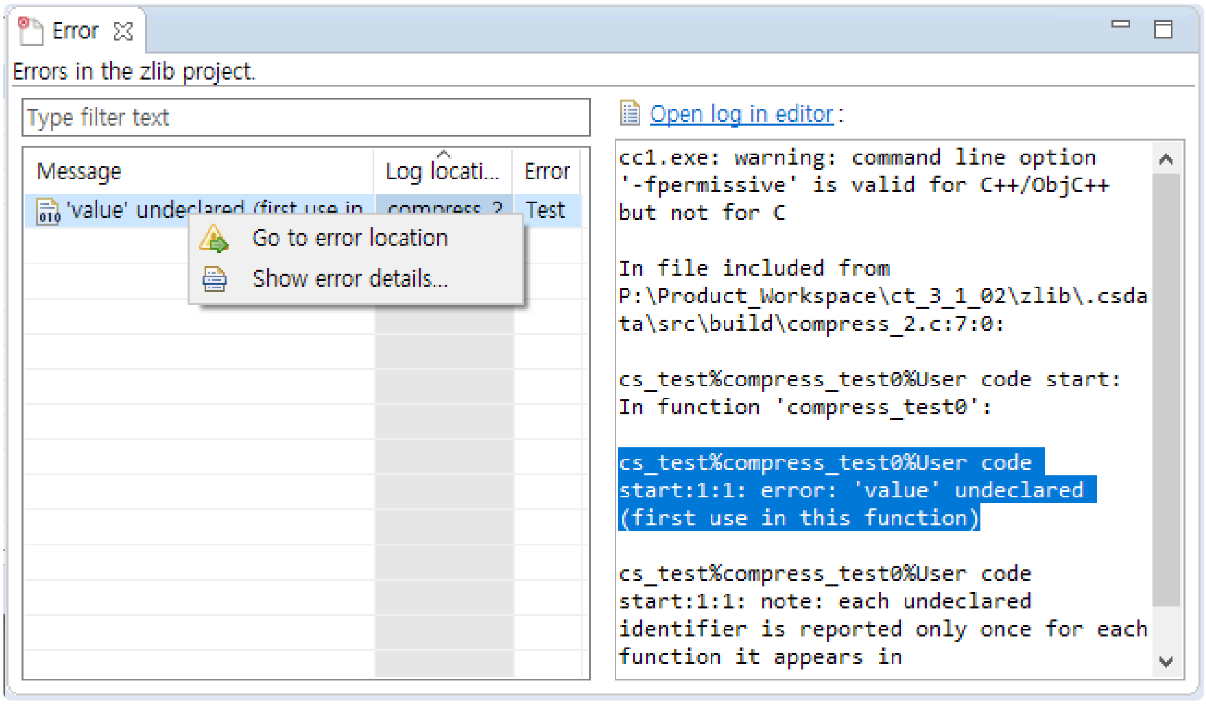
By using the menu displayed when right-clicking a node, you can show or hide the edge out from that node. If you select [Hide], it hides the call relationship for all functions called by the function corresponding to the selected node. The Hide menu of the node having no function call information is disabled. If you select [Show], it shows the functions called by the function corresponding to the selected node one more step. Likewise, if there are no call relationships, the Show menu is disabled.

Highlight Path between Nodes function

By selecting the start node and end node, it highlights all paths exited between two nodes so that you can see easily the interesting section in the complex function call relationship.

15.11. Error View

You can check the analysis error information of the project in detail.



```
cc1.exe: warning: command line option
'-fpermissive' is valid for C++/ObjC++
but not for C

In file included from
P:\Product_Workspace\ct_3_1_02\zlib\.csda
ta\src\build\compress_2.c:7:0:

cs_test%compress_test0%User code start:
In function 'compress_test0':

cs_test%compress_test0%User code
start:1:1: error: 'value' undeclared
(first use in this function)

cs_test%compress_test0%User code
start:1:1: note: each undeclared
identifier is reported only once for each
function it appears in
```

Log type

Type	Description
Build	Errors occurred during build
Statement analysis	Errors occurred during statement analysis
Link	Errors occurred during linking
Pre-processing	Errors occurred during pre-processing

Error type

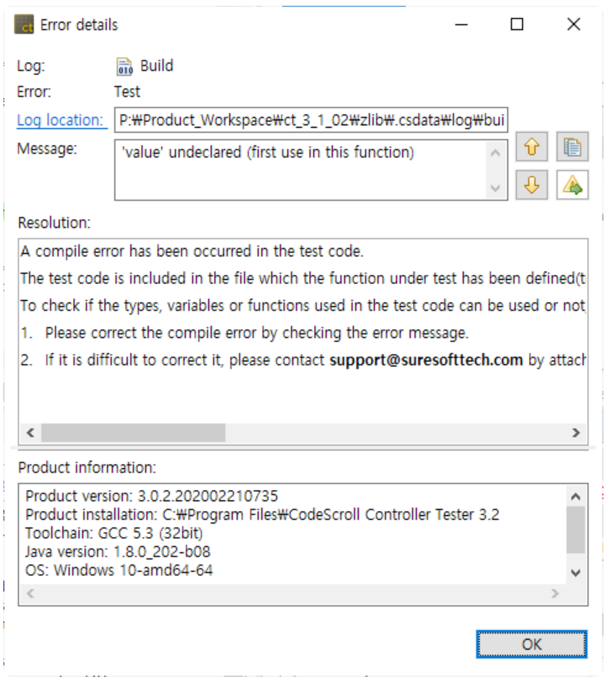
Type	Description
Source	Errors occurred int the source file
Stub	Errors occurred in the stub file
Test	Errors occurred in the test editor

Go to the error location

In the context menu, select [Go to error location] to go to the location where the error has occurred so as to correct the error easily.

Show error details

Double-click the error information or select [Show error details…] in the context menu to check the detail information for the error.



Log: Build
Error: Test
Log location: P:₩Product_Workspace₩ct_3_1_02₩zlib₩.csdata₩log₩bui
Message: 'value' undeclared (first use in this function)

Resolution:
A compile error has been occurred in the test code.
The test code is included in the file which the function under test has been defined(t
To check if the types, variables or functions used in the test code can be used or not
1. Please correct the compile error by checking the error message.
2. If it is difficult to correct it, please contact **support@suresofttech.com** by attach

Product information:
```
Product version: 3.0.2.202002210735
Product installation: C:₩Program Files₩CodeScroll Controller Tester 3.2
Toolchain: GCC 5.3 (32bit)
Java version: 1.8.0_202-b08
OS: Windows 10-amd64-64
```

Buttons

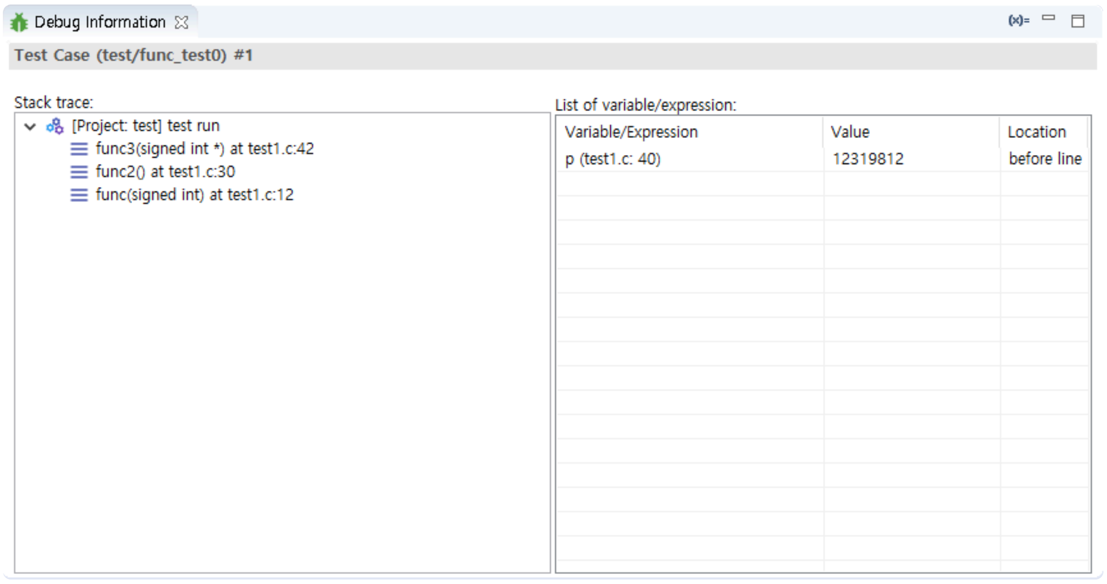
Button	Description
⇧ Previous	Shows the previous error information.
⇩ Next	Shows the next error information.
Copy	Copies the error information.
Go to Error	Points to the location of the error.

15.12. Debug Information View

The debug information view shows information to help you determine the cause of an error in a test case.

- Trace function calls in test cases with errors
- Actual value of variable/expression added to inspect debug information

If you select a test case that has [Inspect Debug Info] in the unit test view, debug information is displayed in the Debug Information view.



Test Case (test/func_test0) #1

Stack trace:

```
[Project: test] test run
    func3(signed int *) at test1.c:42
    func2() at test1.c:30
    func(signed int) at test1.c:12
```

List of variable/expression:

Variable/Expression	Value	Location
p (test1.c: 40)	12319812	before line

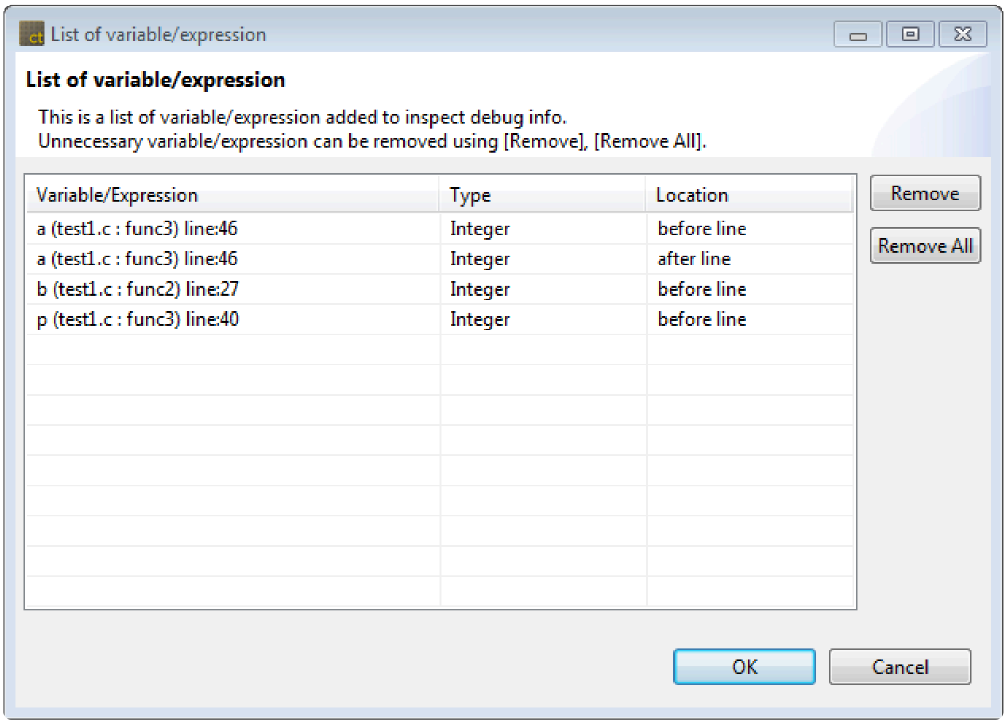
- The Stack trace shows the function call trace when the test case in error was executed. The location where the error occurred is displayed at the top.
- The variable/expression list shows the actual value of the variable/expression added to inspect the debug information.

! If the actual value of the added variable/expression is not displayed:
- When [Inspect Debug Info] of the test case is not executed after adding a new variable/expression
- When the line where the variable/expression was added was not executed when the test case was executed (it was not executed depending on the condition or an error occurred before execution)

Debug Information View toolbar menu

icon	description
(x)=	List of variable/expression to debug

In the list of debug variable/expression, you can check and remove variable/expression.



List of variable/expression

This is a list of variable/expression added to inspect debug info.
Unnecessary variable/expression can be removed using [Remove], [Remove All].

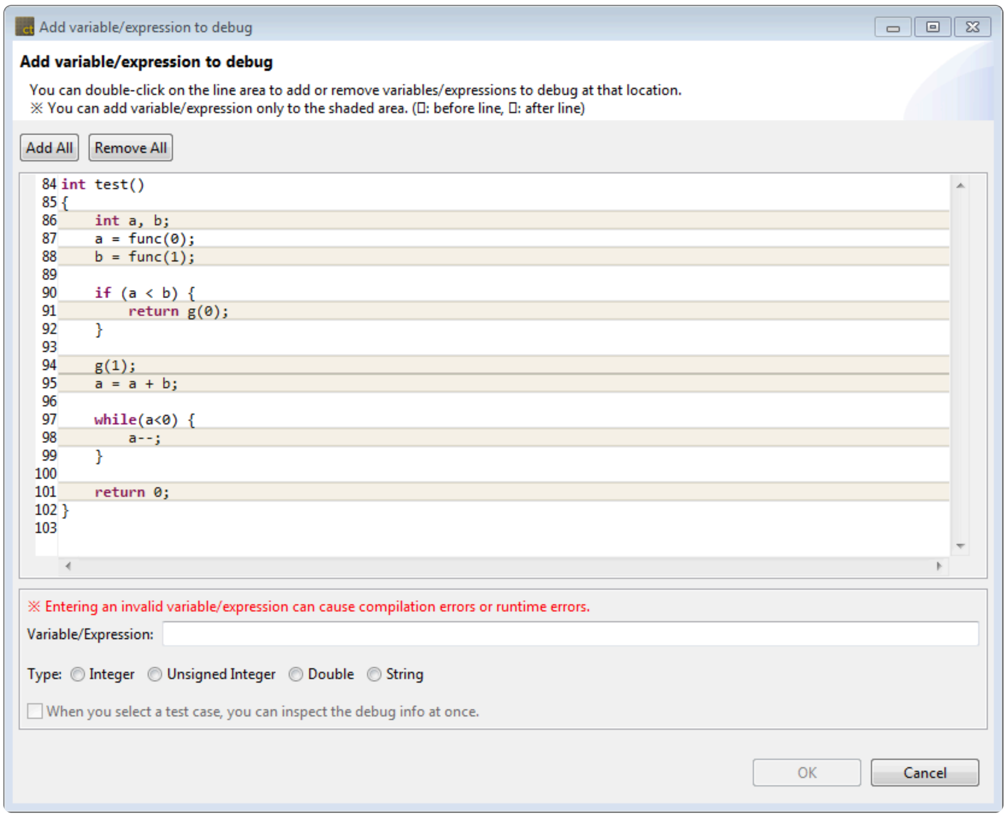
Variable/Expression	Type	Location
a (test1.c : func3) line:46	Integer	before line
a (test1.c : func3) line:46	Integer	after line
b (test1.c : func2) line:27	Integer	before line
p (test1.c : func3) line:40	Integer	before line

Adding variable/expression to debug

You can add variable/expression to debug in the following ways.

1. Double-click the line area in the source code editor
2. Select [Add Variable/expression to debug…] from the line area context menu in the source code editor
3. After specifying a variable or expression in the source code editor, select [Add Variable/expression to debug…] from the context menu.

When the above operation is performed, the [Add variable/expression to debug] window appears.



Add variable/expression to debug

Add variable/expression to debug

You can double-click on the line area to add or remove variables/expressions to debug at that location.
※ You can add variable/expression only to the shaded area. (□: before line, □: after line)

Add All | Remove All

```
int test()
{
    int a, b;
    a = func(0);
    b = func(1);

    if (a < b) {
        return g(0);
    }

    g(1);
    a = a + b;

    while(a<0) {
        a--;
    }

    return 0;
}
```

※ Entering an invalid variable/expression can cause compilation errors or runtime errors.

Variable/Expression:

Type: ○ Integer ○ Unsigned Integer ○ Double ○ String

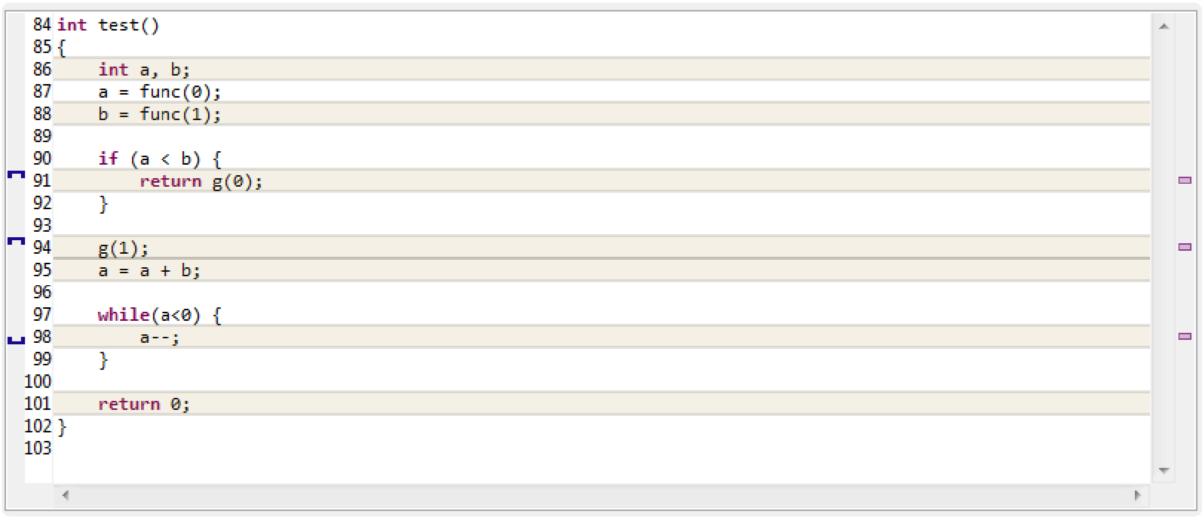
☐ When you select a test case, you can inspect the debug info at once.

OK | Cancel

You can double-click on the line area to add or remove variable/expression to debug at that location.

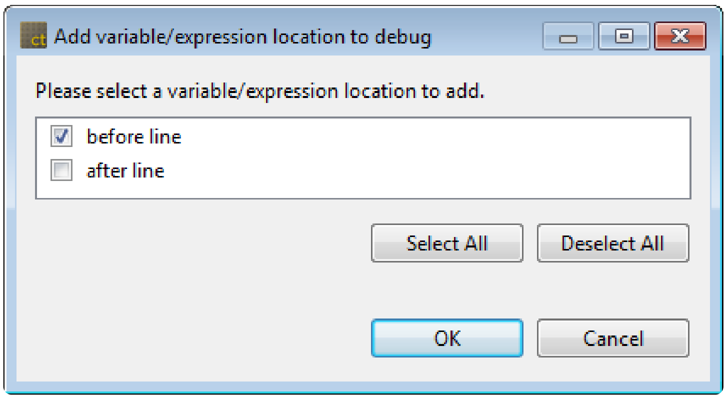
marker	description
⊓	Variable/expression added before the line
⊔	Variable/expression added after the line

You can add markers only in the shaded area.

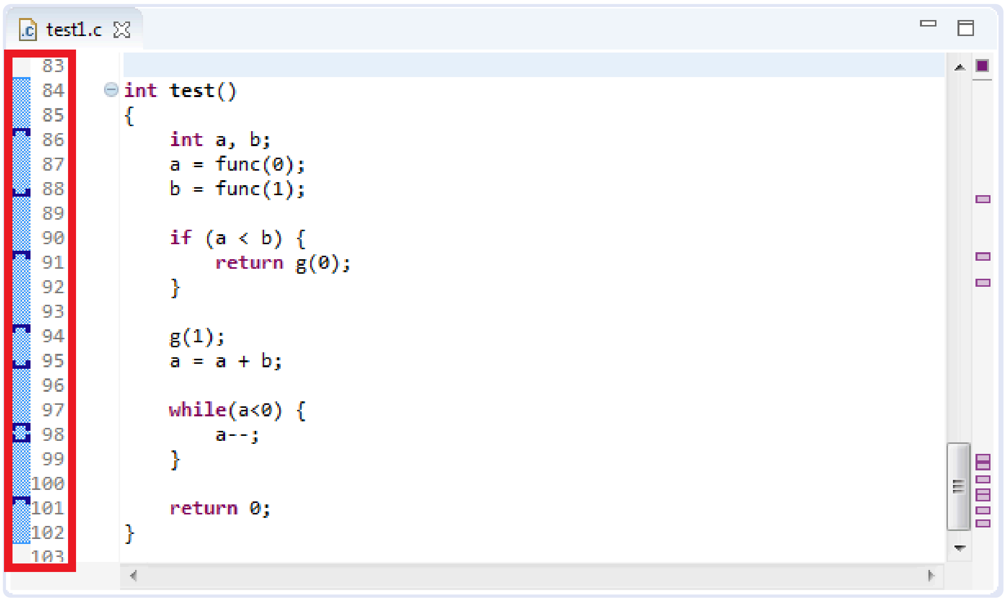


```
int test()
{
    int a, b;
    a = func(0);
    b = func(1);

    if (a < b) {
        return g(0);
    }

    g(1);
    a = a + b;

    while(a<0) {
        a--;
    }

    return 0;
}
```

If you can add a variable/expression to debug both before and after the line in the shaded area, a dialog will pop up asking where to add it.

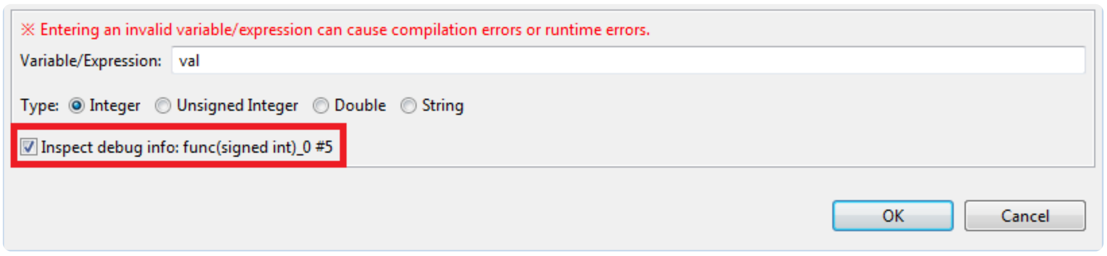

Add variable/expression location to debug
Please select a variable/expression location to add.
before line
after line
Select All
Deselect All
OK
Cancel

You can add or remove variables/expressions anywhere you can add to the target function through the [Add All], [Remove All] buttons at the top of the source viewer.
After specifying the variable/expression and type and clicking the [OK] button, you can see that the marker has been added to the source code editor.



```
int test()
{
    int a, b;
    a = func(0);
    b = func(1);

    if (a < b) {
        return g(0);
    }

    g(1);
    a = a + b;

    while(a<0) {
        a--;
    }

    return 0;
}
```

If the test case is selected in [Unit Test View], you can immediately perform [Inspect Debug Info] while adding a variable/expression to be debug.



※ Entering an invalid variable/expression can cause compilation errors or runtime errors.

Variable/Expression: val

Type: [✓ Integer] Unsigned Integer Double String

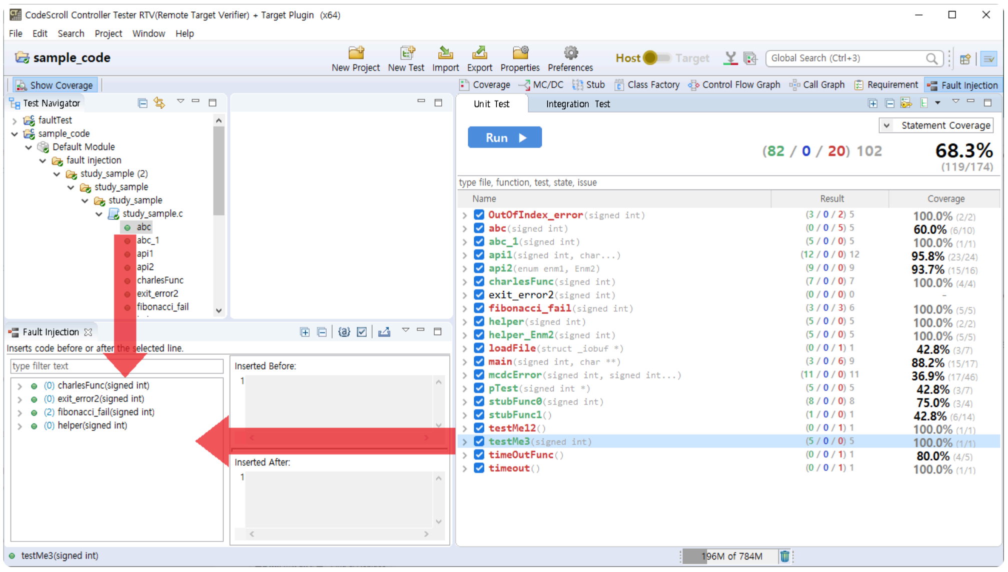
[✓] Inspect debug info: func(signed int)_0 #5

! If you enter an invalid variable/expression, a compilation error or a runtime error may occur when performing [Inspect Debug Info].

15.13. Fault Injection View

The Fault Injection View provides the feature for inserting the code needed to test additionally into the specific area of the function to be tested.

1. Drag and drop the function that you want to inject a fault from the Test Navigator View or the Unit Test View to the Fault Injection View.



CodeScroll Controller Tester RTV(Remote Target Verifier) + Target Plugin (x64)

Test Navigator: faultTest, sample_code, Default Module, fault injection, study_sample (2), study_sample, study_sample, study_sample.c, abc, abc_1, api1, api2, charlesFunc, exit_error2, fibonacci_fail

Fault Injection — Inserts code before or after the selected line.

- (0) charlesFunc(signed int)
- (0) exit_error2(signed int)
- (2) fibonacci_fail(signed int)
- (0) helper(signed int)

Inserted Before: 1

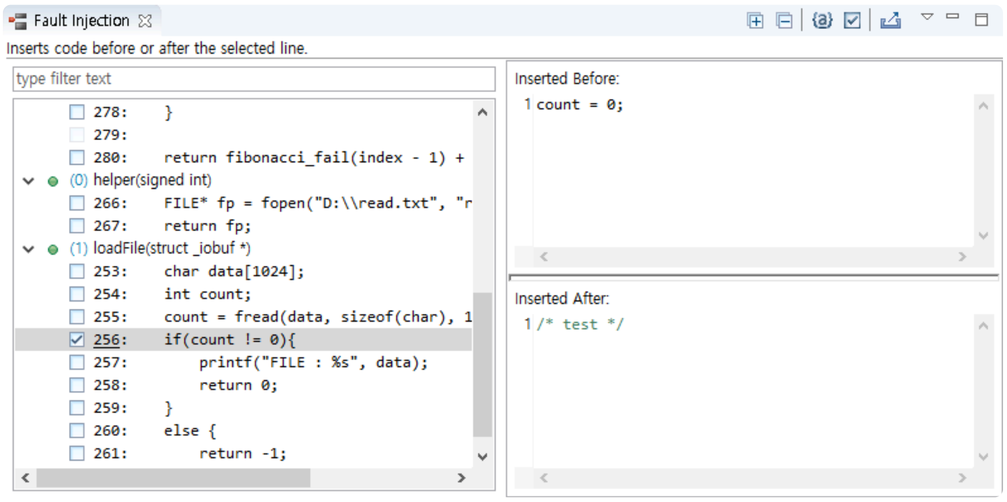
Inserted After: 1

Unit Test — Statement Coverage — (82 / 0 / 20) 102 — 68.3% (119/174)

Name	Result	Coverage
OutOfIndex_error(signed int)	(3 / 0 / 2) 5	100.0% (2/2)
abc(signed int)	(0 / 0 / 5) 5	60.0% (6/10)
abc_1(signed int)	(5 / 0 / 0) 5	100.0% (1/1)
api1(signed int, char...)	(12 / 0 / 0) 12	95.8% (23/24)
api2(enum enm1, Enm2)	(9 / 0 / 0) 9	93.7% (15/16)
charlesFunc(signed int)	(7 / 0 / 0) 7	100.0% (4/4)
exit_error2(signed int)	(0 / 0 / 0) 0	-
fibonacci_fail(signed int)	(3 / 0 / 3) 6	100.0% (5/5)
helper(signed int)	(5 / 0 / 0) 5	100.0% (2/2)
helper_Enm2(signed int)	(5 / 0 / 0) 5	100.0% (5/5)
loadFile(struct _iobuf *)	(0 / 0 / 1) 1	42.8% (3/7)
main(signed int, char **)	(3 / 0 / 6) 9	88.2% (15/17)
mcdcError(signed int, signed int...)	(11 / 0 / 0) 11	36.9% (17/46)
pTest(signed int *)	(5 / 0 / 0) 5	42.8% (3/7)
stubFunc0(signed int)	(8 / 0 / 0) 8	75.0% (3/4)
stubFunc1()	(1 / 0 / 0) 1	42.8% (6/14)
testMe12()	(0 / 0 / 1) 1	100.0% (1/1)
testMe3(signed int)	(5 / 0 / 0) 5	100.0% (1/1)
timeOutFunc()	(0 / 0 / 1) 1	80.0% (4/5)
timeout()	(0 / 0 / 1) 1	100.0% (1/1)

testMe3(signed int) — 196M of 784M

2. In the tree structure on the left of the view, click the line that you want to inject a fault and, on the right of the view, enter the user code to insert before/after the line. The number of the line where user code is written is underlined.



Fault Injection — Inserts code before or after the selected line.

```
    278:    }
    279:
    280:    return fibonacci_fail(index - 1) +
(0) helper(signed int)
    266:    FILE* fp = fopen("D:\\read.txt", "r
    267:    return fp;
(1) loadFile(struct _iobuf *)
    253:    char data[1024];
    254:    int count;
    255:    count = fread(data, sizeof(char), 1
 ✓  256:    if(count != 0){
    257:        printf("FILE : %s", data);
    258:        return 0;
    259:    }
    260:    else {
    261:        return -1;
```

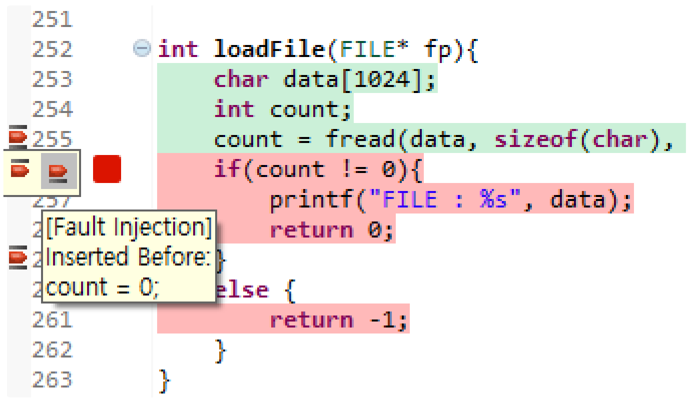
Inserted Before:

```
count = 0;
```

Inserted After:

```
/* test */
```

- When check checkboxes of lines to insert, the user codes are applied. In the source code editor, (before the line), (after the line) markers appear at that lines. When mouse is on the markers, the tooltip about fault injection information and written code appears.



```
int loadFile(FILE* fp){
    char data[1024];
    int count;
    count = fread(data, sizeof(char),
    if(count != 0){
        printf("FILE : %s", data);
        return 0;
    }
    else {
        return -1;
    }
}
```

! Single-line comments (//) and input/output user macros cannot be used.

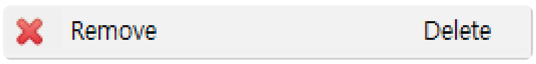
Toolbar menu in the Fault Injection view

Toolbar icon	Description
Expand All	Expand all function trees in Fault Injection view.
Collapse All	Collapse all function trees in Fault Injection view.
Show Only Non-empty Fault Injections	View only the line where the fault injection code is written among the fault injection lines.
Show Only Enable Fault Injections	View only active lines among fault injection lines.
Export Fault Injections	Export fault injections information with .xls format.

Context menu in the Fault Injection view

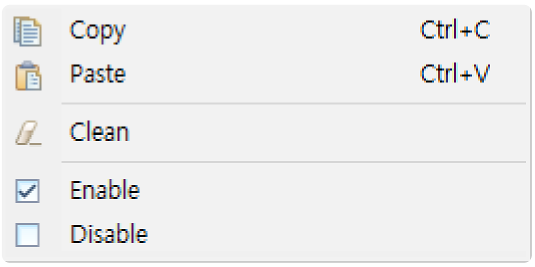
Function nodes and lines can be multi-selected to bring up the context menu.

Context menu of function nodes



Menu	Description
Remove	Remove the function inserted by users.

Context menu of lines



Menu	Description
Copy	Copy the information inserted by user before/after the line.
Paste	Paste the information inserted by user before/after the line.
Clean	Uncheck the checkboxes of the selected lines and remove inserted code.
✓ Enable	Check the checkboxes of the selected lines and activate fault injection.
☐ Disable	Uncheck the checkboxes of the selected lines and deactivate fault injection.

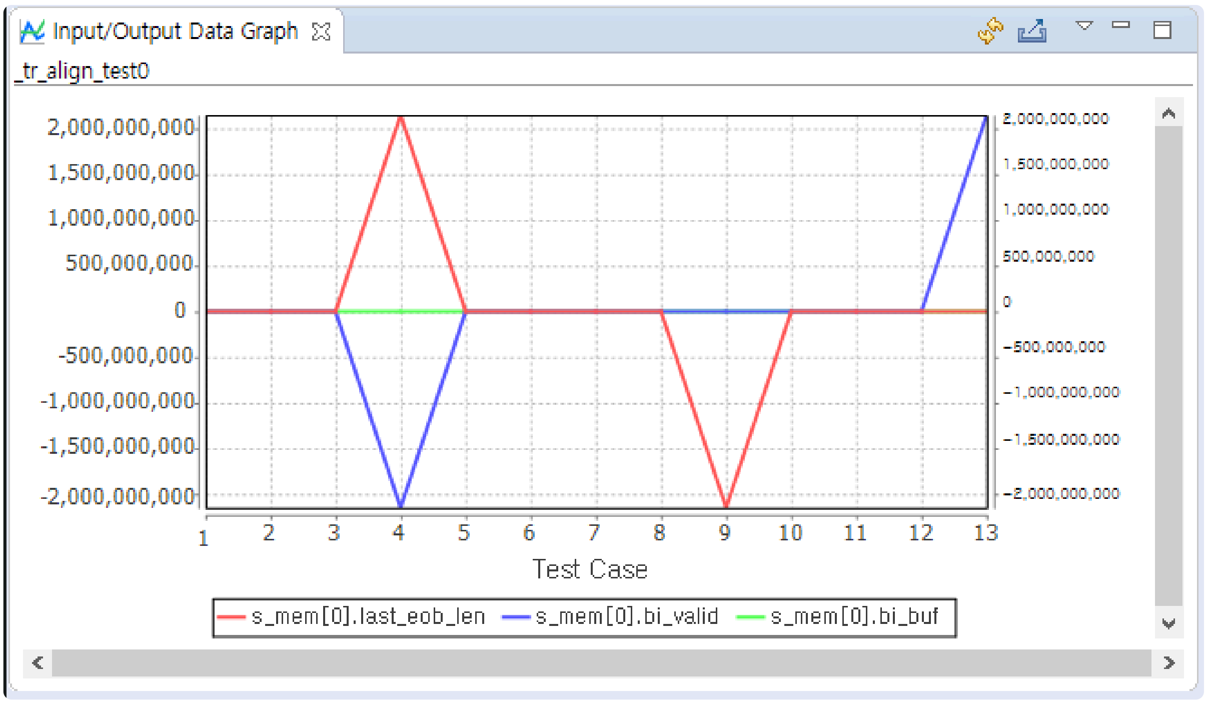
Pull-down menu

Menu	Description
Reconfiguring Fault Injection	Note the Reconfiguring Fault Injection

When modifying the source code, contents of the fault injection may not be properly reflected. In case of modification, contents of the fault injection must be rewritten.

15.14. Input/output Data Graph View

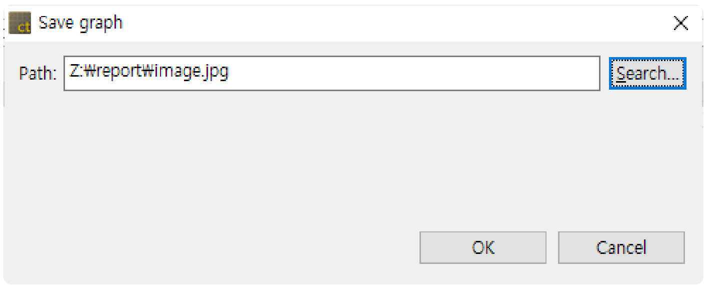
The Controller Tester provides the data for input value/expected value/output value in graph format. The horizontal axis of the graph indicates the number of the test case and the vertical axis indicates the data of the test case.



Toolbar icon in Input/output Data Graph view

Toolbar icon	Description
Refresh	Refreshes the input/output data.
Save graph	Saves the input/output data.

Click [Save graph] to display the notification window that can enter the path for saving the graph. Enter the path to save, the file name and the file format and click [OK] to save the graph.

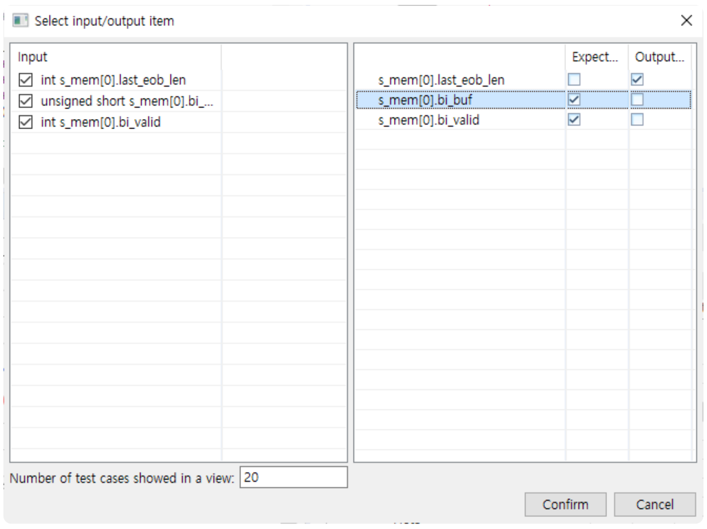


Path: Z:₩report₩image.jpg

Graph settings

Select [Select input/output item] in the pull-down menu (▽) to display the Graph settings window.

- For the items selected in the checkbox, the [Input], [Output value] and [Expected value] are displayed in the Input/output Data Graph. However, if the expected values are specified as ~, &, | and ! etc., the expected value is not applied to the Input/output Data Graph view.
- [Number of test cases showed in a view] allows you to specify the number of test cases to be displayed on one screen.


Select input/output item

Input
☑ int s_mem[0].last_eob_len
☑ unsigned short s_mem[0].bi_...
☑ int s_mem[0].bi_valid

	Expect...	Output...
s_mem[0].last_eob_len	☐	☑
s_mem[0].bi_buf	☑	☐
s_mem[0].bi_valid	☑	☐

Number of test cases showed in a view: 20

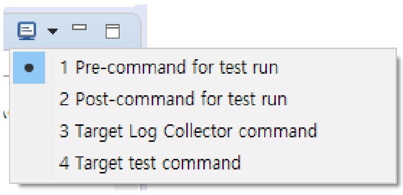
15.15. Console View

Enter the instruction or batch file in [Pre-command for test run] and [Post-command for test run] of [Project] -> [Properties] -> [Test] -> [External Command] and execute the unit test to display the execution result for the external instructions before and after the test execution in the [Console] view.

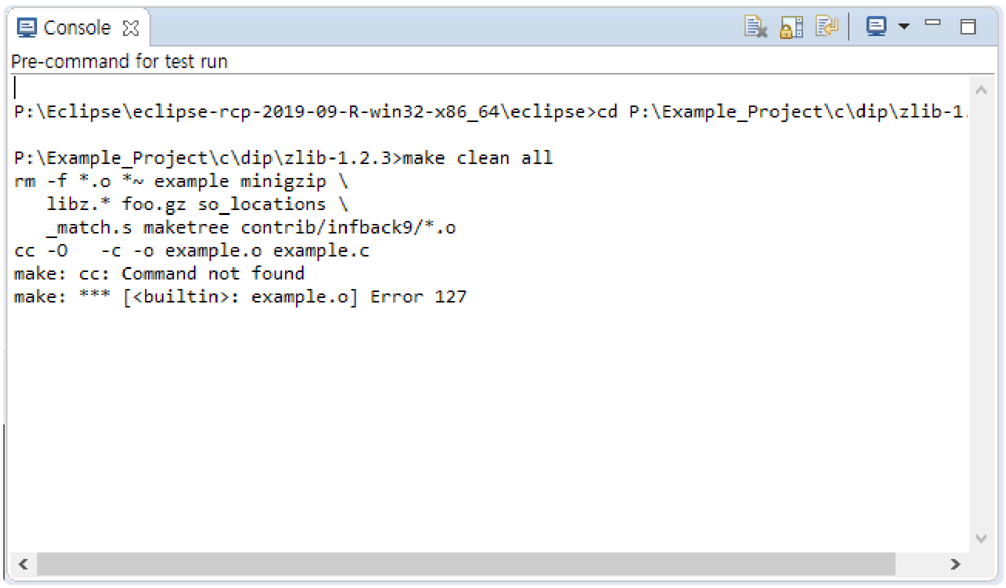
Toolbar icon in the [Console] view

Toolbar icon	Description
Clear Console	Clears the console contents.
Scroll Lock	Locks the scrolling of the [Console] view screen.
Display Selected Console	Shows the selected console.

If [Display Selected Console] is selected, the following two menus are displayed: [Pre-command for test run] and [Post-command for test run].

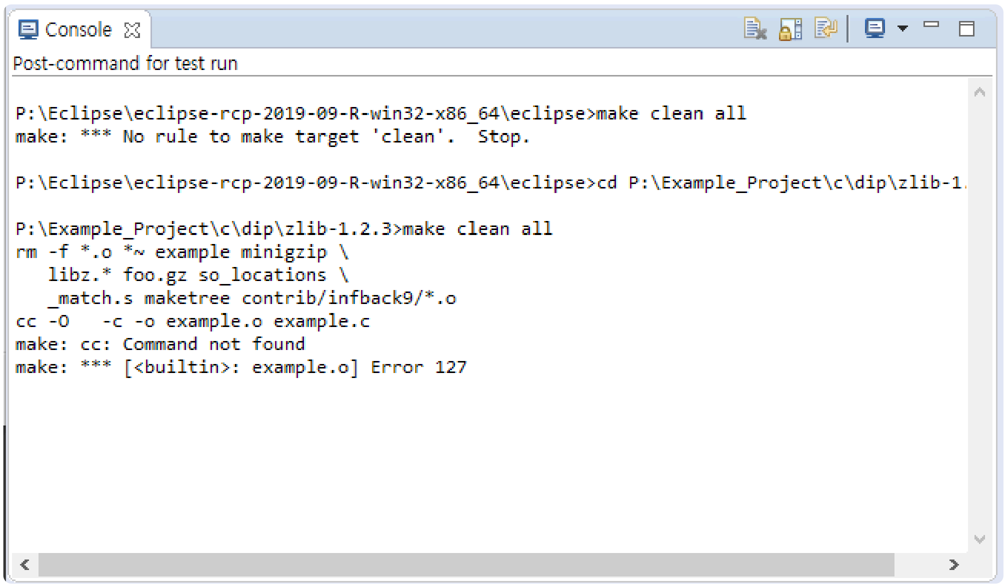

1 Pre-command for test run
2 Post-command for test run
3 Target Log Collector command
4 Target test command

If you select [Pre-command for test run], the execution result for the external command before running the test is displayed in the Console view.



```
P:\Eclipse\eclipse-rcp-2019-09-R-win32-x86_64\eclipse>cd P:\Example_Project\c\dip\zlib-1.

P:\Example_Project\c\dip\zlib-1.2.3>make clean all
rm -f *.o *~ example minigzip \
   libz.* foo.gz so_locations \
   _match.s maketree contrib/infback9/*.o
cc -O   -c -o example.o example.c
make: cc: Command not found
make: *** [<builtin>: example.o] Error 127
```

If you select [Post-command for test run], the execution result for the external instructions after the test execution is displayed in the Console view.

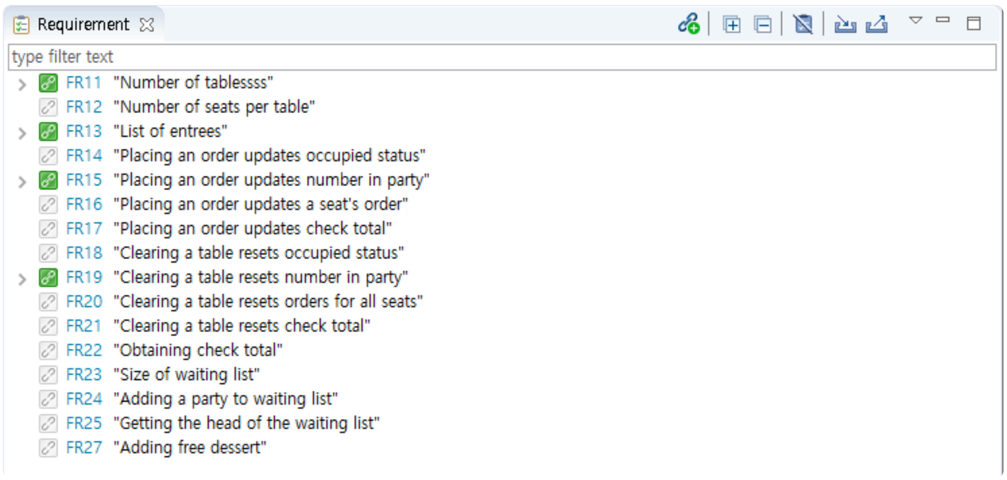


Post-command for test run

```
P:\Eclipse\eclipse-rcp-2019-09-R-win32-x86_64\eclipse>make clean all
make: *** No rule to make target 'clean'.  Stop.

P:\Eclipse\eclipse-rcp-2019-09-R-win32-x86_64\eclipse>cd P:\Example_Project\c\dip\zlib-1.

P:\Example_Project\c\dip\zlib-1.2.3>make clean all
rm -f *.o *~ example minigzip \
   libz.* foo.gz so_locations \
   _match.s maketree contrib/infback9/*.o
cc -O   -c -o example.o example.c
make: cc: Command not found
make: *** [<builtin>: example.o] Error 127
```

15.16. Requirement View

You can import requirements from a requirements management tool or a CSV file into Controller Tester. You can connect imported requirements with tests and export the connected information.



FR11 "Number of tablessss"
FR12 "Number of seats per table"
FR13 "List of entrees"
FR14 "Placing an order updates occupied status"
FR15 "Placing an order updates number in party"
FR16 "Placing an order updates a seat's order"
FR17 "Placing an order updates check total"
FR18 "Clearing a table resets occupied status"
FR19 "Clearing a table resets number in party"
FR20 "Clearing a table resets orders for all seats"
FR21 "Clearing a table resets check total"
FR22 "Obtaining check total"
FR23 "Size of waiting list"
FR24 "Adding a party to waiting list"
FR25 "Getting the head of the waiting list"
FR27 "Adding free dessert"

Requirement status

Status	Description
Not connected	A requirement without connected tests
Connected	A requirement with connected tests
Needs Review	A requirement that need to be reviewed

Toolbar Menu in Requirement View

Icon	Description
Connect requirements and tests	Open the [Connect requirements and tests] dialog box.
Expand All	Expand all requirements
Collapse All	Collapse all requirements
Hide unconnected requirements	Hide unconnected requirements.
Import	Importing requirements created with a CSV file or a requirements management tool.
Export	Export requirements to a requirements test coverage report or requirements management tool.

For more information, please refer to the pages Export, Import.

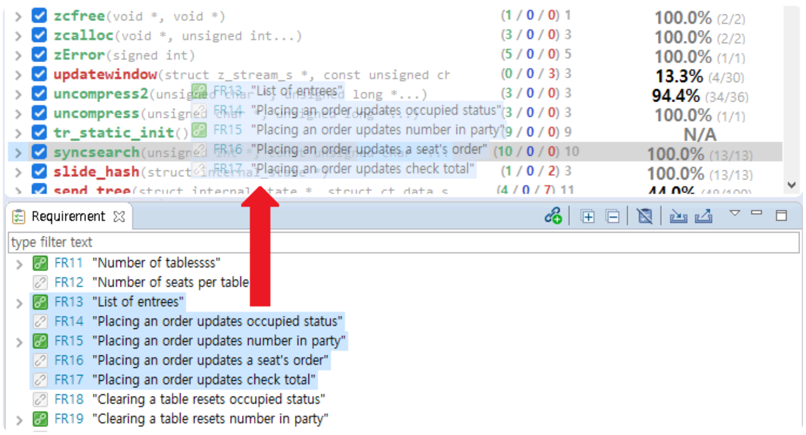
pull-down menu (▽) in Requirement View

Icon	Description
Export requirements traceability (csv)…	Exporting connection information between requirements and tests.
Export requirements traceability [Including all test cases] (csv)…	Export connection information between requirements and tests, including all test cases.
Import requirements traceability	Importing connection information between requirements and tests.
Export Requirements Traceability Information for V-SPICE	Export connection information between requirements and tests in V-SPICE's xml file format.

Connect tests and requirements

Requirements can be connect to test/test case/integration test.

- Drag a requirement from the Requirements View and drop it on the target you want to connect to in the Test View.



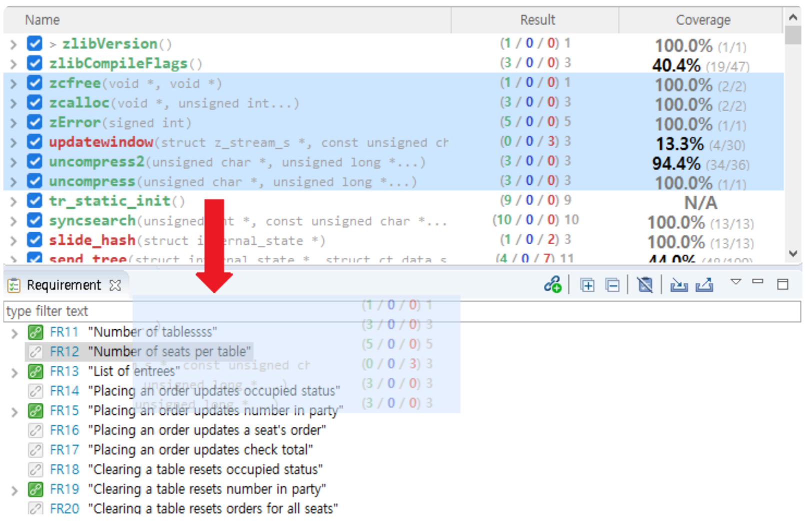
```
zcfree(void *, void *)                      (1 / 0 / 0) 1    100.0% (2/2)
zcalloc(void *, unsigned int...)            (3 / 0 / 0) 3    100.0% (2/2)
zError(signed int)                          (5 / 0 / 0) 5    100.0% (1/1)
updatewindow(struct z_stream_s *, const unsigned ch (0 / 0 / 3) 3   13.3% (4/30)
uncompress2(unsigned ... long *...)         (3 / 0 / 0) 3    94.4% (34/36)
uncompress(unsigned ...)                    (3 / 0 / 0) 3    100.0% (1/1)
tr_static_init()                            (9 / 0 / 0) 9    N/A
syncsearch(unsigned ...)                    (10 / 0 / 0) 10  100.0% (13/13)
slide_hash(struct internal_state *)         (1 / 0 / 2) 3    100.0% (13/13)
```

Requirement

type filter text

```
FR11 "Number of tablessss"
FR12 "Number of seats per table"
FR13 "List of entrees"
FR14 "Placing an order updates occupied status"
FR15 "Placing an order updates number in party"
FR16 "Placing an order updates a seat's order"
FR17 "Placing an order updates check total"
FR18 "Clearing a table resets occupied status"
FR19 "Clearing a table resets number in party"
```

- Drag an item from the test view and drop it on the target you want to connect to in the Requirements View.



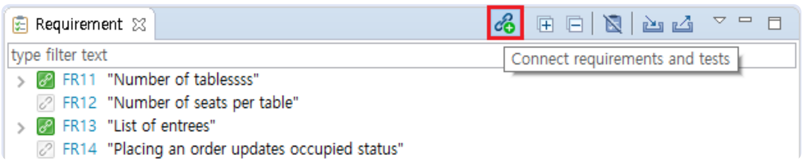
Name	Result	Coverage
> zlibVersion()	(1 / 0 / 0) 1	100.0% (1/1)
zlibCompileFlags()	(3 / 0 / 0) 3	40.4% (19/47)
zcfree(void *, void *)	(1 / 0 / 0) 1	100.0% (2/2)
zcalloc(void *, unsigned int...)	(3 / 0 / 0) 3	100.0% (2/2)
zError(signed int)	(5 / 0 / 0) 5	100.0% (1/1)
updatewindow(struct z_stream_s *, const unsigned ch	(0 / 0 / 3) 3	13.3% (4/30)
uncompress2(unsigned char *, unsigned long *...)	(3 / 0 / 0) 3	94.4% (34/36)
uncompress(unsigned char *, unsigned long *...)	(3 / 0 / 0) 3	100.0% (1/1)
tr_static_init()	(9 / 0 / 0) 9	N/A
syncsearch(unsigned int *, const unsigned char *...	(10 / 0 / 0) 10	100.0% (13/13)
slide_hash(struct internal_state *)	(1 / 0 / 2) 3	100.0% (13/13)

Requirement

type filter text

- FR11 "Number of tablessss"
- FR12 "Number of seats per table"
- FR13 "List of entrees"
- FR14 "Placing an order updates occupied status"
- FR15 "Placing an order updates number in party"
- FR16 "Placing an order updates a seat's order"
- FR17 "Placing an order updates check total"
- FR18 "Clearing a table resets occupied status"
- FR19 "Clearing a table resets number in party"
- FR20 "Clearing a table resets orders for all seats"

- Connecting via the Connect requirements and tests dialog
  1. Select [Connect requirements and tests] from the toolbar menu.



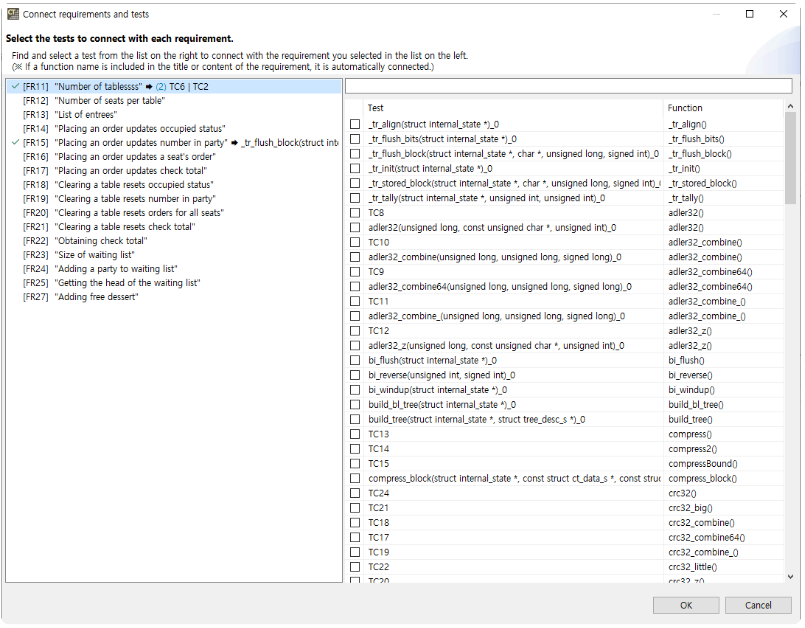
Requirement

type filter text

Connect requirements and tests

- FR11 "Number of tablessss"
- FR12 "Number of seats per table"
- FR13 "List of entrees"
- FR14 "Placing an order updates occupied status"

  2. You can connect requirements and tests through the [Connect requirements and tests] dialog.



Connect requirements and tests

Select the tests to connect with each requirement.

Find and select a test from the list on the right to connect with the requirement you selected in the list on the left.
(※ If a function name is included in the title or content of the requirement, it is automatically connected.)

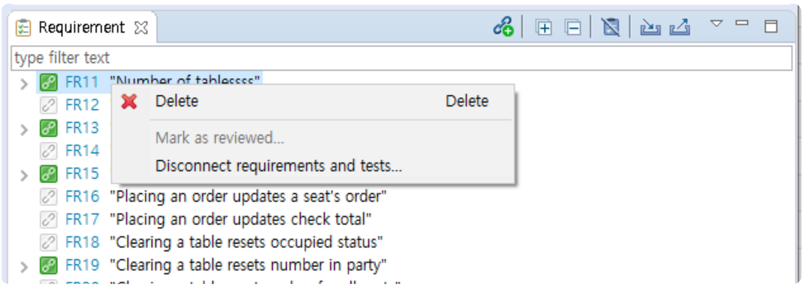
- ✓ [FR11] "Number of tablessss" ➡ (2) TC6 | TC2
- [FR12] "Number of seats per table"
- [FR13] "List of entrees"
- [FR14] "Placing an order updates occupied status"
- ✓ [FR15] "Placing an order updates number in party" ➡ _tr_flush_block(struct int
- [FR16] "Placing an order updates a seat's order"
- [FR17] "Placing an order updates check total"
- [FR18] "Clearing a table resets occupied status"
- [FR19] "Clearing a table resets number in party"
- [FR20] "Clearing a table resets orders for all seats"
- [FR21] "Clearing a table resets check total"
- [FR22] "Obtaining check total"
- [FR23] "Size of waiting list"
- [FR24] "Adding a party to waiting list"
- [FR25] "Getting the head of the waiting list"
- [FR27] "Adding free dessert"

	Test	Function
☐	_tr_align(struct internal_state *)_0	_tr_align()
☐	_tr_flush_bits(struct internal_state *)_0	_tr_flush_bits()
☐	_tr_flush_block(struct internal_state *, char *, unsigned long, signed int)_0	_tr_flush_block()
☐	_tr_init(struct internal_state *)_0	_tr_init()
☐	_tr_stored_block(struct internal_state *, char *, unsigned long, signed int)_(	_tr_stored_block()
☐	_tr_tally(struct internal_state *, unsigned int, unsigned int)_0	_tr_tally()
☐	TC8	adler32()
☐	adler32(unsigned long, const unsigned char *, unsigned int)_0	adler32()
☐	TC10	adler32_combine()
☐	adler32_combine(unsigned long, unsigned long, signed long)_0	adler32_combine()
☐	TC9	adler32_combine64()
☐	adler32_combine64(unsigned long, unsigned long, signed long)_0	adler32_combine64()
☐	TC11	adler32_combine_()
☐	adler32_combine_(unsigned long, unsigned long, signed long)_0	adler32_combine_()
☐	TC12	adler32_z()
☐	adler32_z(unsigned long, const unsigned char *, unsigned int)_0	adler32_z()
☐	bi_flush(struct internal_state *)_0	bi_flush()
☐	bi_reverse(unsigned int, signed int)_0	bi_reverse()
☐	bi_windup(struct internal_state *)_0	bi_windup()
☐	build_bl_tree(struct internal_state *)_0	build_bl_tree()
☐	build_tree(struct internal_state *, struct tree_desc_s *)_0	build_tree()
☐	TC13	compress()
☐	TC14	compress2()
☐	TC15	compressBound()
☐	compress_block(struct internal_state *, const struct ct_data_s *, const struc	compress_block()
☐	TC24	crc32()
☐	TC21	crc32_big()
☐	TC18	crc32_combine()
☐	TC17	crc32_combine64()
☐	TC19	crc32_combine_()
☐	TC22	crc32_little()

OK Cancel

Disconnect requirements and tests

You can disconnect requirements and tests from the context menu in the Requirements View.



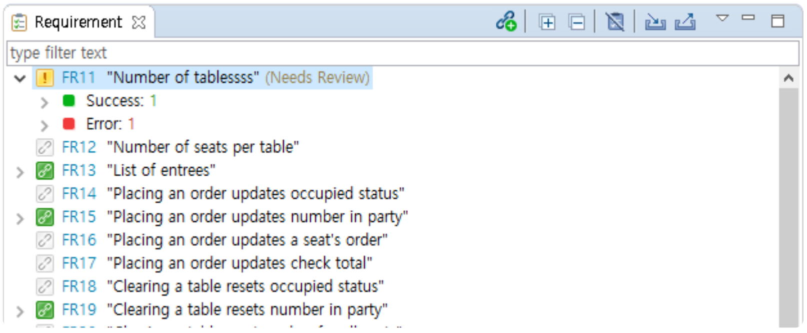
Requirement

type filter text

- FR11 "Number of tablessss"
- FR12
- FR13
- FR14
- FR15
- FR16 "Placing an order updates a seat's order"
- FR17 "Placing an order updates check total"
- FR18 "Clearing a table resets occupied status"
- FR19 "Clearing a table resets number in party"

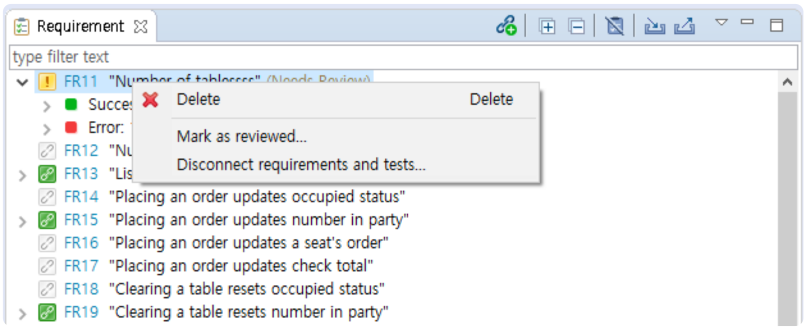
Review of tests connected to requirements

1. When a requirement is re-imported, it will be marked as [Needs Review] if the title or description has changed.



FR11 "Number of tablessss" (Needs Review)
Success: 1
Error: 1
FR12 "Number of seats per table"
FR13 "List of entrees"
FR14 "Placing an order updates occupied status"
FR15 "Placing an order updates number in party"
FR16 "Placing an order updates a seat's order"
FR17 "Placing an order updates check total"
FR18 "Clearing a table resets occupied status"
FR19 "Clearing a table resets number in party"

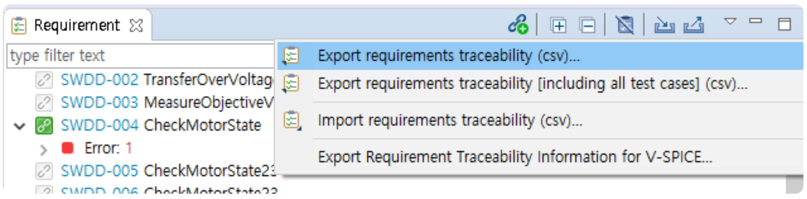
2. After reviewing the requirements and connected tests that need to be reviewed, you can mark them as reviewed with the context menu.



FR11 "Number of tablessss" (Needs Review)
Success
Error:
FR12
FR13
FR14 "Placing an order updates occupied status"
FR15 "Placing an order updates number in party"
FR16 "Placing an order updates a seat's order"
FR17 "Placing an order updates check total"
FR18 "Clearing a table resets occupied status"
FR19 "Clearing a table resets number in party"

Export requirements traceability

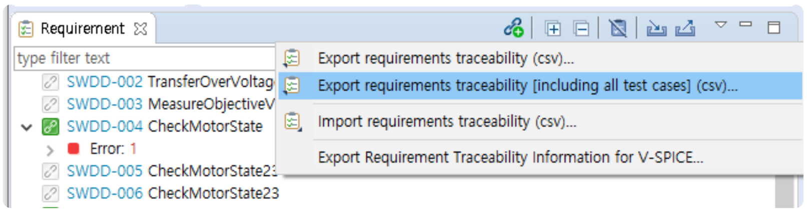
You can export the connection information between requirements and tests to a CSV file.


Requirement
type filter text
Export requirements traceability (csv)...
Export requirements traceability [including all test cases] (csv)...
Import requirements traceability (csv)...
Export Requirement Traceability Information for V-SPICE...

SWDD-002 TransferOverVoltag
SWDD-003 MeasureObjectiveV
SWDD-004 CheckMotorState
Error: 1
SWDD-005 CheckMotorState23

Export requirements traceability [Including all test case]

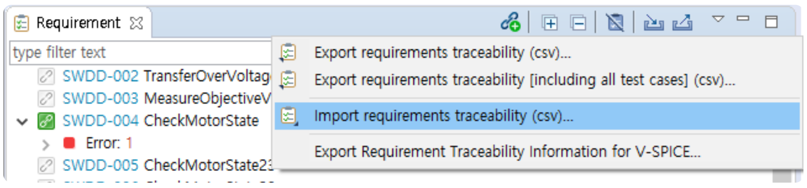
You can export the connection information between requirements and tests to a CSV file, including all test cases.


Requirement
type filter text
Export requirements traceability (csv)...
Export requirements traceability [including all test cases] (csv)...
Import requirements traceability (csv)...
Export Requirement Traceability Information for V-SPICE...

SWDD-002 TransferOverVoltag
SWDD-003 MeasureObjectiveV
SWDD-004 CheckMotorState
Error: 1
SWDD-005 CheckMotorState23
SWDD-006 CheckMotorState23

Import requirements traceability

After entering traceability information in the CSV file created by [Export requirements traceability], you can import it through the [Import requirements traceability] menu.


Requirement
type filter text
SWDD-002 TransferOverVoltag
SWDD-003 MeasureObjectiveV
SWDD-004 CheckMotorState
Error: 1
SWDD-005 CheckMotorState23
Export requirements traceability (csv)...
Export requirements traceability [including all test cases] (csv)...
Import requirements traceability (csv)...
Export Requirement Traceability Information for V-SPICE...

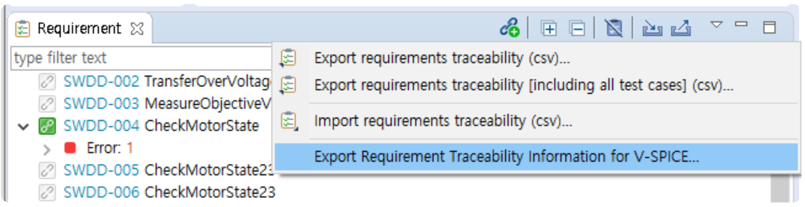
- Requirements traceability file description

Row	Description
TEST_TYPE	Test: 0 Integration Test: 1 Test Case: 2
TEST_NAME	Integration Test: Name Test or Test case: a unique name for the test
TESTCASE_NO	Test case: number Non Test case: 0
REQ_KEY	The key of the requirement to be connected or connected to the test
TEST_ID	Integration Test: Name Test: The name displayed in the test view Test case: The name displayed next to the number in the test view

The unique name of the test can be found by selecting ‘Show as Unique Test Name’ from the toolbar menu of the test view or by searching.

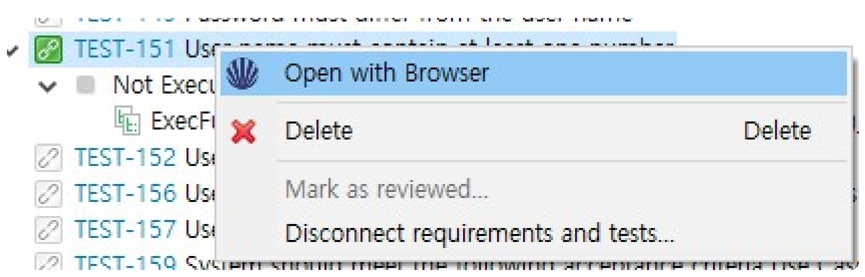
Export requirement traceability information for V-SPICE

Connection information between requirements and tests can be exported to an xml file conforming to the V-SPICE format.


Requirement
type filter text
SWDD-002 TransferOverVoltag
SWDD-003 MeasureObjectiveV
SWDD-004 CheckMotorState
Error: 1
SWDD-005 CheckMotorState23
SWDD-006 CheckMotorState23
Export requirements traceability (csv)...
Export requirements traceability [including all test cases] (csv)...
Import requirements traceability (csv)...
Export Requirement Traceability Information for V-SPICE...

Open in Requirements Management Tool

Requirements imported from the requirements management tool or tests exported to the requirements management tool can be viewed in the requirements management tool through the [Open with Browser] context menu.



16. Analysis Perspective

The Analysis Perspective provides a UI for analysis information that can be confirmed from the test results.

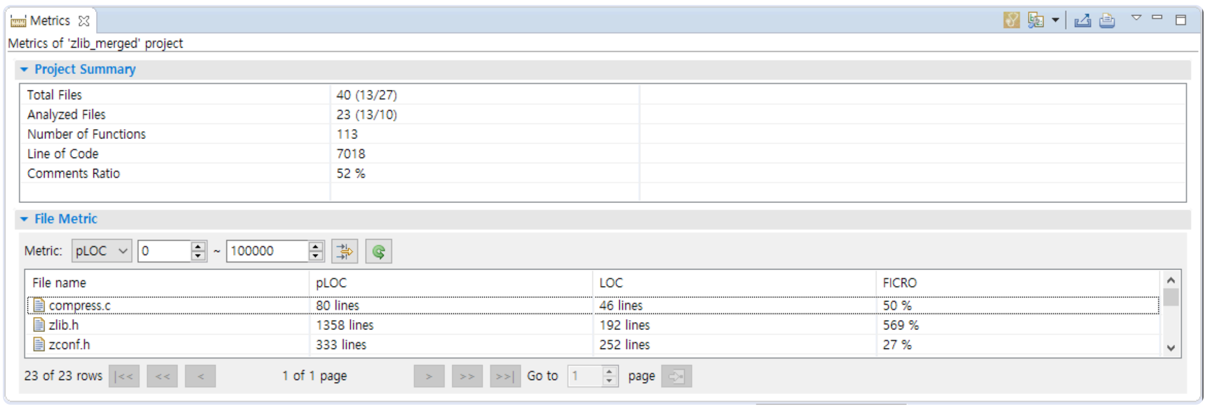
The components that make up the analysis perspective are:

- Metrics View
- Metrics Chart View
- Metrics Top Chart View
- Metrics Bar Chart View
- Metrics Diagnosis Chart View
- Unused Function View
- Source-Header Relation View
- Global Variable Relation View
- Function Call Hierarchy View
- Source Code Editor section

Views that are not included by default can be opened from [Window]> [Show View]> [Other…] on the top menu.

16.1. Metrics View

The Metrics view shows the result that measures the metric for the project. It shows the summary information for the overall metric and the metric information for each items included in the project (module, file, class, function).



Metrics

Metrics of 'zlib_merged' project

Project Summary

Total Files	40 (13/27)
Analyzed Files	23 (13/10)
Number of Functions	113
Line of Code	7018
Comments Ratio	52 %

File Metric

Metric: pLOC 0 ~ 100000

File name	pLOC	LOC	FICRO
compress.c	80 lines	46 lines	50 %
zlib.h	1358 lines	192 lines	569 %
zconf.h	333 lines	252 lines	27 %

23 of 23 rows 1 of 1 page Go to 1 page

Icons

Icon	Description
▣	Module (a logical portion that divides the project for each function)
🗎	File (Source file and header file belonging to the project)
Ⓒ	Class
●	Function

Toolbar menu

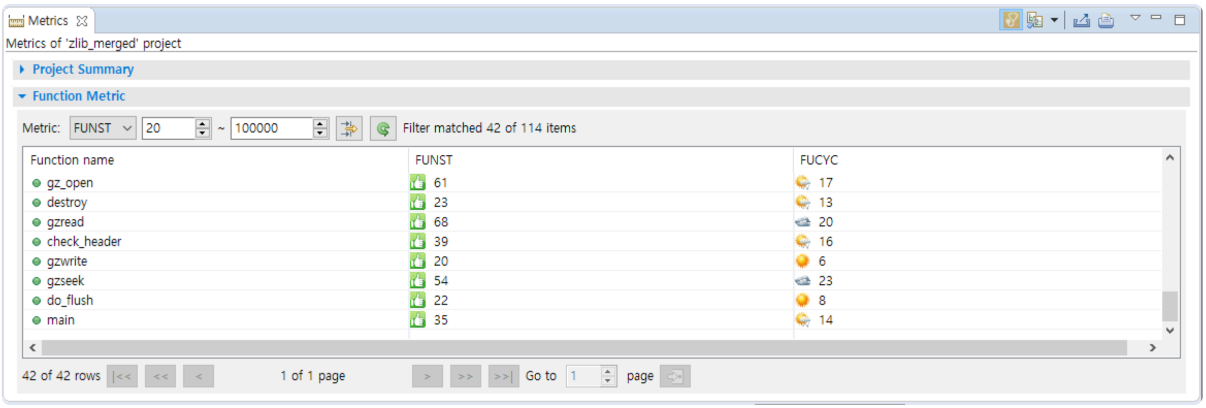
Menu	Description
Show Diagnosis	Displays a diagnostic image of the value in the left of the metric value.
Change Mode	Changes the view mode (module, file, class, function).
Export View Content	Exports the contents of view as a report.
Print View Content	Prints the contents of view.

Pull-down menu

Menu	Description
Sort by	Sorts based on the selected item (even if clicking the column name in the table, it is sorted equally).
Columns	Changes the order and width of the columns (allows you to change the order by dragging

	and dropping the table's column name).
Configure diagnosis	Opens the diagnostics preferences page (allows you to set the diagnostic step and the ranges or images for each metric).
Set to Hide/ Show metric	Sets whether to hide or show the metrics.
Metric View Option	Sets the number of lines per page in the Metric view.

Filtering



Metrics

Metrics of 'zlib_merged' project

Project Summary

Function Metric

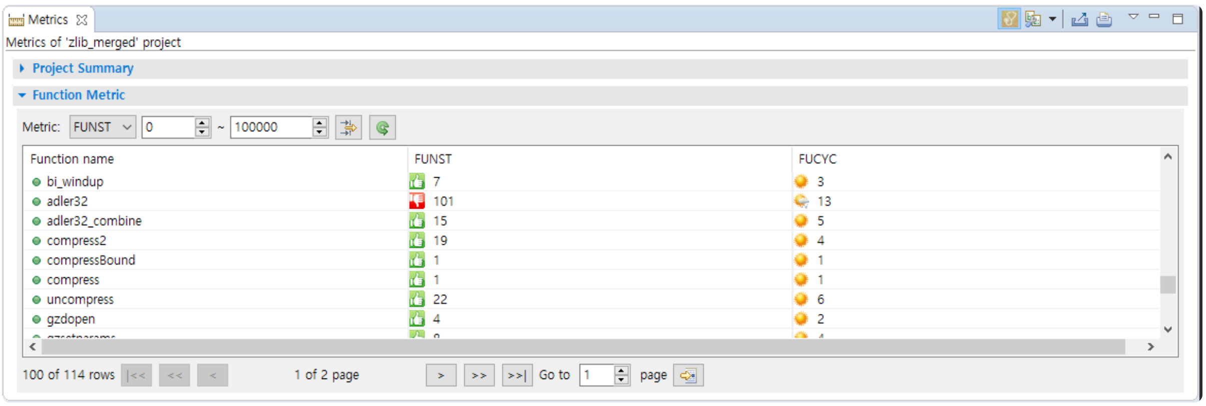
Metric: FUNST 20 ~ 100000 Filter matched 42 of 114 items

Function name	FUNST	FUCYC
gz_open	61	17
destroy	23	13
gzread	68	20
check_header	39	16
gzwrite	20	6
gzseek	54	23
do_flush	22	8
main	35	14

42 of 42 rows |<< << < 1 of 1 page > >> >>| Go to 1 page

The filtering allows you to view only those items within the desired range for the specific metric. Select a metric, enter the range value and click [Filtering] button in the right section to see those values corresponding to the entered information.
If you want to return to the status before filtering, click [Initialize the Filtering Criteria] button on the right side of [Filtering] button.

Paging



Metrics

Metrics of 'zlib_merged' project

Project Summary

Function Metric

Metric: FUNST 0 ~ 100000

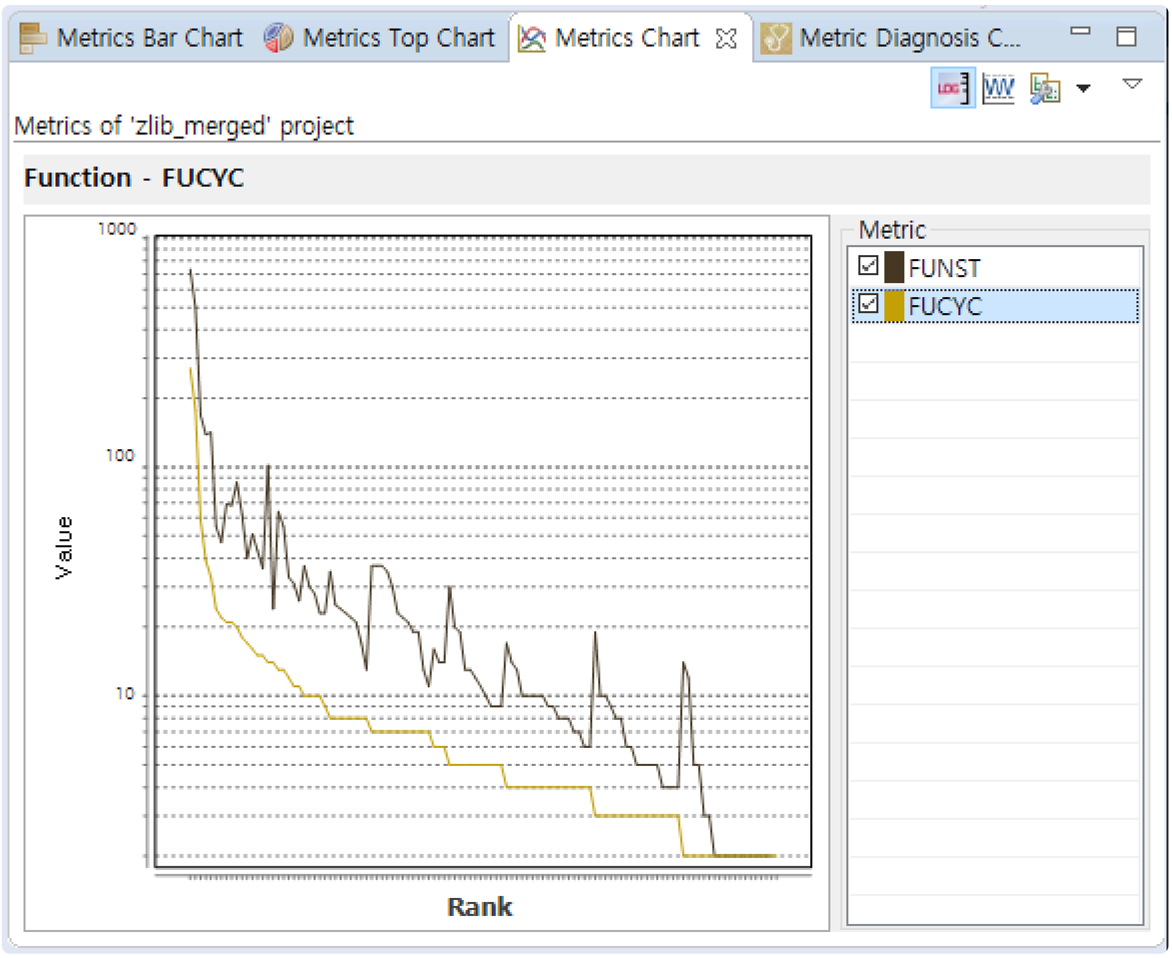
Function name	FUNST	FUCYC
bi_windup	7	3
adler32	101	13
adler32_combine	15	5
compress2	19	4
compressBound	1	1
compress	1	1
uncompress	22	6
gzdopen	4	2

100 of 114 rows |<< << < 1 of 2 page > >> >>| Go to 1 page

The Paging allows you to view many items conveniently.

16.2. Metrics Chart View

The Metrics Chart shows the metric view in a line chart. The x-axis is each item, and the y-axis is the metric value of the item. You can compare the distribution of values between different metrics each other in the project.



Toolbar menu

Menu	Description
Show Log Scale	Changes the y-axis of chart to log units.
Show Normalized Metric	Shows the standardized metric value.
Change Mode	Changes the view mode (module, file, class, function).

Pull-down menu

Menu	Description
Sort by	Sorts based on the selected item (even if clicking the column name in the table, it is sorted equally).
Set to Hide/Show	Sets whether to hide or show the metrics.

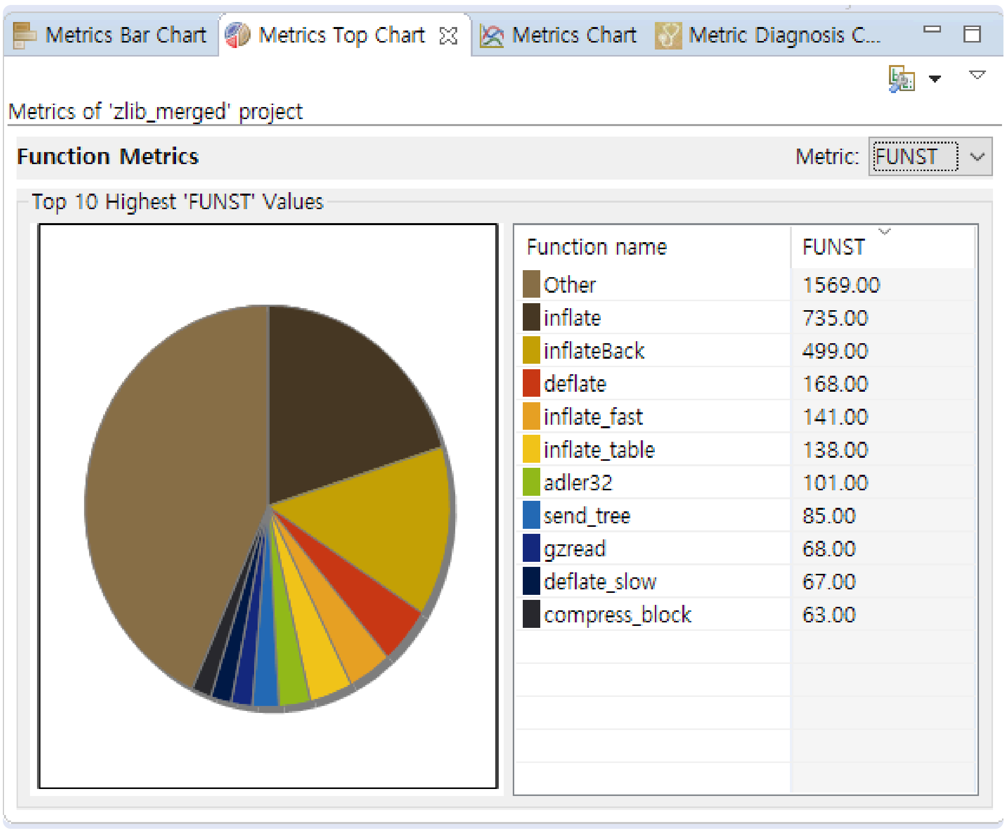
metric	
Metrics View Options	Sets the connection function with Metric view.

Select Metric

If you select the checkbox left to the metric name in the right table, the checked metrics are displayed in the chart. If you click the metric name in the checked metric, the items are sorted based on that metric value.

16.3. Metrics Top Chart View

The Metrics Top Chart view shows the top items of the metric value in a pie chart. You can see the ratio of the top items in the total.



Metrics of 'zlib_merged' project

Function Metrics Metric: FUNST

Top 10 Highest 'FUNST' Values

Function name	FUNST
Other	1569.00
inflate	735.00
inflateBack	499.00
deflate	168.00
inflate_fast	141.00
inflate_table	138.00
adler32	101.00
send_tree	85.00
gzread	68.00
deflate_slow	67.00
compress_block	63.00

Menu	Description
Change Mode	Changes the view mode (module, file, class, function).

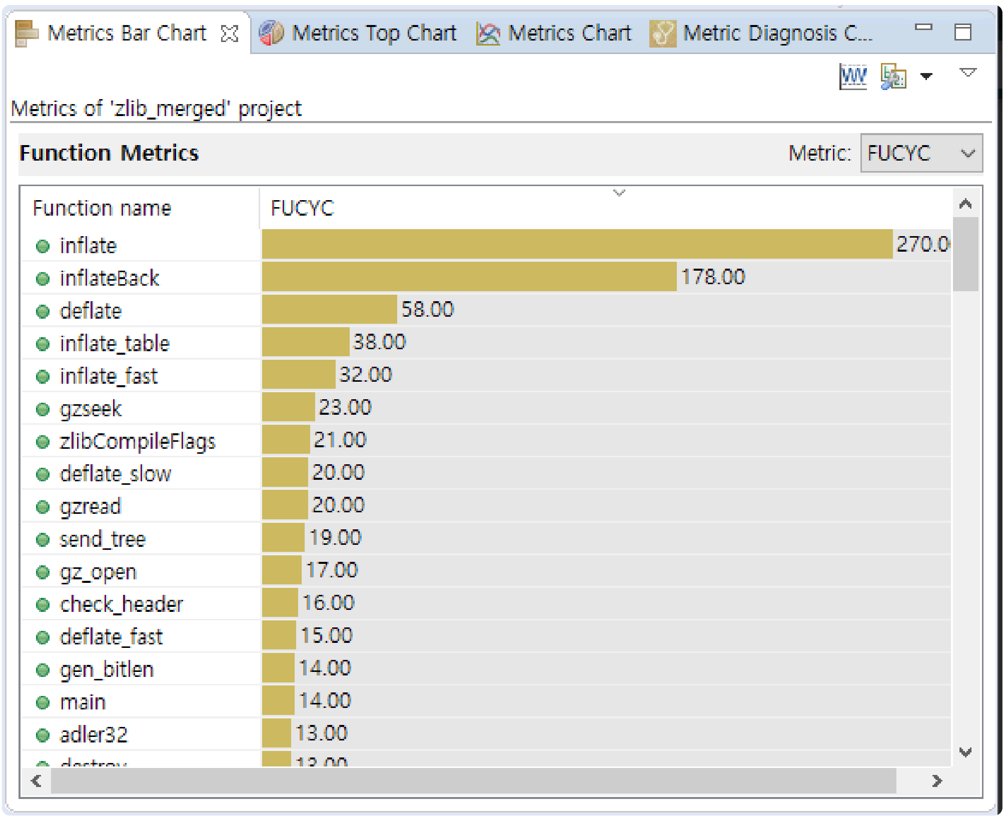
Pull-down menu

Menu	Description
Metrics Hide/Show Setting	Sets whether to hide or show the metrics.
Metrics View Options	Sets the number of top items to be displayed and sets whether to show the sum of the resting items.

The selection of the pie chart and the selected item in the table are connected together.

16.4. Metrics Bar Chart View

The Metrics Bar Chart view shows the metric values in a bar chart. You can check the value size for each item in the bar chart.



Metrics of 'zlib_merged' project

Function Metrics Metric: FUCYC

Function name	FUCYC
● inflate	270.0
● inflateBack	178.00
● deflate	58.00
● inflate_table	38.00
● inflate_fast	32.00
● gzseek	23.00
● zlibCompileFlags	21.00
● deflate_slow	20.00
● gzread	20.00
● send_tree	19.00
● gz_open	17.00
● check_header	16.00
● deflate_fast	15.00
● gen_bitlen	14.00
● main	14.00
● adler32	13.00
● destroy	13.00

Icons

Icon	Description
📦	Module (a logical portion that divides the project for each function)
📄	File (Source file and header file belonging to the project)
Ⓖ	Class
●	Function

Toolbar menu

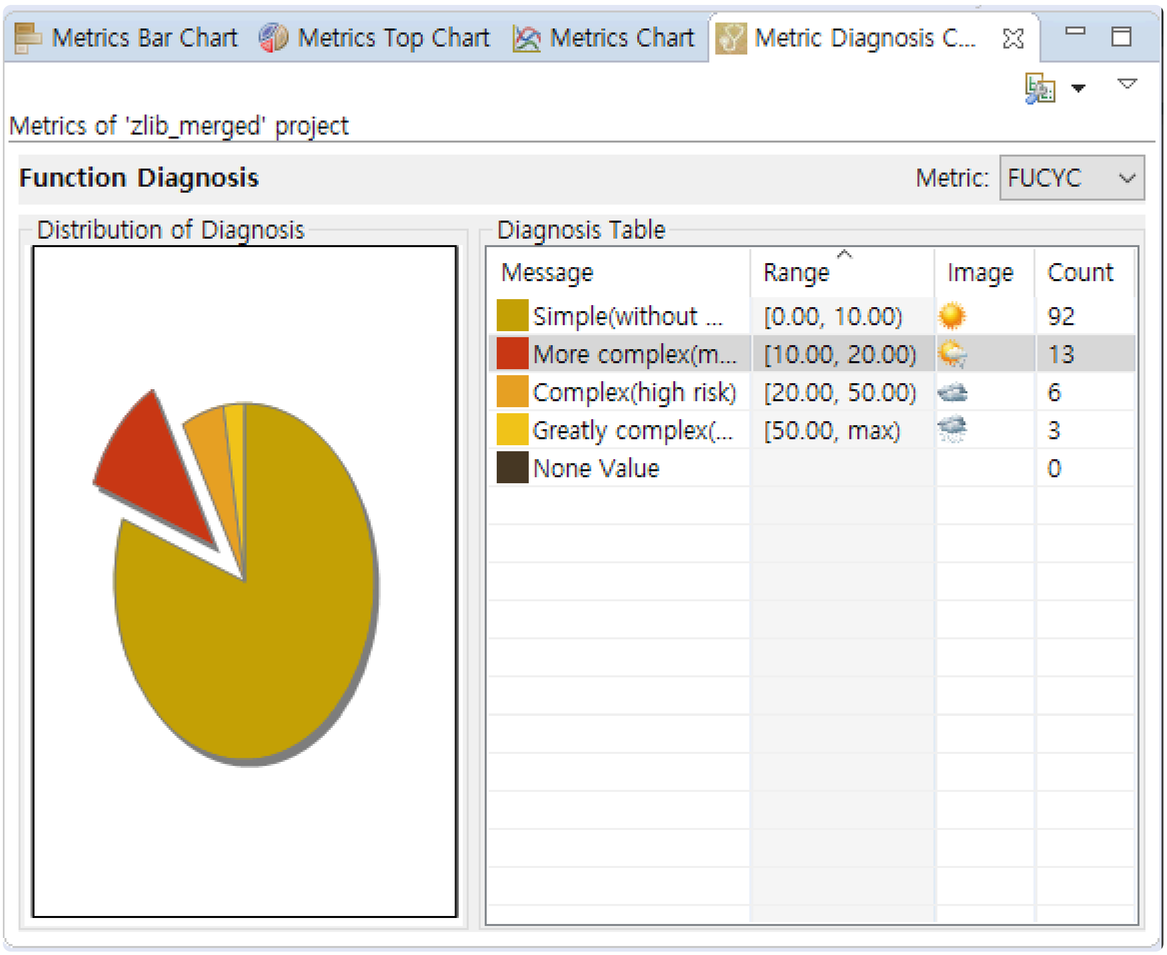
Icon	Description
Show Normalized Metric	Shows the standardized metric value.
Change Mode	Changes the view mode (📦 module, 📄 file, Ⓖ class, ● function).

Pull-down menu

Icon	Description
Metrics Hide/Show Setting	Sets whether to hide or show the metrics.
Metric View Options	Sets the number of items to be displayed.

16.5. Metrics Diagnosis Chart View

The Metric Diagnosis Chart view shows the number of items included in the diagnostic range in a pie chart. You can check the number of items within each diagnostic range in the project.



	Message	Range	Image	Count
🟨	Simple(without ...	[0.00, 10.00)	☀	92
🟥	More complex(m...	[10.00, 20.00)	⛅	13
🟧	Complex(high risk)	[20.00, 50.00)	☁	6
🟨	Greatly complex(...	[50.00, max)	☁	3
🟫	None Value			0

Toolbar menu

Menu	Description
Change Mode	Changes the view mode (module, file, class, function).

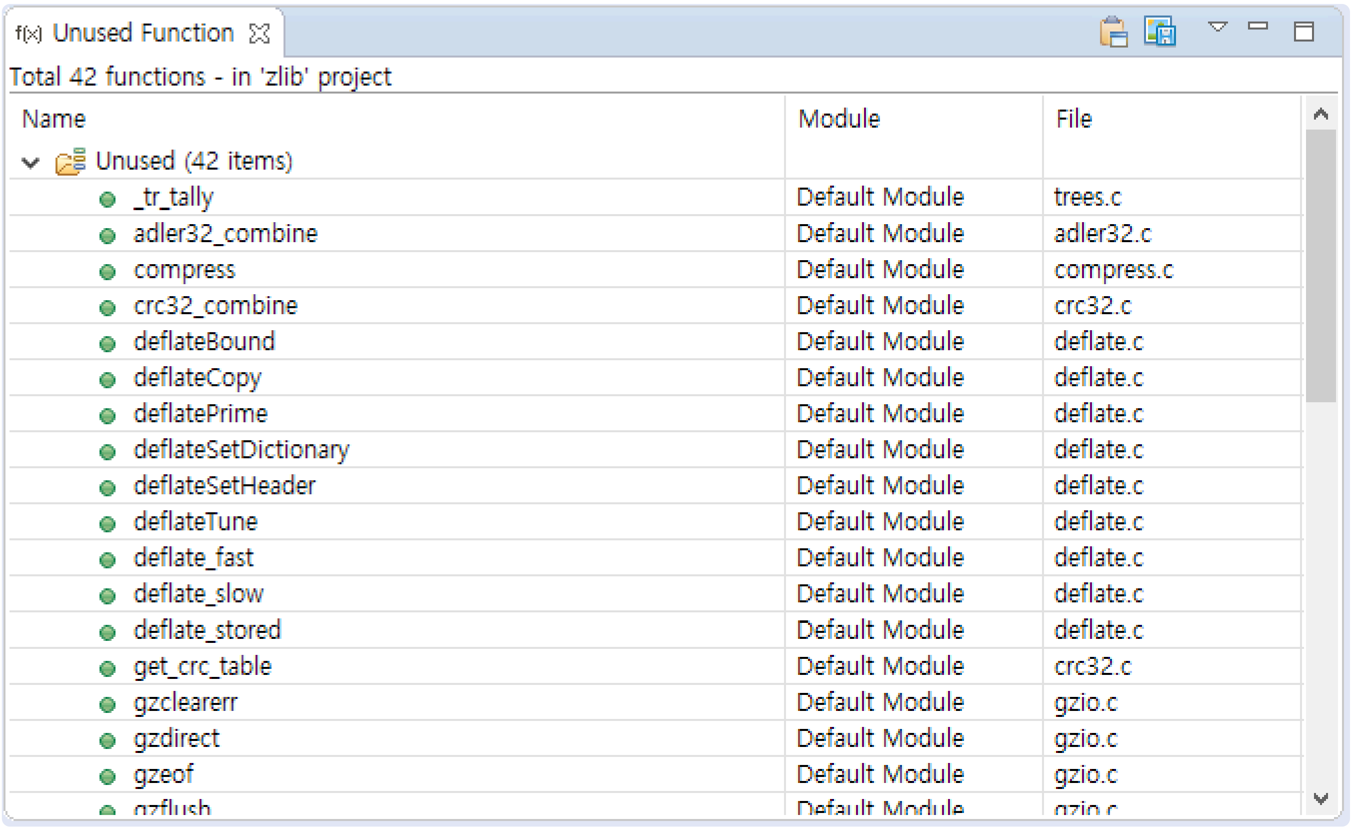
Pull-down menu

Menu	Description
Configure Diagnosis	Opens the diagnostics preferences page (allows you to set the diagnostic step and the ranges or images for each metric).
Metrics Hide/ Show	Sets whether to hide or show the metrics.
Metric View Options	Sets whether to display the items having no diagnostic value.

The selection of the pie chart and the selected item in the table are connected together.

16.6. Unused Function View

The Unused Function view shows the functions included in the selected project by classifying them according to the specified criteria. It shows the currently unused functions and the criteria for classifying can be added.



f(x) Unused Function

Total 42 functions - in 'zlib' project

Name	Module	File
Unused (42 items)		
● _tr_tally	Default Module	trees.c
● adler32_combine	Default Module	adler32.c
● compress	Default Module	compress.c
● crc32_combine	Default Module	crc32.c
● deflateBound	Default Module	deflate.c
● deflateCopy	Default Module	deflate.c
● deflatePrime	Default Module	deflate.c
● deflateSetDictionary	Default Module	deflate.c
● deflateSetHeader	Default Module	deflate.c
● deflateTune	Default Module	deflate.c
● deflate_fast	Default Module	deflate.c
● deflate_slow	Default Module	deflate.c
● deflate_stored	Default Module	deflate.c
● get_crc_table	Default Module	crc32.c
● gzclearerr	Default Module	gzio.c
● gzdirect	Default Module	gzio.c
● gzeof	Default Module	gzio.c
● gzflush	Default Module	gzio.c

Menu	Description
Copy to System clipboard	Copy unused function view image to system clipboard.
Save as PNG	Save unused function view as image.

Icons

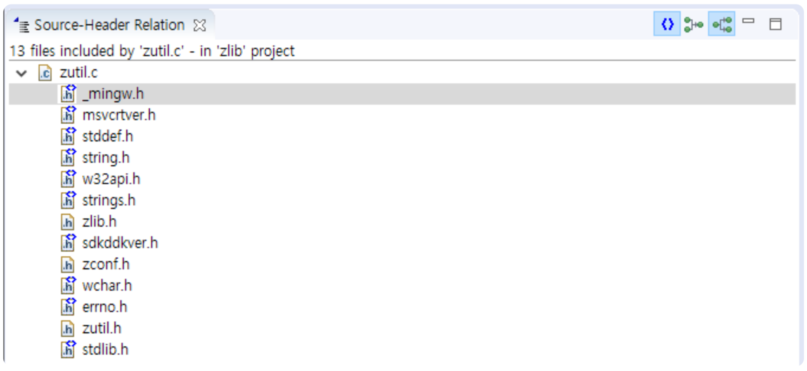
Icon	Description
	Classification criteria
	Function group
●	Function

Pull-down menu

Menu	Description
Function View Options	Sets the number of functions to be displayed for each group.

16.7. Source-Header Relation View

Source-Header Relation view shows `<include>` and `#include` relations between the source file and the header file



13 files included by 'zutil.c' - in 'zlib' project
zutil.c
_mingw.h
msvcrtver.h
stddef.h
string.h
w32api.h
strings.h
zlib.h
sdkddkver.h
zconf.h
wchar.h
errno.h
zutil.h
stdlib.h

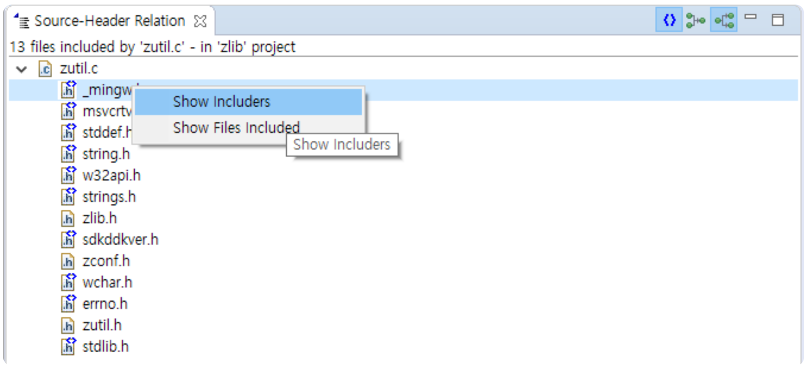
Icons

Icon	Description
.c	Source file
.h	Header file
.h	System header file

Toolbar menu

Menu	Description
Show System Header	Shows the system header.
Show Includers	Shows the files that includes the selected file.
Show Files Included	Shows the file included in the selected file.

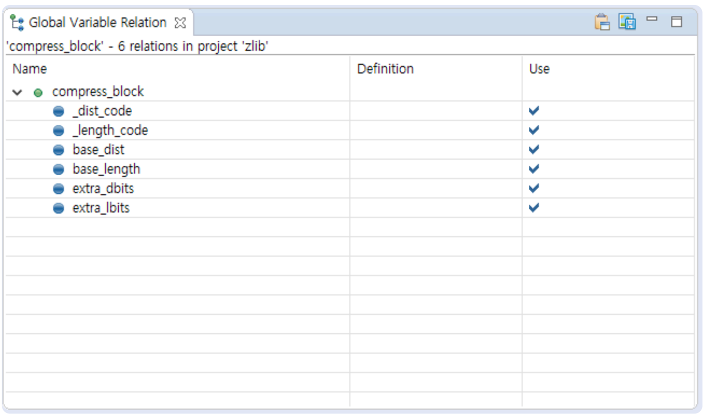
Show Includers, Show Files Included
You can display the files that includes the selected file or the files that the selected file is included by using the menu displayed when right-clicking a file in the view.



13 files included by 'zutil.c' - in 'zlib' project
zutil.c
_mingw
msvcrtv
stddef.h
string.h
w32api.h
strings.h
zlib.h
sdkddkver.h
zconf.h
wchar.h
errno.h
zutil.h
stdlib.h

16.8. Global Variable Relation View

The Global Variable Relation view shows the function where the global variable is defined and used. If a function is selected, it shows the global variables defined or used in the function, and if a global variable is selected, it shows the functions where the global variable is defined or used.



'compress_block' - 6 relations in project 'zlib'

Name	Definition	Use
compress_block		
_dist_code		✓
_length_code		✓
base_dist		✓
base_length		✓
extra_dbits		✓
extra_lbits		✓

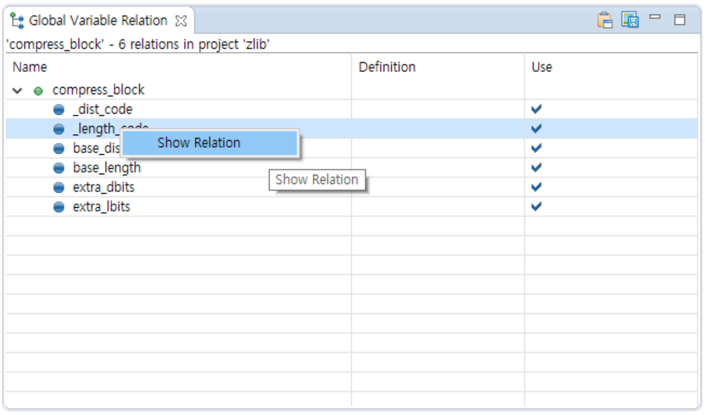
Menu	Description
Copy to System clipboard	Copy global variable relation view image to system clipboard.
Save as PNG	Save global variable relation view as image.

Icons

Icon	Description
●	Function
●	Global Variable

Show Relation

You can view the relation for the selected items again by using the menu displayed when right-clicking the related item in the view.

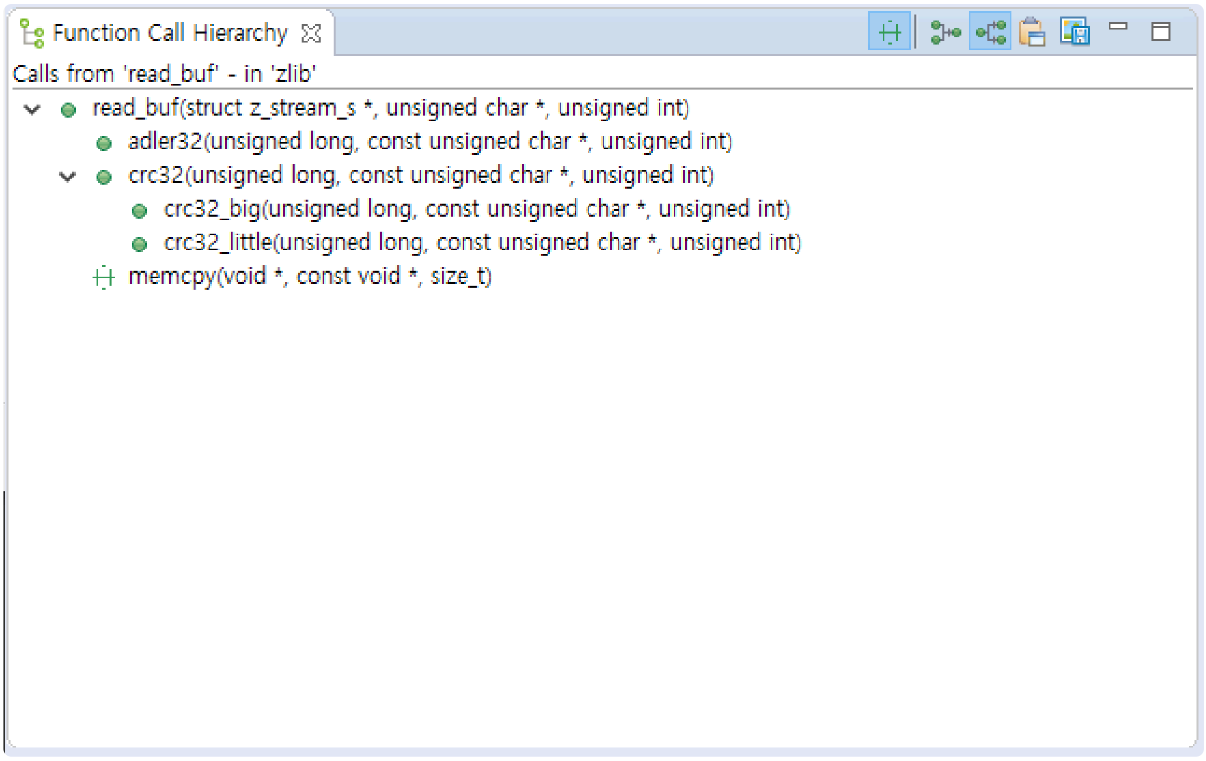


'compress_block' - 6 relations in project 'zlib'

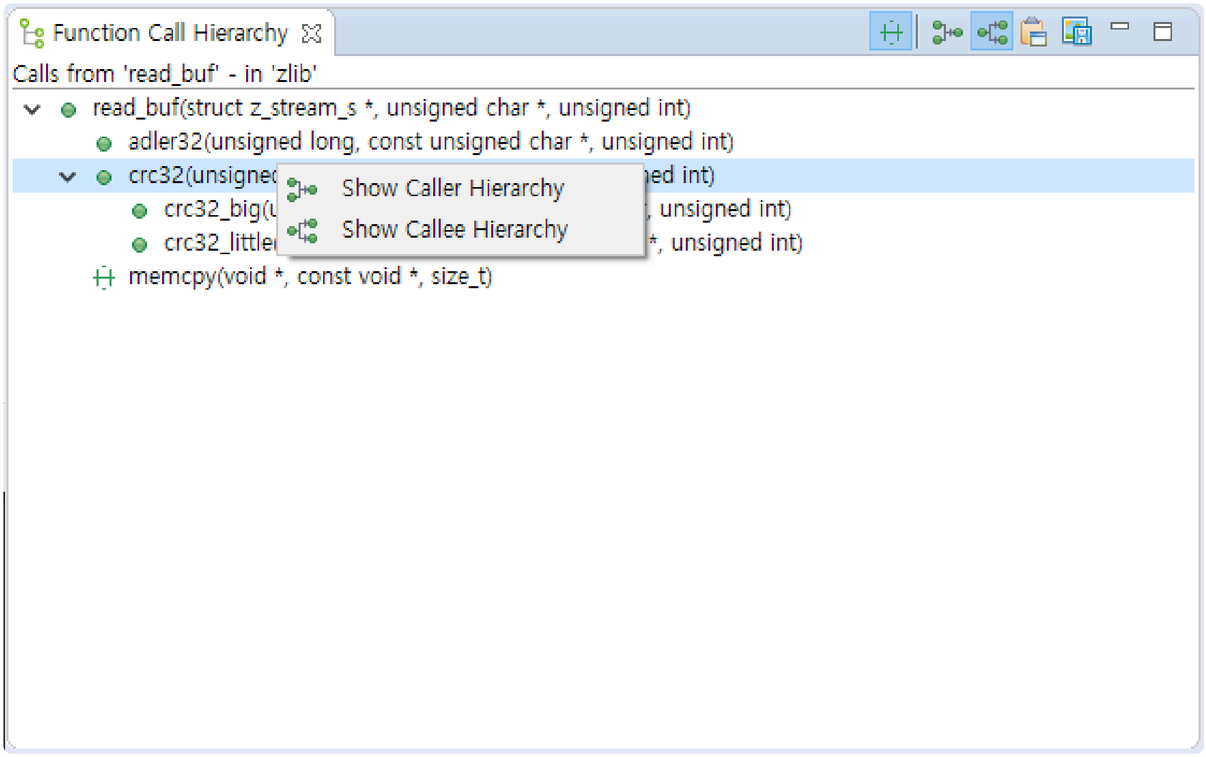
Name	Definition	Use
compress_block		
_dist_code		✓
_length_code		✓
base_dist		✓
base_length		✓
extra_dbits		✓
extra_lbits		✓

16.9. Function Call Hierarchy View

The [Function Call Hierarchy] view shows the information for the function called by the selected function or the called function in the hierarchy structure.
You can change the call information for the selected function by using the context menu that appears when selecting and right-clicking the function displayed in the hierarchy structure and double-click it to open the editor for the source file that the function is defined and to go to the location of the selected function. (However, not included if it is a system function)



Calls from 'read_buf' - in 'zlib'
read_buf(struct z_stream_s *, unsigned char *, unsigned int)
adler32(unsigned long, const unsigned char *, unsigned int)
crc32(unsigned long, const unsigned char *, unsigned int)
crc32_big(unsigned long, const unsigned char *, unsigned int)
crc32_little(unsigned long, const unsigned char *, unsigned int)
memcpy(void *, const void *, size_t)

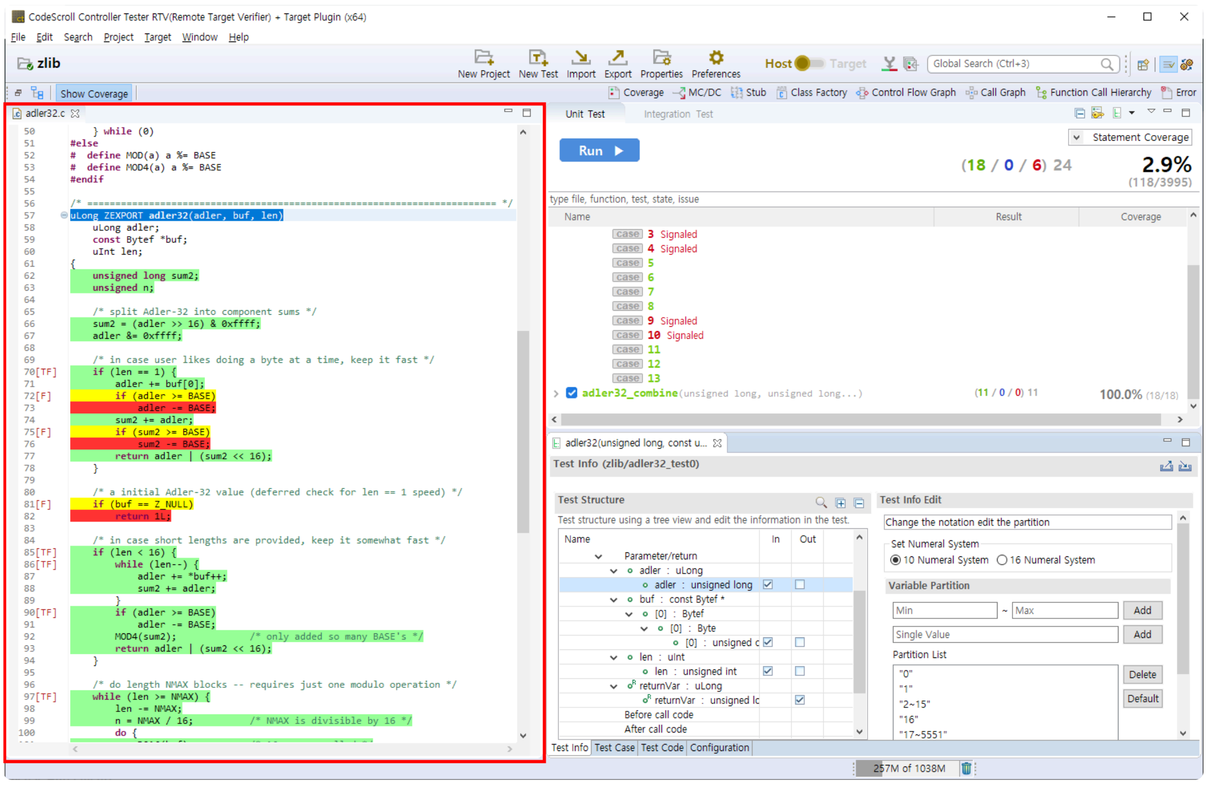


Calls from 'read_buf' - in 'zlib'
read_buf(struct z_stream_s *, unsigned char *, unsigned int)
adler32(unsigned long, const unsigned char *, unsigned int)
crc32(unsigned ... ed int)
crc32_big(u ... , unsigned int)
crc32_little ... *, unsigned int)
memcpy(void *, const void *, size_t)

Menu	Description
Show System Function	Sets whether to indicate the call information for the system function in a hierarchical structure.
Show Caller Hierarchy	Shows the functions that call the selected functions in a hierarchical structure.
Show Callee Hierarchy	Shows the functions called by the selected function in a hierarchical structure.
Copy to System clipboard	Copy function call hierarchy view image to system clipboard.
Save as PNG	Save function call hierarchy layer view as image.

16.10. Source Code Editor section

The source code editor section is a pre-reserved area, located on the left of the screen.



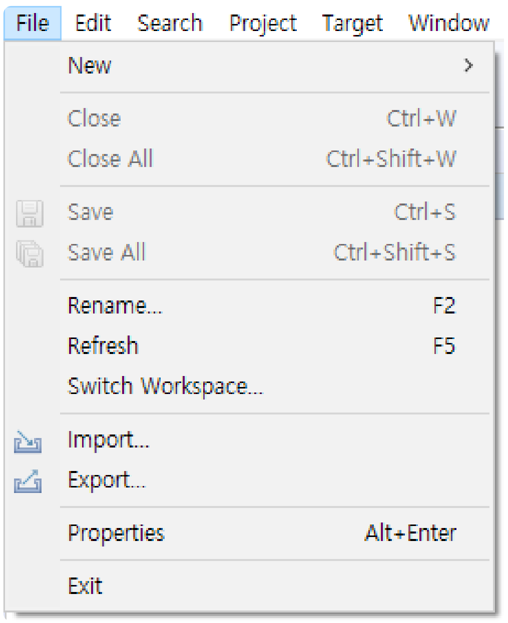
```
    } while (0)
#else
#  define MOD(a) a %= BASE
#  define MOD4(a) a %= BASE
#endif

/* ========================================================================= */
uLong ZEXPORT adler32(adler, buf, len)
    uLong adler;
    const Bytef *buf;
    uInt len;
{
    unsigned long sum2;
    unsigned n;

    /* split Adler-32 into component sums */
    sum2 = (adler >> 16) & 0xffff;
    adler &= 0xffff;

    /* in case user likes doing a byte at a time, keep it fast */
    if (len == 1) {
        adler += buf[0];
        if (adler >= BASE)
            adler -= BASE;
        sum2 += adler;
        if (sum2 >= BASE)
            sum2 -= BASE;
        return adler | (sum2 << 16);
    }

    /* a initial Adler-32 value (deferred check for len == 1 speed) */
    if (buf == Z_NULL)
        return 1L;

    /* in case short lengths are provided, keep it somewhat fast */
    if (len < 16) {
        while (len--) {
            adler += *buf++;
            sum2 += adler;
        }
        if (adler >= BASE)
            adler -= BASE;
        MOD4(sum2);             /* only added so many BASE's */
        return adler | (sum2 << 16);
    }

    /* do length NMAX blocks -- requires just one modulo operation */
    while (len >= NMAX) {
        len -= NMAX;
        n = NMAX / 16;          /* NMAX is divisible by 16 */
        do {
```

Name	Result	Coverage
case 3 Signaled		
case 4 Signaled		
case 5		
case 6		
case 7		
case 8		
case 9 Signaled		
case 10 Signaled		
case 11		
case 12		
case 13		
adler32_combine(unsigned long, unsigned long...)	(11 / 0 / 0) 11	100.0% (18/18)

CodeScroll Controller Tester RTV(Remote Target Verifier) + Target Plugin (x64)
File Edit Search Project Target Window Help
zlib
New Project New Test Import Export Properties Preferences
Host Target
Global Search (Ctrl+3)
Show Coverage
Coverage MC/DC Stub Class Factory Control Flow Graph Call Graph Function Call Hierarchy Error
adler32.c
Unit Test Integration Test
Run
Statement Coverage
(18 / 0 / 6) 24
2.9%
(118/3995)
type file, function, test, state, issue
adler32(unsigned long, const u...
Test Info (zlib/adler32_test0)
Test Structure
Test structure using a tree view and edit the information in the test.
Name In Out
Parameter/return
adler : uLong
adler : unsigned long
buf : const Bytef *
[0] : Bytef
[0] : Byte
[0] : unsigned c
len : uInt
len : unsigned int
returnVar : uLong
returnVar : unsigned lc
Before call code
After call code
Test Info Edit
Change the notation edit the partition
Set Numeral System
10 Numeral System
16 Numeral System
Variable Partition
Min ~ Max Add
Single Value Add
Partition List
"0"
"1"
"2~15"
"16"
"17~5551"
Delete
Default
Test Info Test Case Test Code Configuration
257M of 1038M

17. File Menu

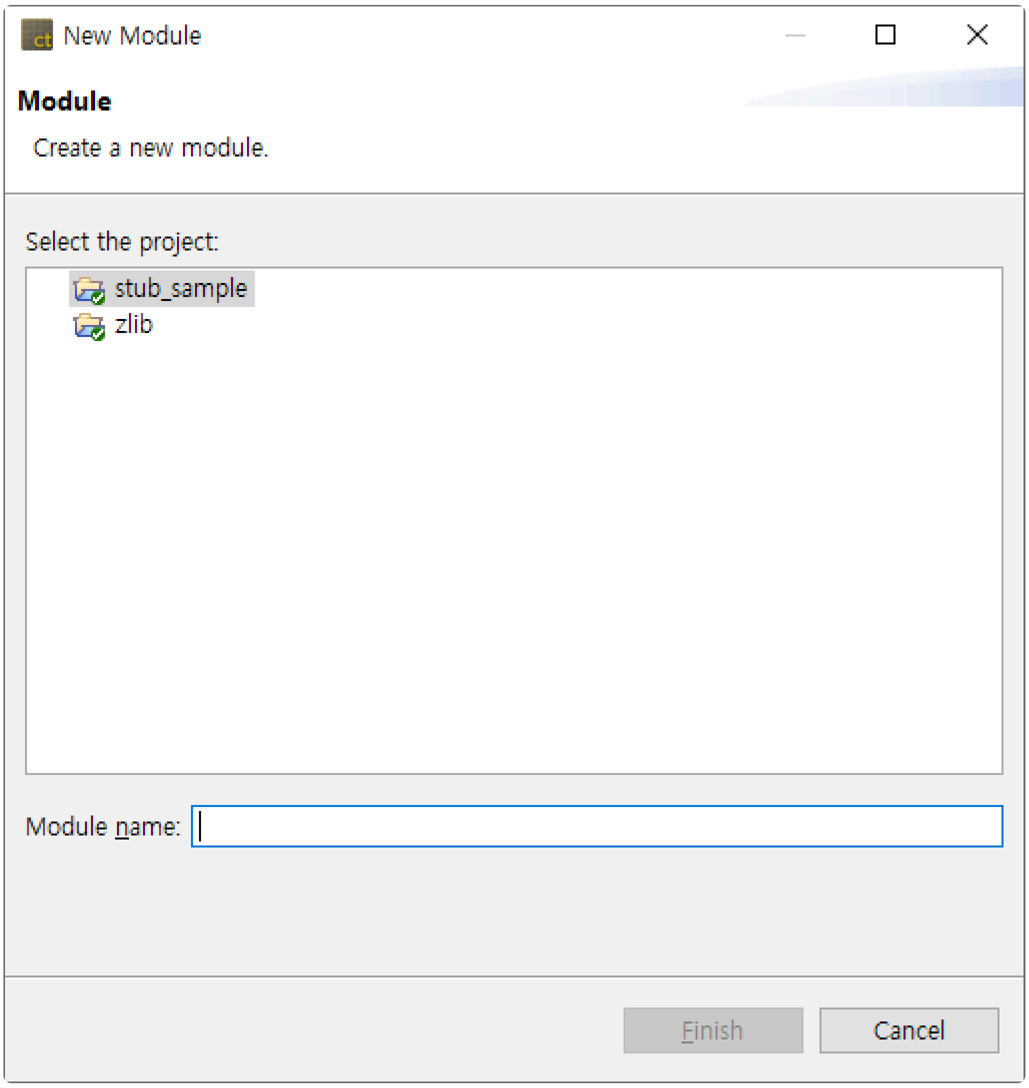
In File menu, Create a new project or module, Editor-related operation, Refresh, Change Workspace, Import and Export, View Properties of the selected item and Exit Tool etc. can be carried out.



- New:
  - Create a project
  - Create a module
- Close/Close all/Save/Save all: Editor-related menu
- Rename: You can modify the name of project or module.
- Switch workspace
- Import
- Export
- Exit: Exit tool.

17.1. Create a Module

You can create a new module in the project. The information other than the module name is created the same as the modules already existed in the target project.

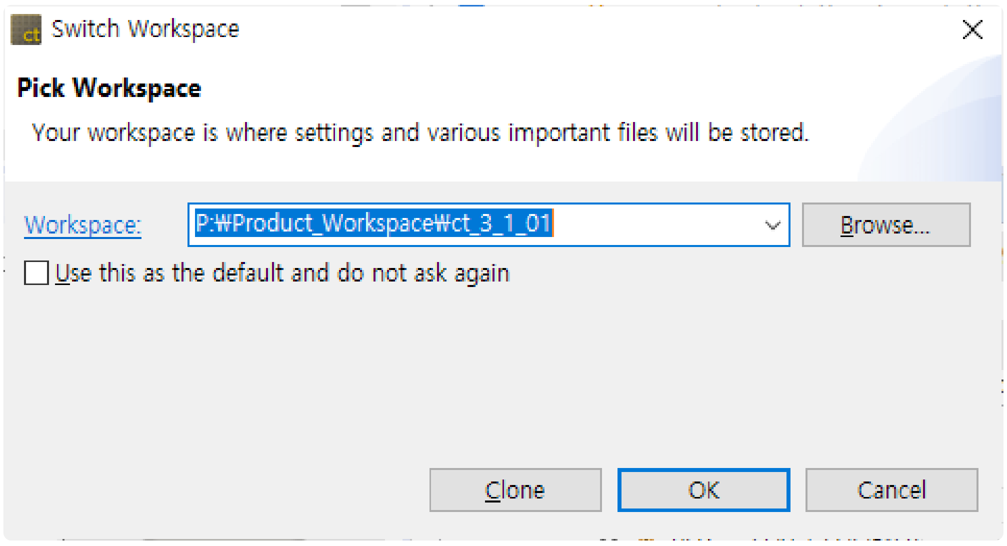


1. In [New] menu, click [Other…], select [Module] in [Other] and click [Next].
2. Select the project that you want to create a new module.
3. Enter the module name. The module name existed already cannot be used.
4. Click [Finish] to create the module.

You can also create a module by using the [New] menu displayed when right-clicking a project in Test Navigator view.

17.2. Switch Workspace

You can switch the directory of workspace. When you witch the workspace, the tool restarts with the switched workspace.



Pick Workspace

Your workspace is where settings and various important files will be stored.

Workspace: P:₩Product_Workspace₩ct_3_1_01

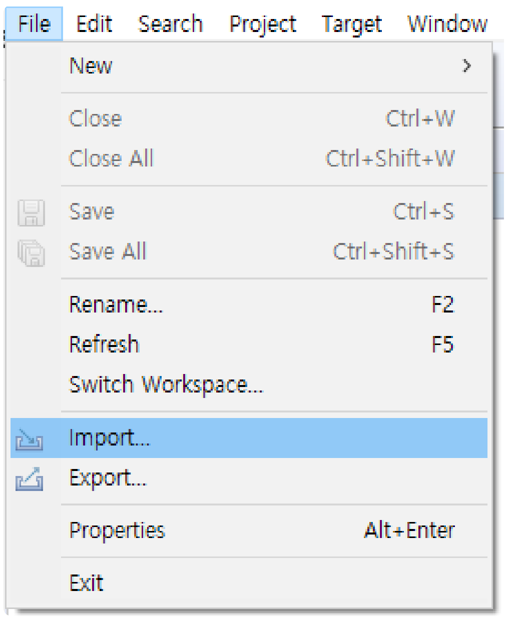
☐ Use this as the default and do not ask again

Click [Browse…] to select the workspace directory to be switched or to enter it manually. You can select the workspace directory selected previously in the list displayed when clicking [▼].
If you select the checkbox [Use this as the default and do not ask again], you are not prompted again to select a workspace directory the next time you execute the tool.
If you click [Clone], the selected workspace is copied to the other directory.

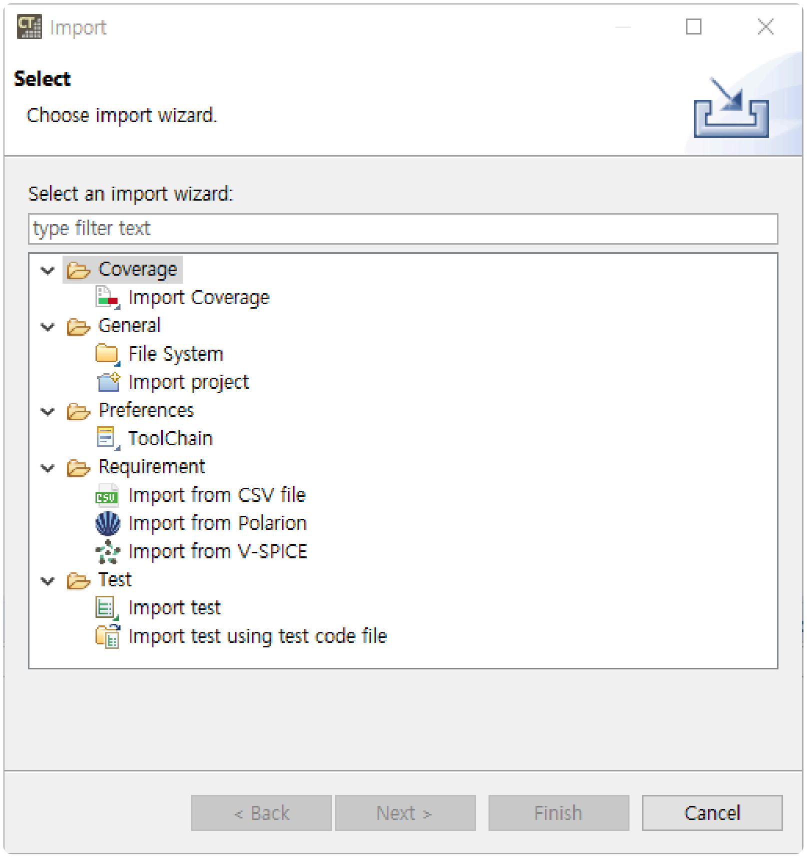
17.3. Import

Controller Tester provides a feature that import project and data used other version or other PC.

1. Select [File] -> [Import] from the main menu or [Import] from the dashboard to open the Import Wizard.



2. Select a item to import and click [Next].



Select

Choose import wizard.

Select an import wizard:

type filter text

- Coverage
  - Import Coverage
- General
  - File System
  - Import project
- Preferences
  - ToolChain
- Requirement
  - Import from CSV file
  - Import from Polarion
  - Import from V-SPICE
- Test
  - Import test
  - Import test using test code file

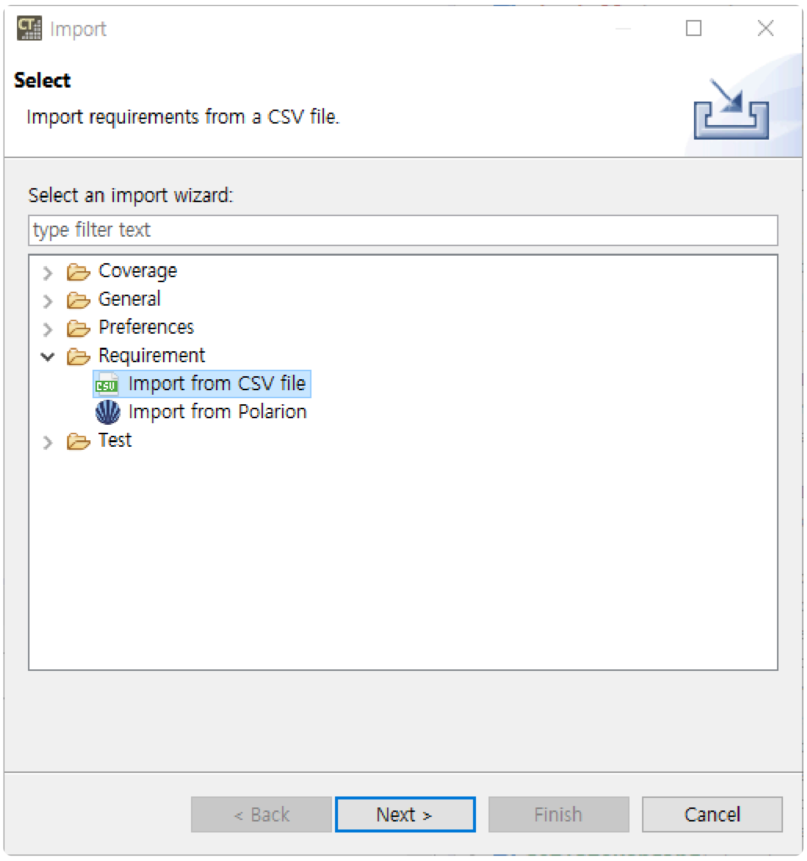
Parent item	Child item	Description
Coverage	Import Coverage	import coverages in csd format.

General	File System Import project	Import files or projects.
Preferences	ToolChain	Import toolchains exported before.
Requirement	Import from CSV file Import from Polarion Import from V-SPICE	Import requirements from CSV files or requirement management tools.
Test	Import test Import test using test code file	import tests exported before or tests from test codes.

17.3.1. Requirement – Import from CSV file

You can import requirement documents written in CSV file to Controller Tester.

1. In the Import Wizard, select [Requirement] -> [Import from CSV file] and click [Next].



Import

Select

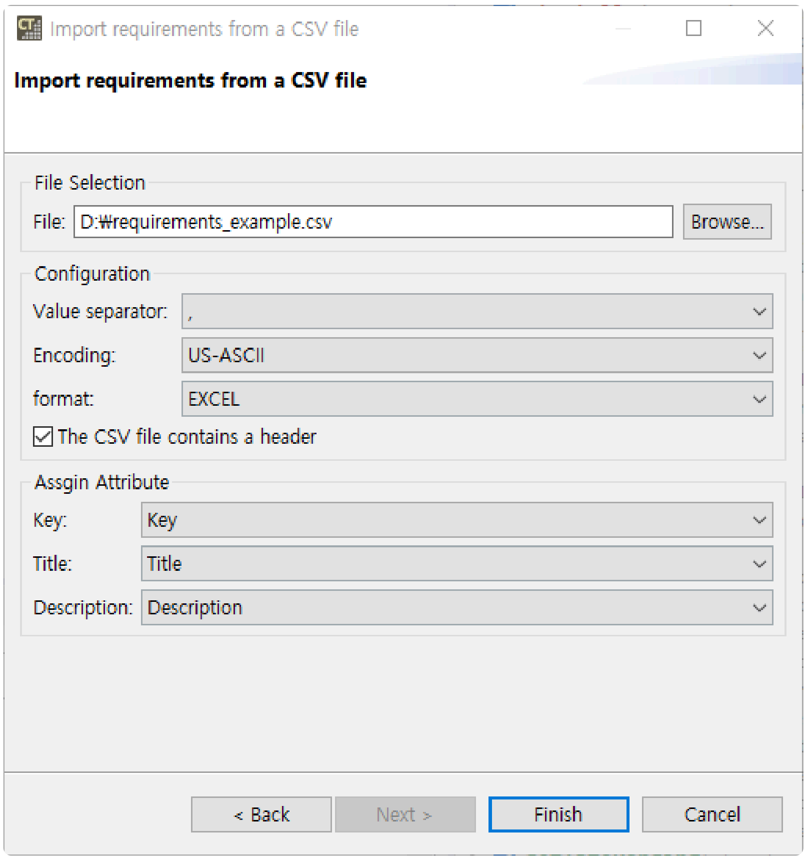
Import requirements from a CSV file.

Select an import wizard:

type filter text

- Coverage
- General
- Preferences
- Requirement
  - Import from CSV file
  - Import from Polarion
- Test

2. Enter informations for importing requirements and click [Finish].


Import requirements from a CSV file

Import requirements from a CSV file

File Selection

File: D:₩requirements_example.csv

Configuration

Value separator: ,

Encoding: US-ASCII

format: EXCEL

☑ The CSV file contains a header

Assgin Attribute

Key: Key

Title: Title

Description: Description

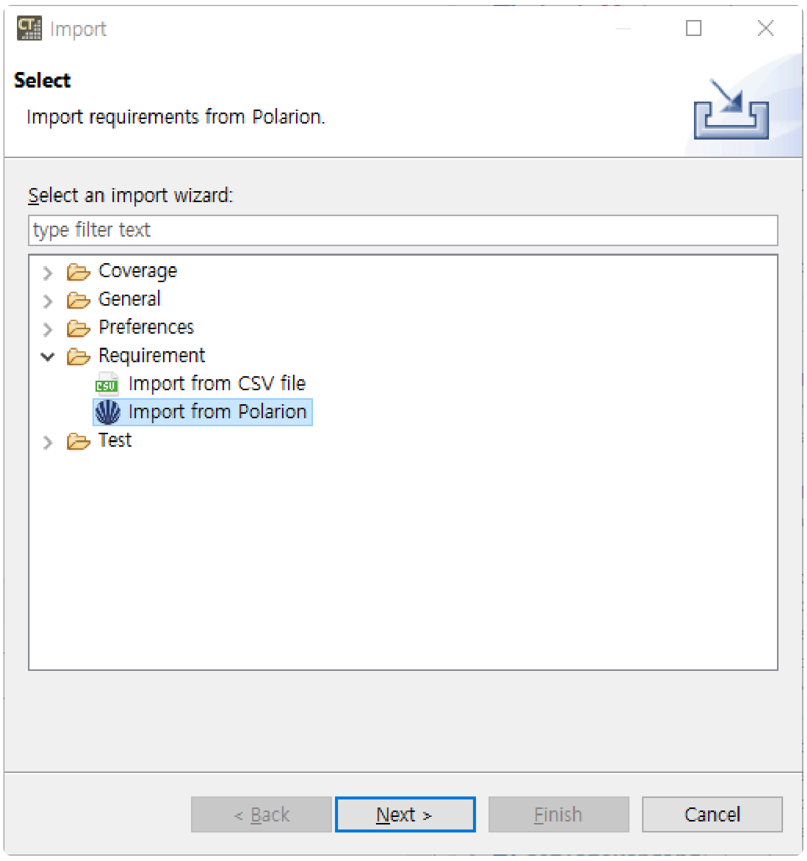
a. File Selection
   - Enter the path of a file that the requirements are stored.
b. Configuration
   - **Value seperator** : Enter a separator that separate each value in the CSV file. Default value is ,(comma).
   - **Encoding** : Enter a encoding of the CSV file. Default value is US-ASCII.
   - **format** : Enter a format of the CSV file. Default value is EXCEL.
   - **The CSV file contains a header** : Check when the CSV file contains a header.
c. Assign Attribute
   - **Key** : Select the column that corresponds to the key of the requirements.
   - **Title** : Select the column that corresponds to the title of the requirements.
   - **Description** : Select the column that corresponds to the description of the requirements.

The information you entered in the previous import is automatically filled in.

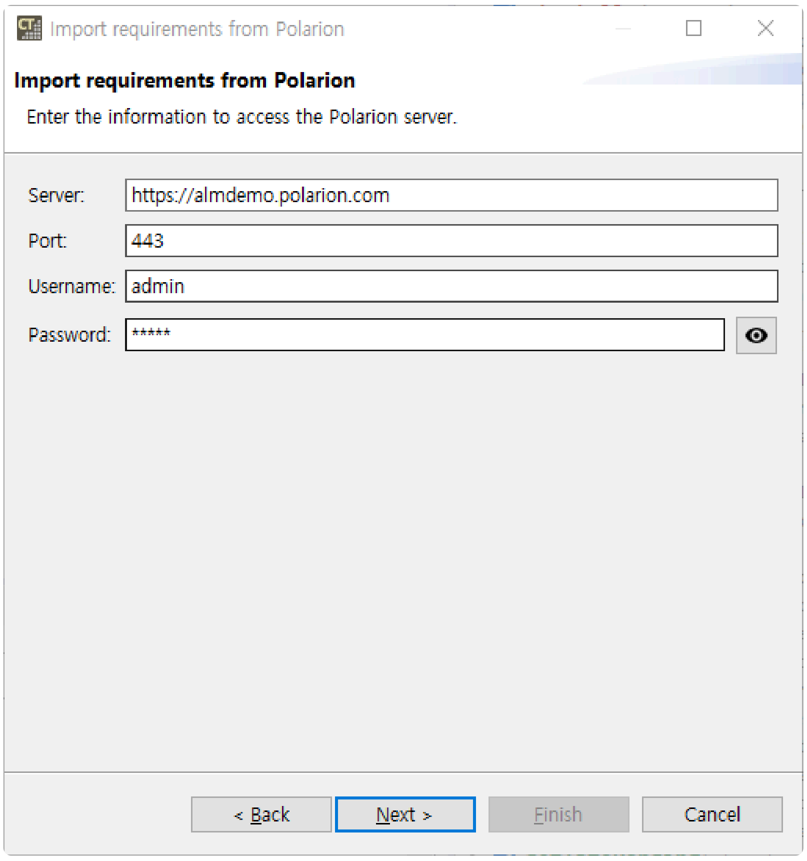
17.3.2. Requirement – Import from Polarion

You can import requirement documents from Polarion to Controller Tester.

1. In the Import Wizard, select [Requirement] -> [Import from Polarion] and click [Next].



2. Enter the information to connect with Polarion server and click [Next]. You can see the entered password to click button.



Import requirements from Polarion

Import requirements from Polarion

Enter the information to access the Polarion server.

Server: https://almdemo.polarion.com

Port: 443

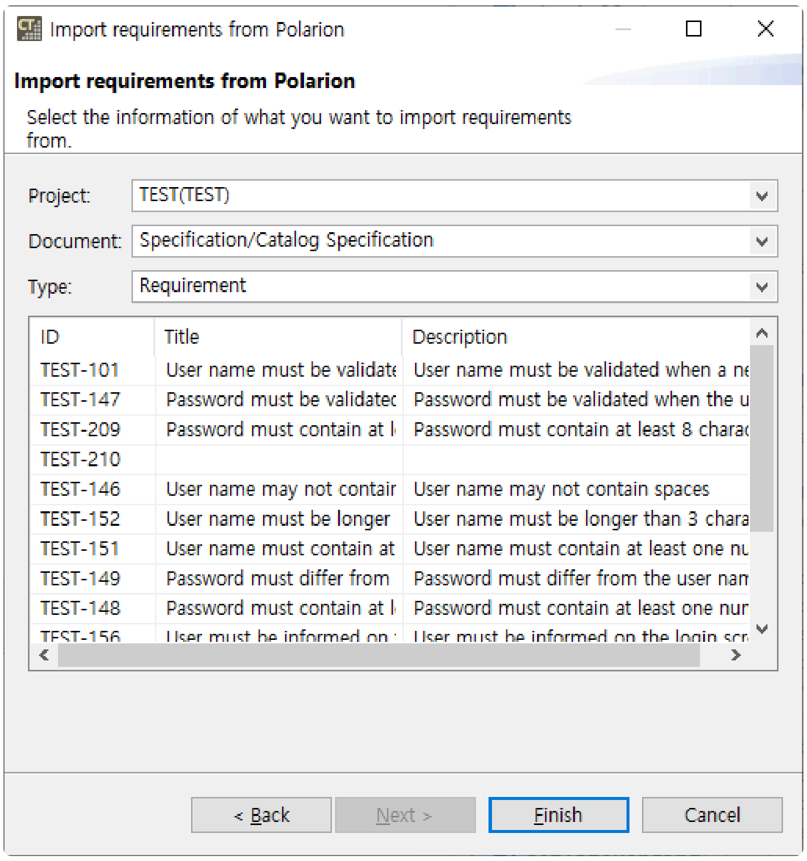
Username: admin

Password: *****

< Back | Next > | Finish | Cancel

- The information of Polarion's demo server is entered in server and port.
- If you use a local server, enter `http://ip_address` in server and port number of local server in port.

3. When you enter the Project, Document, and Type to import from Polarion, the corresponding requirements list appears. Check the requirements and click the [Finish] button to import the requirements.



Import requirements from Polarion

Import requirements from Polarion

Select the information of what you want to import requirements from.

Project: TEST(TEST)

Document: Specification/Catalog Specification

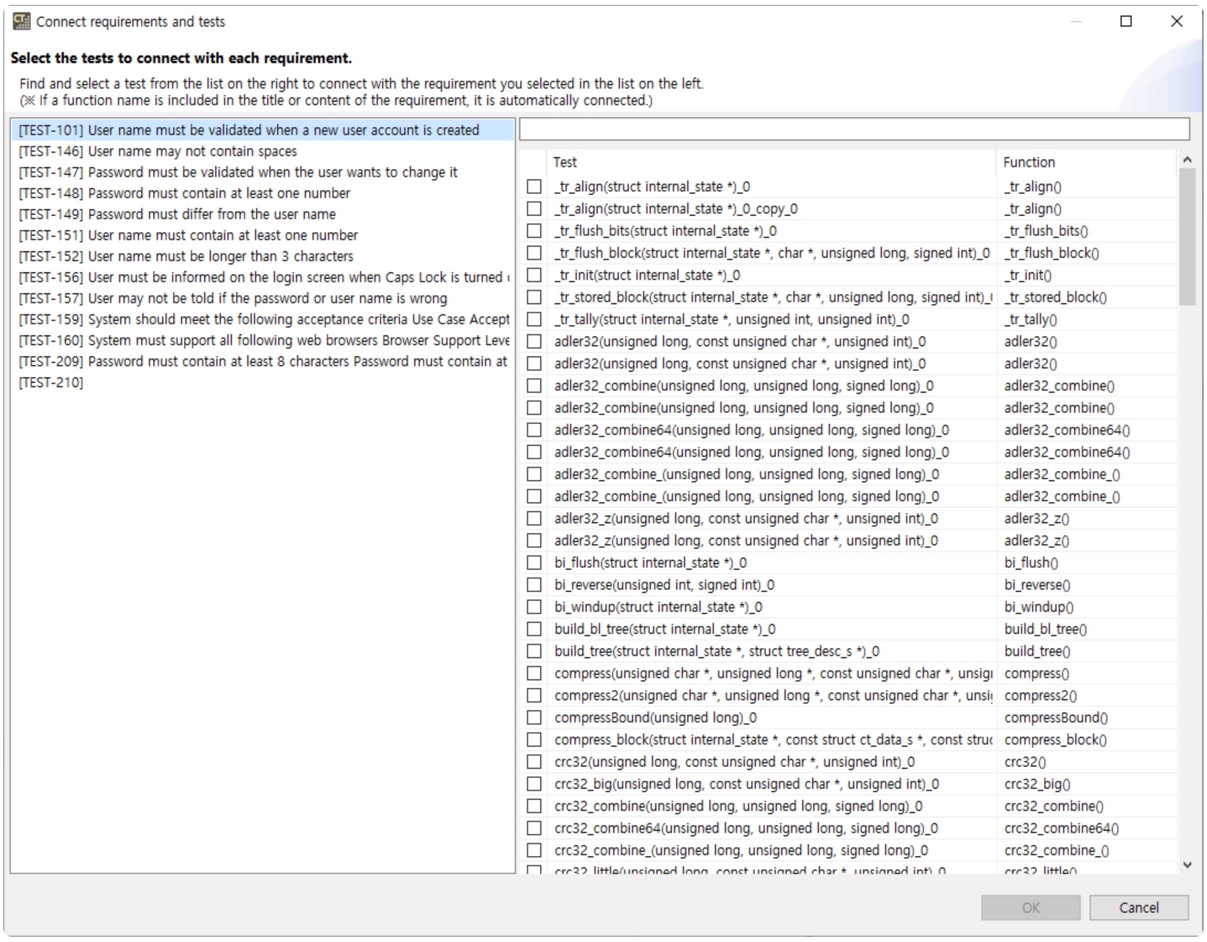
Type: Requirement

ID	Title	Description
TEST-101	User name must be validate	User name must be validated when a ne
TEST-147	Password must be validatec	Password must be validated when the u
TEST-209	Password must contain at l	Password must contain at least 8 charac
TEST-210		
TEST-146	User name may not contair	User name may not contain spaces
TEST-152	User name must be longer	User name must be longer than 3 chara
TEST-151	User name must contain at	User name must contain at least one nu
TEST-149	Password must differ from	Password must differ from the user nam
TEST-148	Password must contain at l	Password must contain at least one nur
TEST-156	User must be informed on	User must be informed on the login scr

< Back | Next > | Finish | Cancel

- If you do not select the Document, you can also import requirements that are not included in a specific document.

4. [Connect requirements and tests] dialog appears where you can connect the imported requirements and tests. If the title or description of the requirement contains the name of the function associated with the test, it is automatically linked. Click [Cancel] to finish [Connect requirements and tests] without linking requirements and tests.



Select the tests to connect with each requirement.

Find and select a test from the list on the right to connect with the requirement you selected in the list on the left.
(※ If a function name is included in the title or content of the requirement, it is automatically connected.)

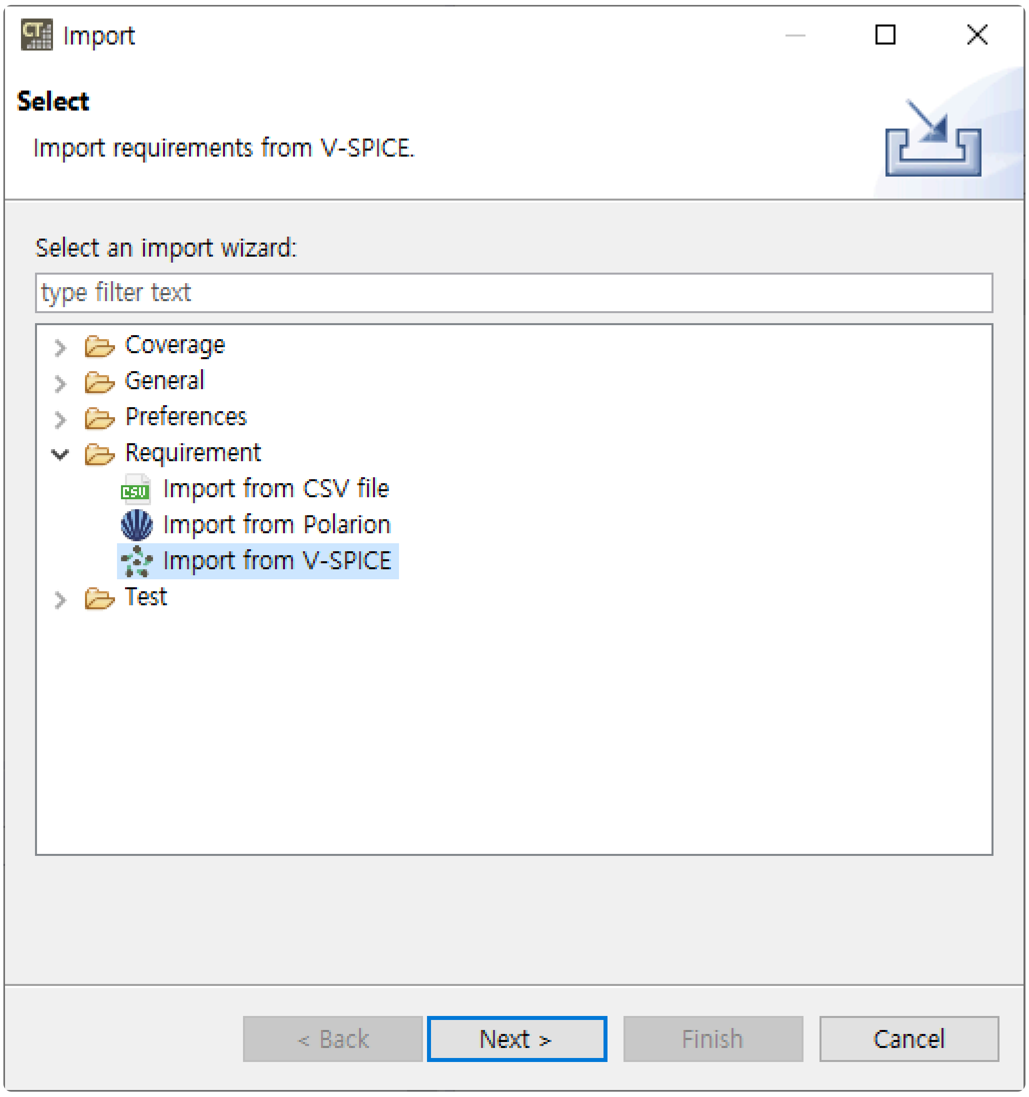
[TEST-101] User name must be validated when a new user account is created
[TEST-146] User name may not contain spaces
[TEST-147] Password must be validated when the user wants to change it
[TEST-148] Password must contain at least one number
[TEST-149] Password must differ from the user name
[TEST-151] User name must contain at least one number
[TEST-152] User name must be longer than 3 characters
[TEST-156] User must be informed on the login screen when Caps Lock is turned
[TEST-157] User may not be told if the password or user name is wrong
[TEST-159] System should meet the following acceptance criteria Use Case Accept
[TEST-160] System must support all following web browsers Browser Support Leve
[TEST-209] Password must contain at least 8 characters Password must contain at
[TEST-210]

	Test	Function
☐	_tr_align(struct internal_state *)_0	_tr_align()
☐	_tr_align(struct internal_state *)_0_copy_0	_tr_align()
☐	_tr_flush_bits(struct internal_state *)_0	_tr_flush_bits()
☐	_tr_flush_block(struct internal_state *, char *, unsigned long, signed int)_0	_tr_flush_block()
☐	_tr_init(struct internal_state *)_0	_tr_init()
☐	_tr_stored_block(struct internal_state *, char *, unsigned long, signed int)_	_tr_stored_block()
☐	_tr_tally(struct internal_state *, unsigned int, unsigned int)_0	_tr_tally()
☐	adler32(unsigned long, const unsigned char *, unsigned int)_0	adler32()
☐	adler32(unsigned long, const unsigned char *, unsigned int)_0	adler32()
☐	adler32_combine(unsigned long, unsigned long, signed long)_0	adler32_combine()
☐	adler32_combine(unsigned long, unsigned long, signed long)_0	adler32_combine()
☐	adler32_combine64(unsigned long, unsigned long, signed long)_0	adler32_combine64()
☐	adler32_combine64(unsigned long, unsigned long, signed long)_0	adler32_combine64()
☐	adler32_combine_(unsigned long, unsigned long, signed long)_0	adler32_combine_()
☐	adler32_combine_(unsigned long, unsigned long, signed long)_0	adler32_combine_()
☐	adler32_z(unsigned long, const unsigned char *, unsigned int)_0	adler32_z()
☐	adler32_z(unsigned long, const unsigned char *, unsigned int)_0	adler32_z()
☐	bi_flush(struct internal_state *)_0	bi_flush()
☐	bi_reverse(unsigned int, signed int)_0	bi_reverse()
☐	bi_windup(struct internal_state *)_0	bi_windup()
☐	build_bl_tree(struct internal_state *)_0	build_bl_tree()
☐	build_tree(struct internal_state *, struct tree_desc_s *)_0	build_tree()
☐	compress(unsigned char *, unsigned long *, const unsigned char *, unsig	compress()
☐	compress2(unsigned char *, unsigned long *, const unsigned char *, unsi	compress2()
☐	compressBound(unsigned long)_0	compressBound()
☐	compress_block(struct internal_state *, const struct ct_data_s *, const struc	compress_block()
☐	crc32(unsigned long, const unsigned char *, unsigned int)_0	crc32()
☐	crc32_big(unsigned long, const unsigned char *, unsigned int)_0	crc32_big()
☐	crc32_combine(unsigned long, unsigned long, signed long)_0	crc32_combine()
☐	crc32_combine64(unsigned long, unsigned long, signed long)_0	crc32_combine64()
☐	crc32_combine_(unsigned long, unsigned long, signed long)_0	crc32_combine_()
☐	crc32_little(unsigned long, const unsigned char *, unsigned int)_0	crc32_little()

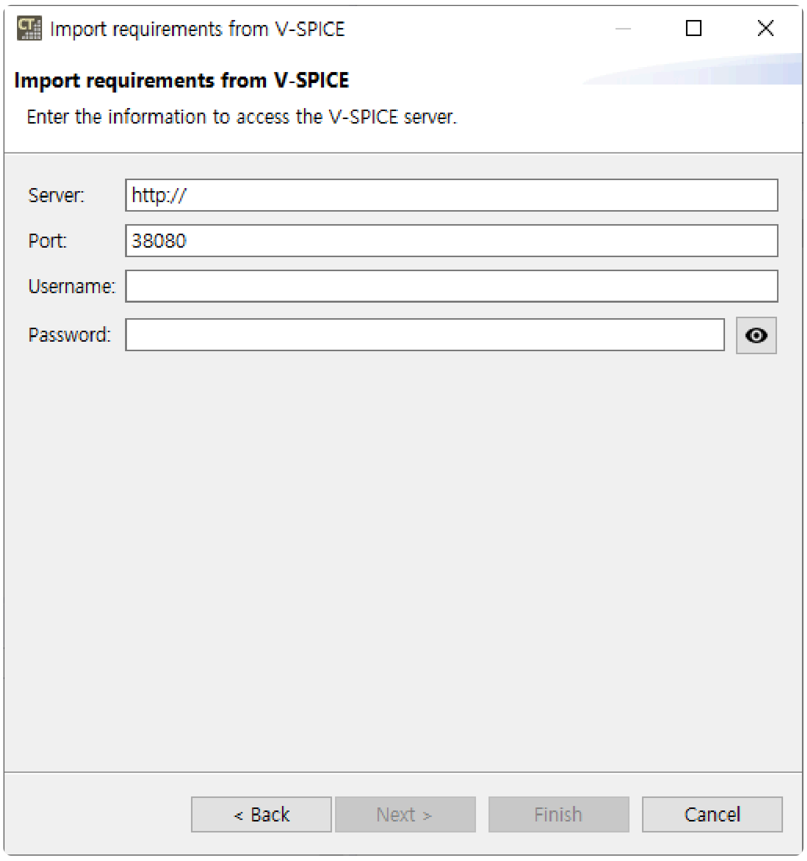
17.3.3. Requirement – Import from V-SPICE

You can import requirement documents from V-SPICE to Controller Tester.

1. In the Import Wizard, select [Requirement] > [Import from V-SPICE] and click [Next].



2. Enter the information to connect with V-SPICE server and click [Next]. You can see the entered password to click 👁 button.


Import requirements from V-SPICE

Import requirements from V-SPICE

Enter the information to access the V-SPICE server.

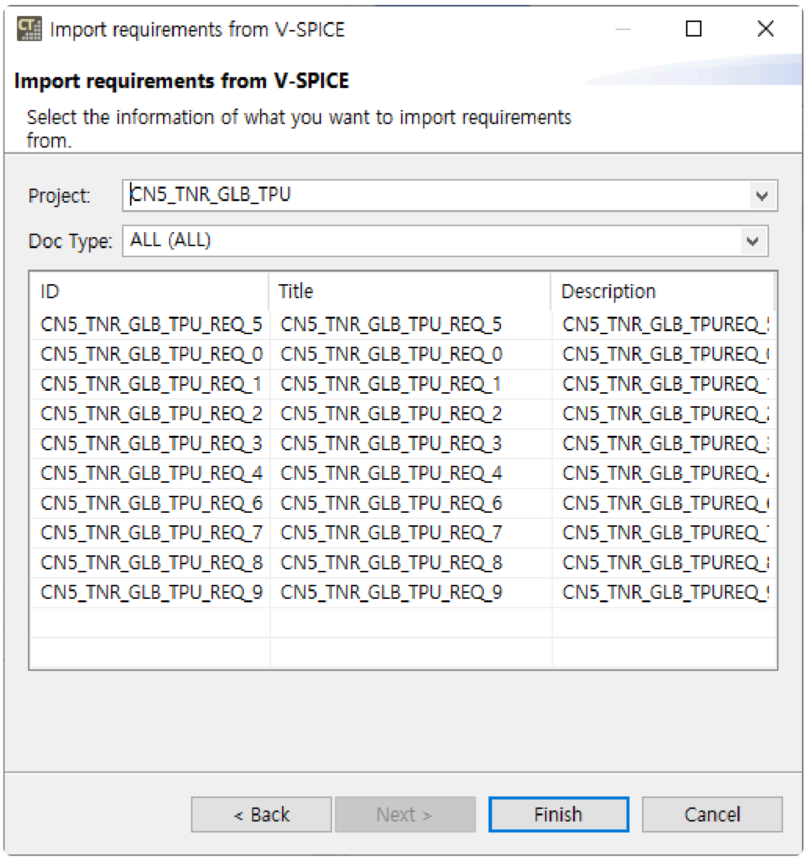
Server: http://

Port: 38080

Username:

Password:

3. When you enter the Project to import from V-SPICE, the corresponding requirements list appears. Check the requirements and click the [Finish] button to import the requirements.


Import requirements from V-SPICE

Import requirements from V-SPICE

Select the information of what you want to import requirements from.

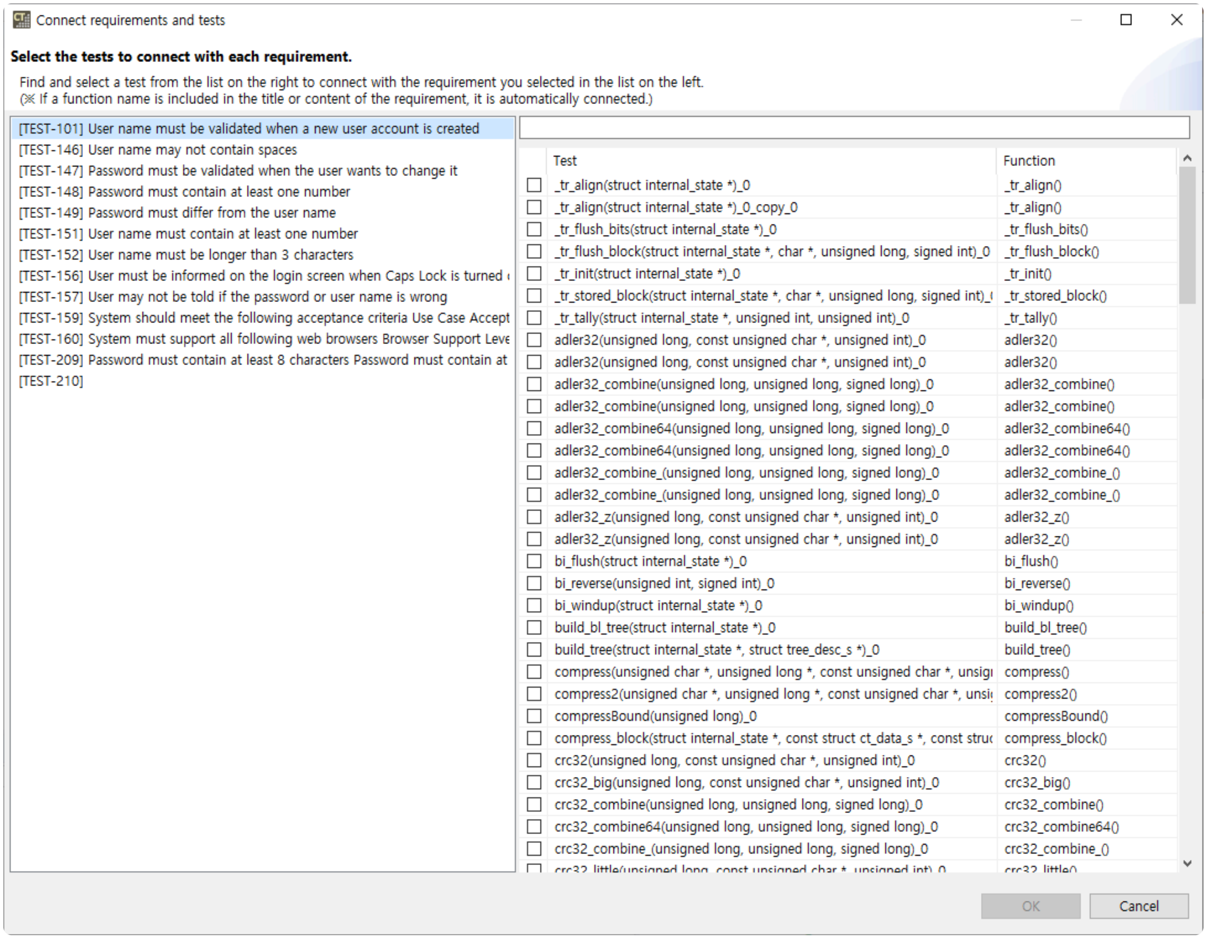
Project: CN5_TNR_GLB_TPU

Doc Type: ALL (ALL)

ID	Title	Description
CN5_TNR_GLB_TPU_REQ_5	CN5_TNR_GLB_TPU_REQ_5	CN5_TNR_GLB_TPUREQ_
CN5_TNR_GLB_TPU_REQ_0	CN5_TNR_GLB_TPU_REQ_0	CN5_TNR_GLB_TPUREQ_
CN5_TNR_GLB_TPU_REQ_1	CN5_TNR_GLB_TPU_REQ_1	CN5_TNR_GLB_TPUREQ_
CN5_TNR_GLB_TPU_REQ_2	CN5_TNR_GLB_TPU_REQ_2	CN5_TNR_GLB_TPUREQ_
CN5_TNR_GLB_TPU_REQ_3	CN5_TNR_GLB_TPU_REQ_3	CN5_TNR_GLB_TPUREQ_
CN5_TNR_GLB_TPU_REQ_4	CN5_TNR_GLB_TPU_REQ_4	CN5_TNR_GLB_TPUREQ_
CN5_TNR_GLB_TPU_REQ_6	CN5_TNR_GLB_TPU_REQ_6	CN5_TNR_GLB_TPUREQ_
CN5_TNR_GLB_TPU_REQ_7	CN5_TNR_GLB_TPU_REQ_7	CN5_TNR_GLB_TPUREQ_
CN5_TNR_GLB_TPU_REQ_8	CN5_TNR_GLB_TPU_REQ_8	CN5_TNR_GLB_TPUREQ_
CN5_TNR_GLB_TPU_REQ_9	CN5_TNR_GLB_TPU_REQ_9	CN5_TNR_GLB_TPUREQ_

4. [Connect requirements and tests] dialog appears where you can connect the imported requirements and tests. If the title or description of the requirement contains the name of the function associated with the test, it is automatically linked. Click [Cancel] to finish [Connect

requirements and tests] without linking requirements and tests.



Connect requirements and tests

Select the tests to connect with each requirement.

Find and select a test from the list on the right to connect with the requirement you selected in the list on the left.
(※ If a function name is included in the title or content of the requirement, it is automatically connected.)

[TEST-101] User name must be validated when a new user account is created
[TEST-146] User name may not contain spaces
[TEST-147] Password must be validated when the user wants to change it
[TEST-148] Password must contain at least one number
[TEST-149] Password must differ from the user name
[TEST-151] User name must contain at least one number
[TEST-152] User name must be longer than 3 characters
[TEST-156] User must be informed on the login screen when Caps Lock is turned
[TEST-157] User may not be told if the password or user name is wrong
[TEST-159] System should meet the following acceptance criteria Use Case Accept
[TEST-160] System must support all following web browsers Browser Support Leve
[TEST-209] Password must contain at least 8 characters Password must contain at
[TEST-210]

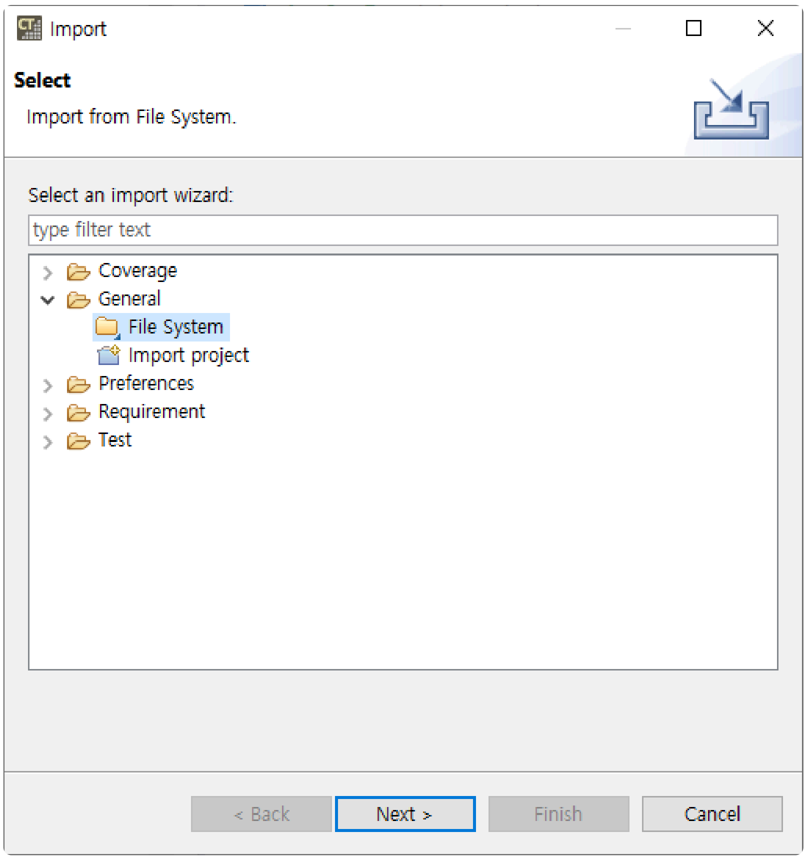
	Test	Function
☐	_tr_align(struct internal_state *)_0	_tr_align()
☐	_tr_align(struct internal_state *)_0_copy_0	_tr_align()
☐	_tr_flush_bits(struct internal_state *)_0	_tr_flush_bits()
☐	_tr_flush_block(struct internal_state *, char *, unsigned long, signed int)_0	_tr_flush_block()
☐	_tr_init(struct internal_state *)_0	_tr_init()
☐	_tr_stored_block(struct internal_state *, char *, unsigned long, signed int)_(	_tr_stored_block()
☐	_tr_tally(struct internal_state *, unsigned int, unsigned int)_0	_tr_tally()
☐	adler32(unsigned long, const unsigned char *, unsigned int)_0	adler32()
☐	adler32(unsigned long, const unsigned char *, unsigned int)_0	adler32()
☐	adler32_combine(unsigned long, unsigned long, signed long)_0	adler32_combine()
☐	adler32_combine(unsigned long, unsigned long, signed long)_0	adler32_combine()
☐	adler32_combine64(unsigned long, unsigned long, signed long)_0	adler32_combine64()
☐	adler32_combine64(unsigned long, unsigned long, signed long)_0	adler32_combine64()
☐	adler32_combine_(unsigned long, unsigned long, signed long)_0	adler32_combine_()
☐	adler32_combine_(unsigned long, unsigned long, signed long)_0	adler32_combine_()
☐	adler32_z(unsigned long, const unsigned char *, unsigned int)_0	adler32_z()
☐	adler32_z(unsigned long, const unsigned char *, unsigned int)_0	adler32_z()
☐	bi_flush(struct internal_state *)_0	bi_flush()
☐	bi_reverse(unsigned int, signed int)_0	bi_reverse()
☐	bi_windup(struct internal_state *)_0	bi_windup()
☐	build_bl_tree(struct internal_state *)_0	build_bl_tree()
☐	build_tree(struct internal_state *, struct tree_desc_s *)_0	build_tree()
☐	compress(unsigned char *, unsigned long *, const unsigned char *, unsigı	compress()
☐	compress2(unsigned char *, unsigned long *, const unsigned char *, unsi	compress2()
☐	compressBound(unsigned long)_0	compressBound()
☐	compress_block(struct internal_state *, const struct ct_data_s *, const struc	compress_block()
☐	crc32(unsigned long, const unsigned char *, unsigned int)_0	crc32()
☐	crc32_big(unsigned long, const unsigned char *, unsigned int)_0	crc32_big()
☐	crc32_combine(unsigned long, unsigned long, signed long)_0	crc32_combine()
☐	crc32_combine64(unsigned long, unsigned long, signed long)_0	crc32_combine64()
☐	crc32_combine_(unsigned long, unsigned long, signed long)_0	crc32_combine_()
☐	crc32_little(unsigned long, const unsigned char *, unsigned int)_0	crc32_little()

OK Cancel

17.3.4. General – File System

You can add the source files to the project by using [Import] – [File System] feature.

1. In the Import Wizard, select [General] -> [File System] and click the [Next] button.



Import

Select

Import from File System.

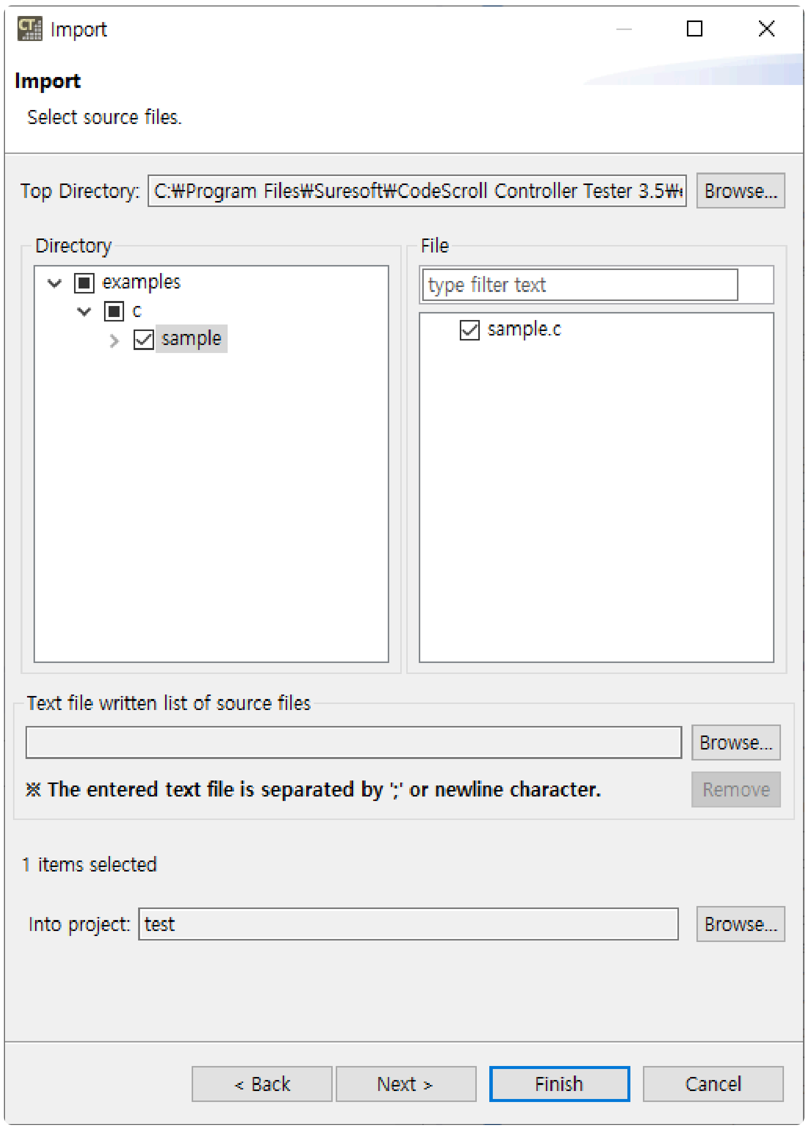
Select an import wizard:

type filter text

- Coverage
- General
  - File System
  - Import project
- Preferences
- Requirement
- Test

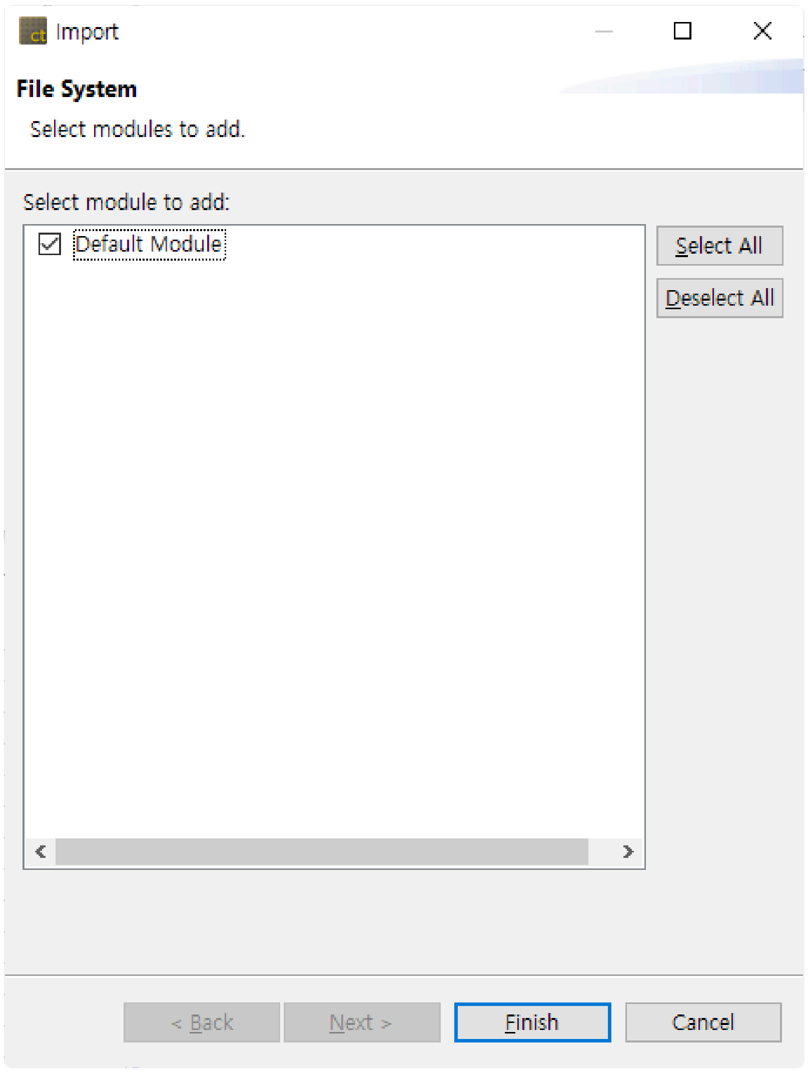
< Back | Next > | Finish | Cancel

2. Enter the information of the file to be imported and click the [Next] button.


Import
Import
Select source files.
Top Directory: C:₩Program Files₩Suresoft₩CodeScroll Controller Tester 3.5₩
Browse...
Directory
examples
c
sample
File
type filter text
sample.c
Text file written list of source files
Browse...
※ The entered text file is separated by ';' or newline character.
Remove
1 items selected
Into project: test
Browse...
< Back
Next >
Finish
Cancel

Item	Description
Top Directory	Select the directory of the source files to be imported.
Directory, File	Select the source files to be imported.
Text file written list of source files	Select the directory of the txt file containing a list of source files.(Option)
Into project	Select the project to add the imported source files.

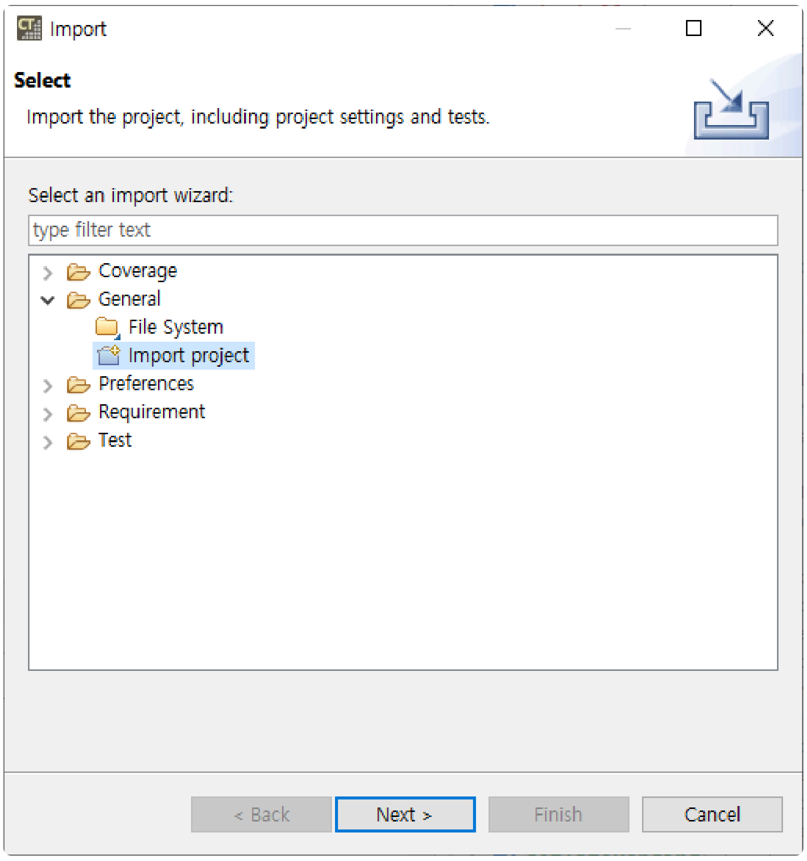
3. Select the module that the source file will be added from the list of modules included in the project and click the [Finish] button.


Import
File System
Select modules to add.
Select module to add:
☑ Default Module
Select All
Deselect All
< Back
Next >
Finish
Cancel

17.3.5. General – Import project

Using the Import Project feature, you can import a project exported from another PC.

1. In the Import Wizard, click [General] -> [Import Project] and then click the [Next] button.



Import

Select

Import the project, including project settings and tests.

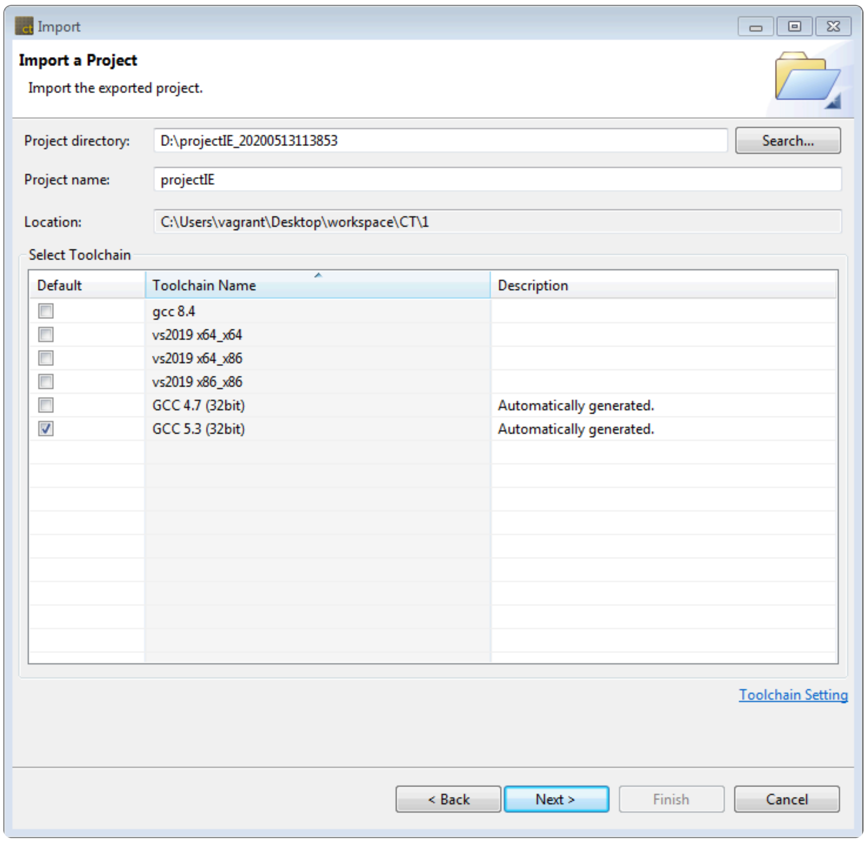
Select an import wizard:

type filter text

- Coverage
- General
  - File System
  - Import project
- Preferences
- Requirement
- Test

< Back | Next > | Finish | Cancel

2. Click the [Next] button after entering the exported project directory and selecting the toolchain. When you select a directory, the toolchain associated with the project to import is automatically selected. If you don't have a suitable toolchain, you need to import the toolchain using the toolchain export/import feature before importing the project.



Import

Import a Project

Import the exported project.

Project directory: D:\projectIE_20200513113853

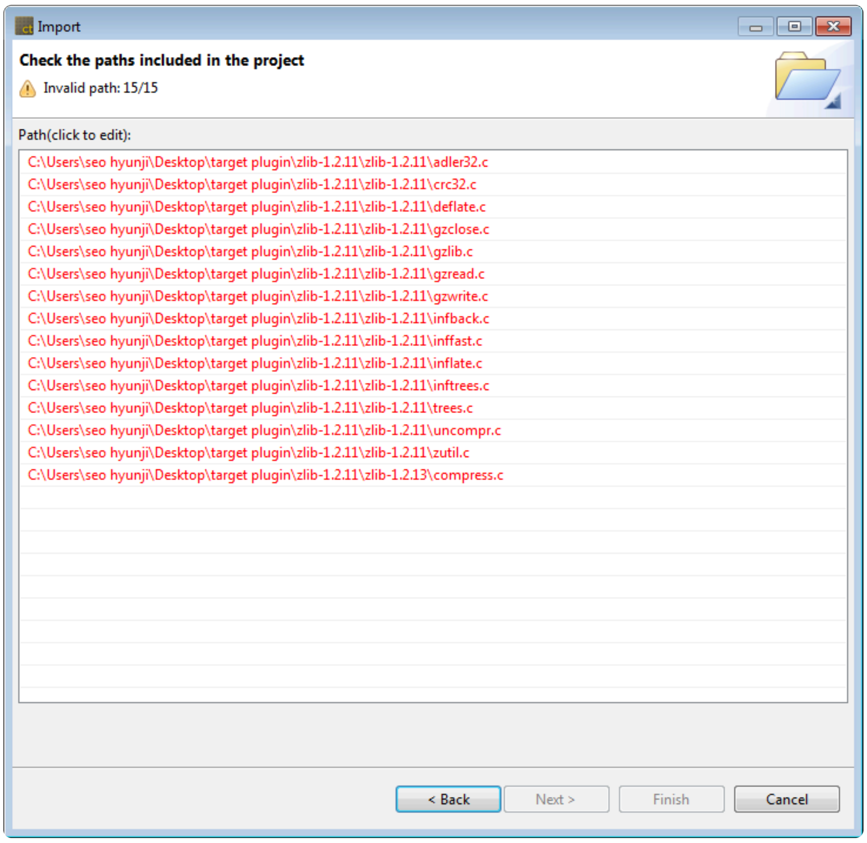
Project name: projectIE

Location: C:\Users\vagrant\Desktop\workspace\CT\1

Select Toolchain

Default	Toolchain Name	Description
☐	gcc 8.4	
☐	vs2019 x64_x64	
☐	vs2019 x64_x86	
☐	vs2019 x86_x86	
☐	GCC 4.7 (32bit)	Automatically generated.
✓	GCC 5.3 (32bit)	Automatically generated.

3. You can check the path information included in the project to be imported. Invalid paths are marked in red and can be modified by clicking with the mouse or pressing the F2 key.



Import

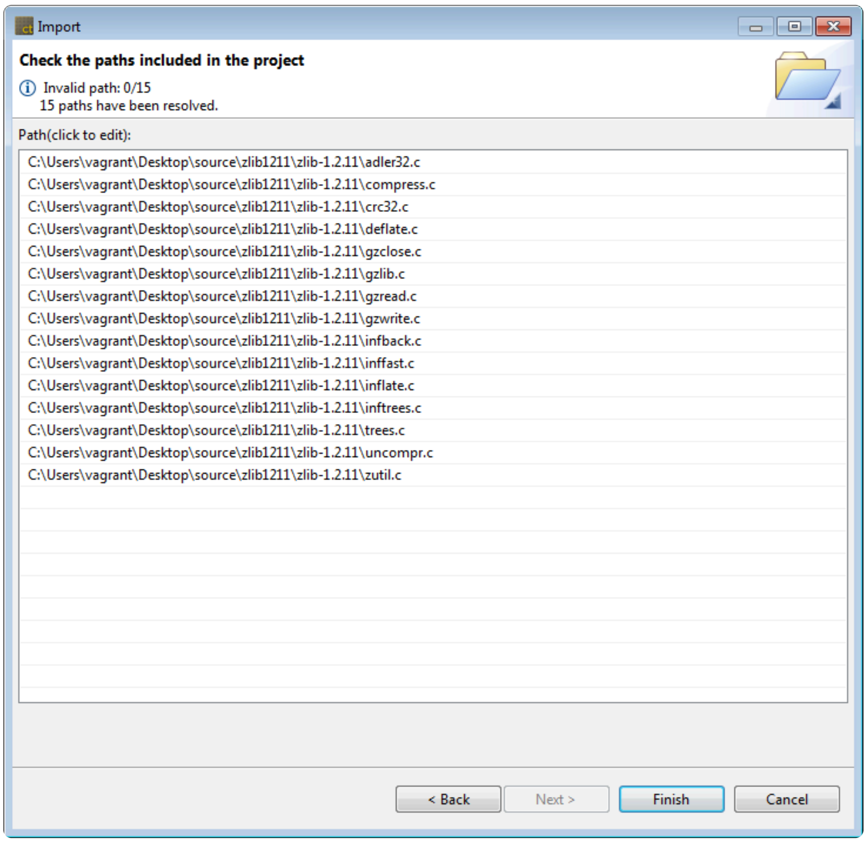
Check the paths included in the project

Invalid path: 15/15

Path(click to edit):

```
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\adler32.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\crc32.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\deflate.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\gzclose.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\gzlib.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\gzread.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\gzwrite.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\infback.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\inffast.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\inflate.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\inftrees.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\trees.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\uncompr.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.11\zutil.c
C:\Users\seo hyunji\Desktop\target plugin\zlib-1.2.11\zlib-1.2.13\compress.c
```

4. If you edit one path, all paths that can be found in the relative path are automatically corrected. The number of modified paths is displayed at the top of the wizard. After editting, click the [Finish] button.


Import

Check the paths included in the project

Invalid path: 0/15
15 paths have been resolved.

Path(click to edit):

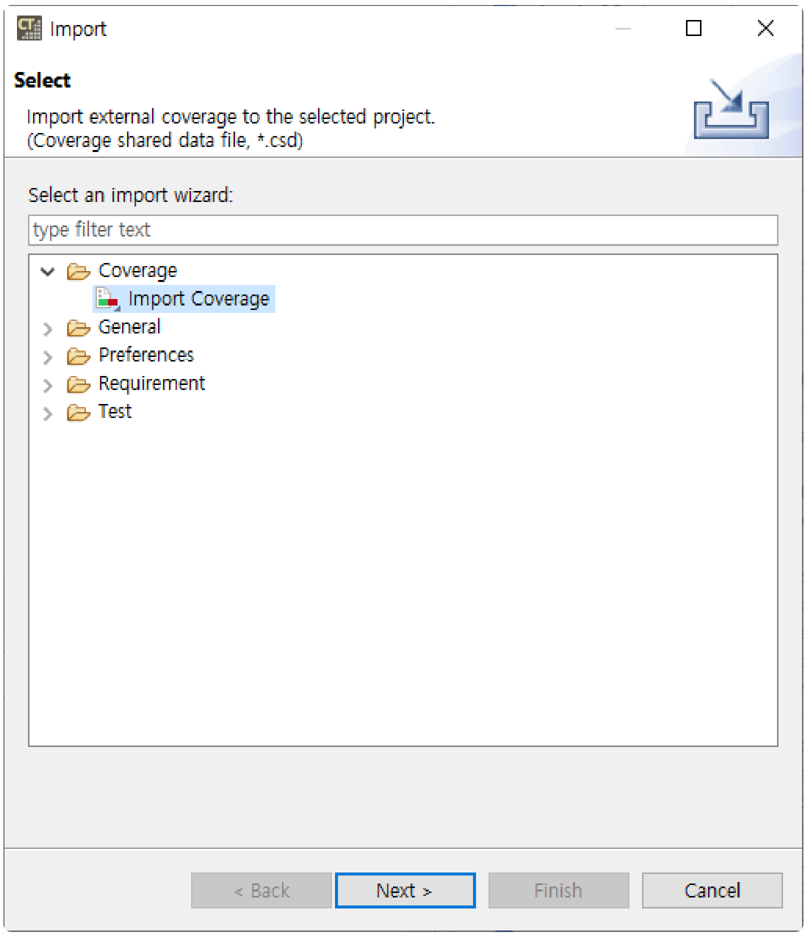
```
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\adler32.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\compress.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\crc32.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\deflate.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\gzclose.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\gzlib.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\gzread.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\gzwrite.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\infback.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\inffast.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\inflate.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\inftrees.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\trees.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\uncompr.c
C:\Users\vagrant\Desktop\source\zlib1211\zlib-1.2.11\zutil.c
```

If path is not in absolute path format of Windows OS, the path is not checked for validity.

17.3.6. Coverage – Import Coverage

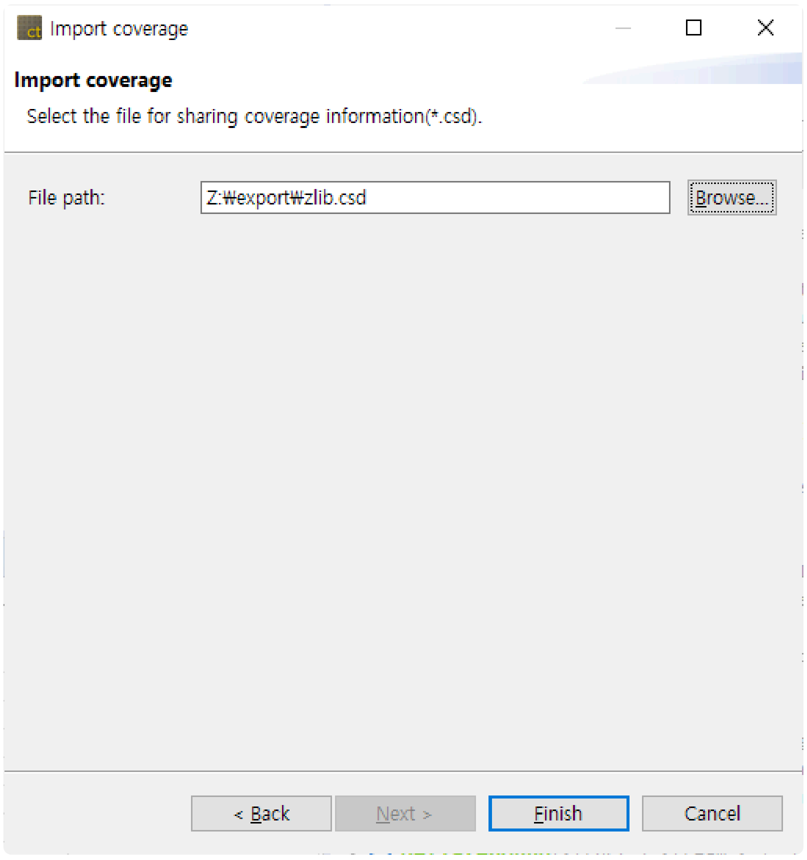
! If the version, the coverage type, and the ternary operator option of the coverage file to be imported are the same as those of Controller Tester, the coverage can be imported. For details, please refer to the Coverage Import Guide page of User Guides.

1. In the [Import] wizard, select [Coverage] > [Import Coverage] and click [Next].

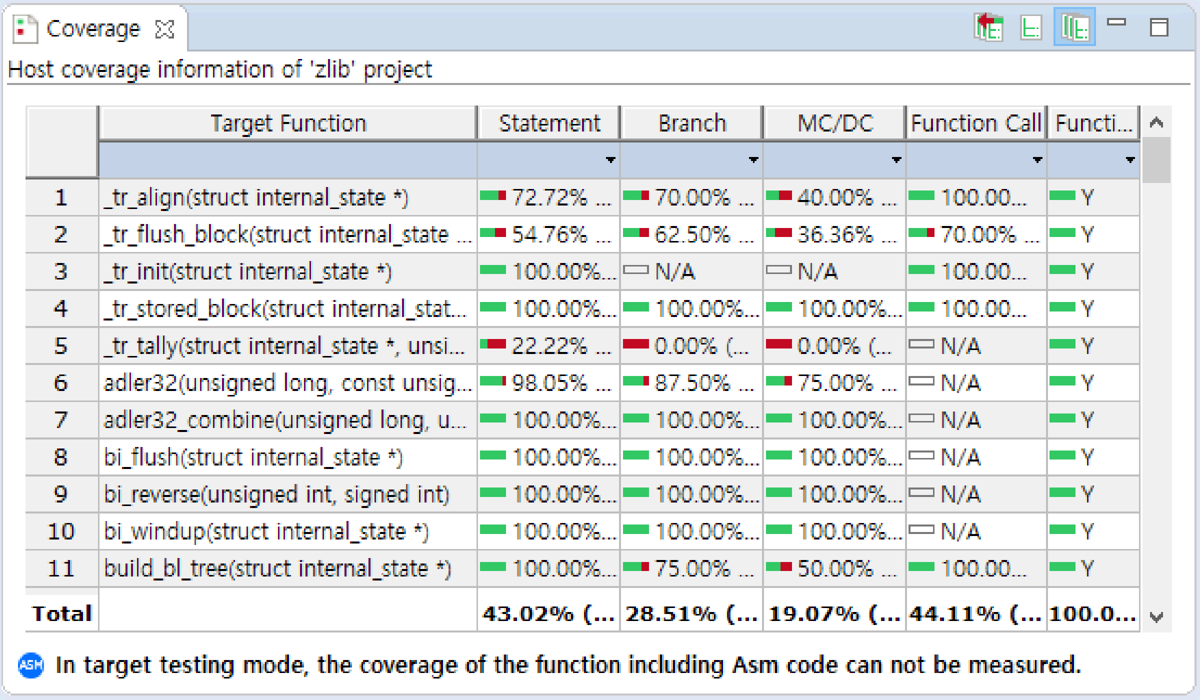


Import external coverage to the selected project.
(Coverage shared data file, *.csd)

2. Enter the path of coverage file to be imported and click [Finish].



The imported coverage information can be checked by selecting [Show full coverage (Include External Coverage)] in the toolbar menu of the Coverage View.


Coverage

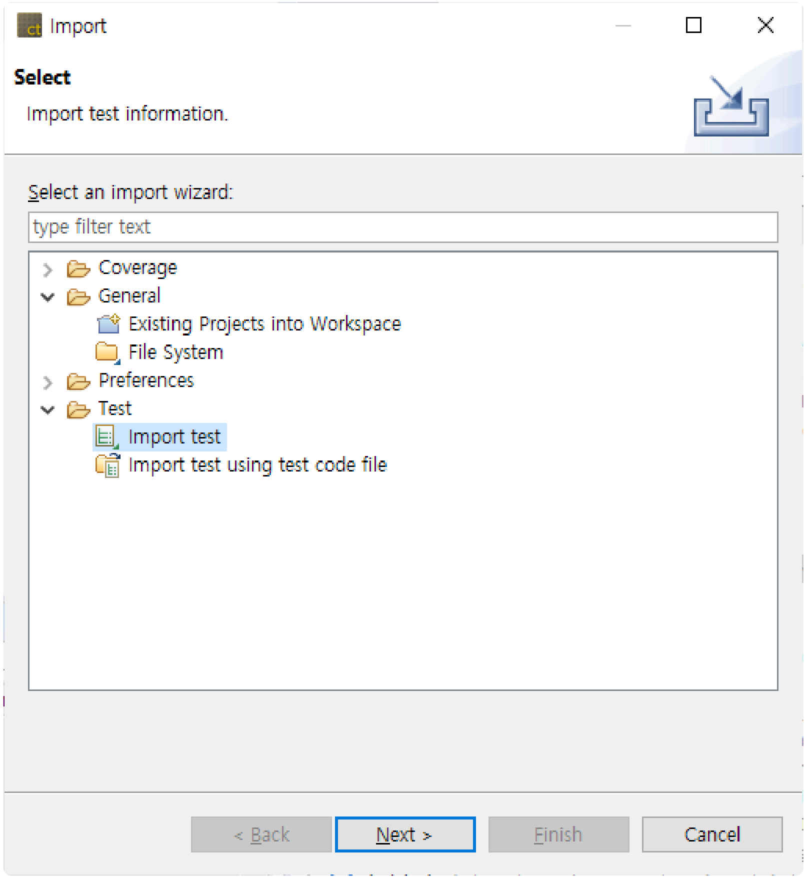
Host coverage information of 'zlib' project

	Target Function	Statement	Branch	MC/DC	Function Call	Functi...
1	_tr_align(struct internal_state *)	72.72% ...	70.00% ...	40.00% ...	100.00...	Y
2	_tr_flush_block(struct internal_state ...	54.76% ...	62.50% ...	36.36% ...	70.00% ...	Y
3	_tr_init(struct internal_state *)	100.00%...	N/A	N/A	100.00...	Y
4	_tr_stored_block(struct internal_stat...	100.00%...	100.00%...	100.00%...	100.00...	Y
5	_tr_tally(struct internal_state *, unsi...	22.22% ...	0.00% (...	0.00% (...	N/A	Y
6	adler32(unsigned long, const unsig...	98.05% ...	87.50% ...	75.00% ...	N/A	Y
7	adler32_combine(unsigned long, u...	100.00%...	100.00%...	100.00%...	N/A	Y
8	bi_flush(struct internal_state *)	100.00%...	100.00%...	100.00%...	N/A	Y
9	bi_reverse(unsigned int, signed int)	100.00%...	100.00%...	100.00%...	N/A	Y
10	bi_windup(struct internal_state *)	100.00%...	100.00%...	100.00%...	N/A	Y
11	build_bl_tree(struct internal_state *)	100.00%...	75.00% ...	50.00% ...	100.00...	Y
Total		**43.02% (...**	**28.51% (...**	**19.07% (...**	**44.11% (...**	**100.0...**

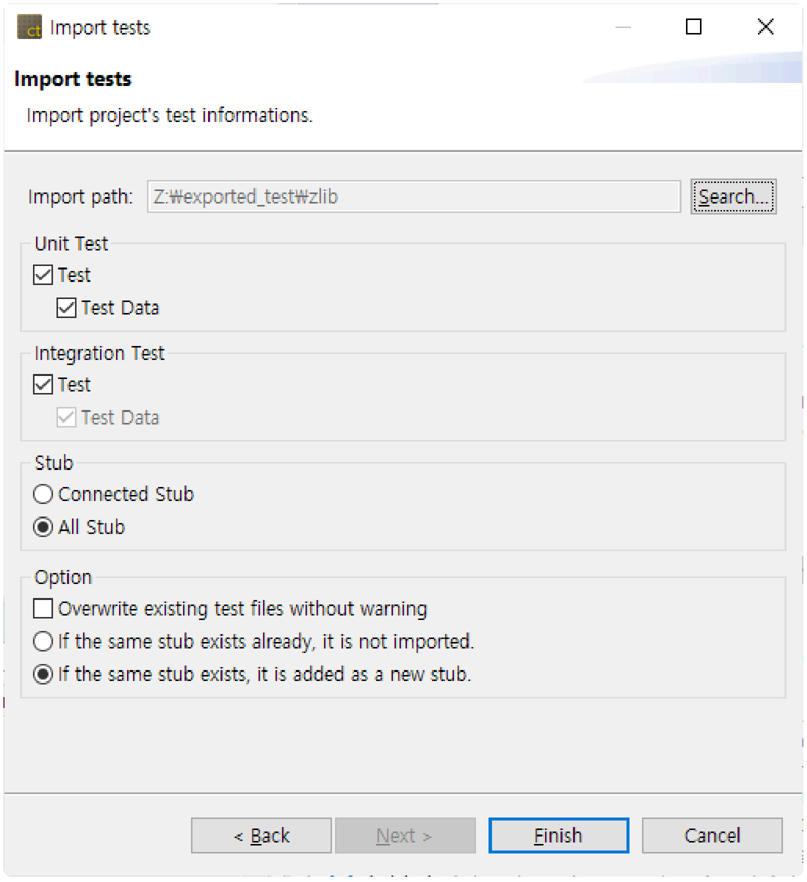
In target testing mode, the coverage of the function including Asm code can not be measured.

17.3.7. Test – Import test

1. In the Import Wizard, select [Test] -> [Import Test] and click [Next].



2. Enter the information for the test to be imported and click [Finish].



Import tests

Import project's test informations.

Import path: Z:₩exported_test₩zlib

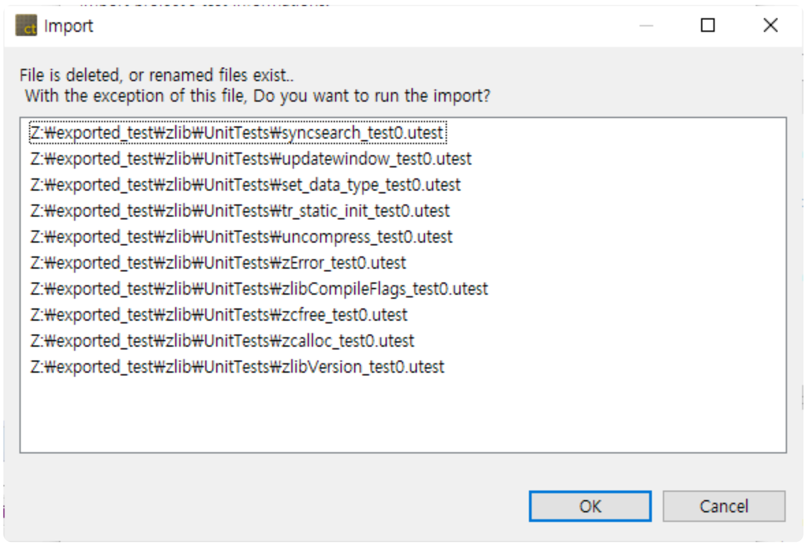
Unit Test
- [✓] Test
  - [✓] Test Data

Integration Test
- [✓] Test
  - [✓] Test Data

Stub
- ○ Connected Stub
- ● All Stub

Option
- [ ] Overwrite existing test files without warning
- ○ If the same stub exists already, it is not imported.
- ● If the same stub exists, it is added as a new stub.

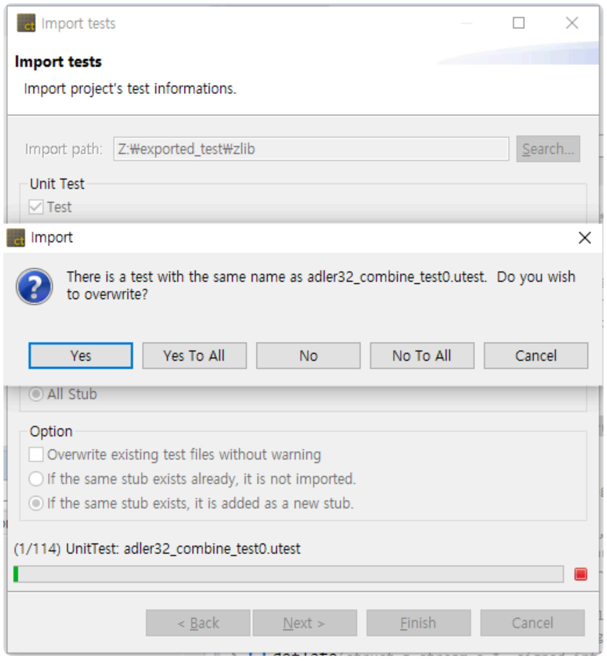
3. If there are items that the name has been changed or the file has been deleted when importing the test information, the notification windows is displayed, allowing you to select whether to import the information except for that items. This notification window is displayed only if the information was exported from Controller Tester 2.6.14 or later version at a time. If the information is exported from the other menu and previous version, the notification is not displayed.


Import

File is deleted, or renamed files exist..
With the exception of this file, Do you want to run the import?

```
Z:₩exported_test₩zlib₩UnitTests₩syncsearch_test0.utest
Z:₩exported_test₩zlib₩UnitTests₩updatewindow_test0.utest
Z:₩exported_test₩zlib₩UnitTests₩set_data_type_test0.utest
Z:₩exported_test₩zlib₩UnitTests₩tr_static_init_test0.utest
Z:₩exported_test₩zlib₩UnitTests₩uncompress_test0.utest
Z:₩exported_test₩zlib₩UnitTests₩zError_test0.utest
Z:₩exported_test₩zlib₩UnitTests₩zlibCompileFlags_test0.utest
Z:₩exported_test₩zlib₩UnitTests₩zcfree_test0.utest
Z:₩exported_test₩zlib₩UnitTests₩zcalloc_test0.utest
Z:₩exported_test₩zlib₩UnitTests₩zlibVersion_test0.utest
```

4. If the same test exists in the project, select whether to overwrite the test. Select [Yes] to overwrite and select [No] to cancel the import.


Import tests

Import tests
Import project's test informations.

Import path: Z:₩exported_test₩zlib

Unit Test
[✓ Test]

Import

There is a test with the same name as adler32_combine_test0.utest. Do you wish to overwrite?

[✓ All Stub]

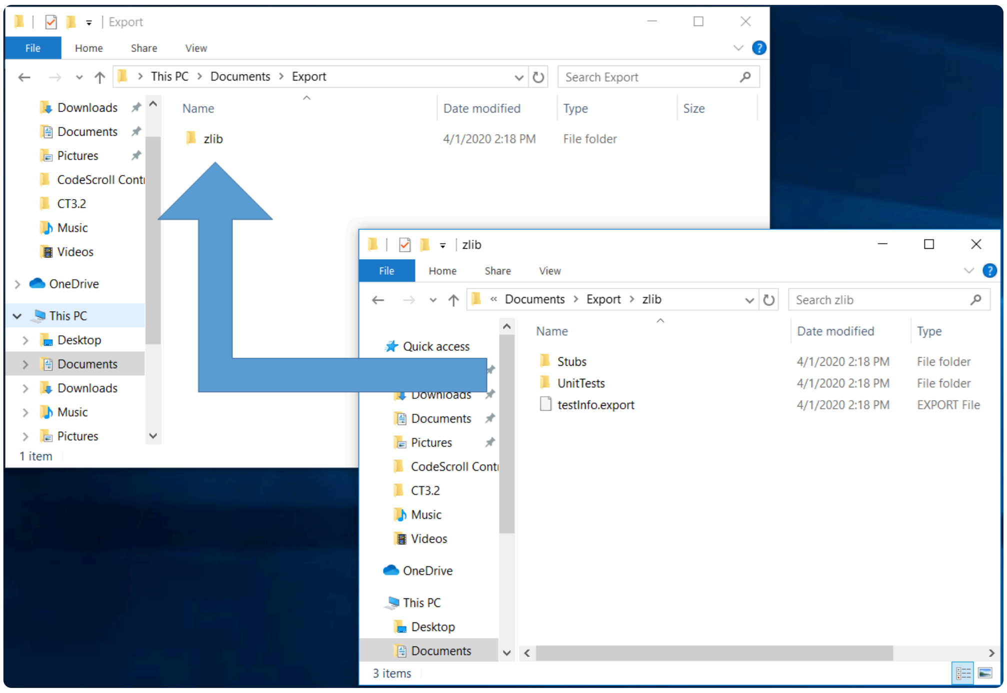
Option
Overwrite existing test files without warning
If the same stub exists already, it is not imported.
[✓ If the same stub exists, it is added as a new stub.]

(1/114) UnitTest: adler32_combine_test0.utest

5. After the import has completed, it is applied to the selected project.

Import information exported from Controller Tester 2.6.14 or earlier

1. Enter the path to import the test in [Import path].

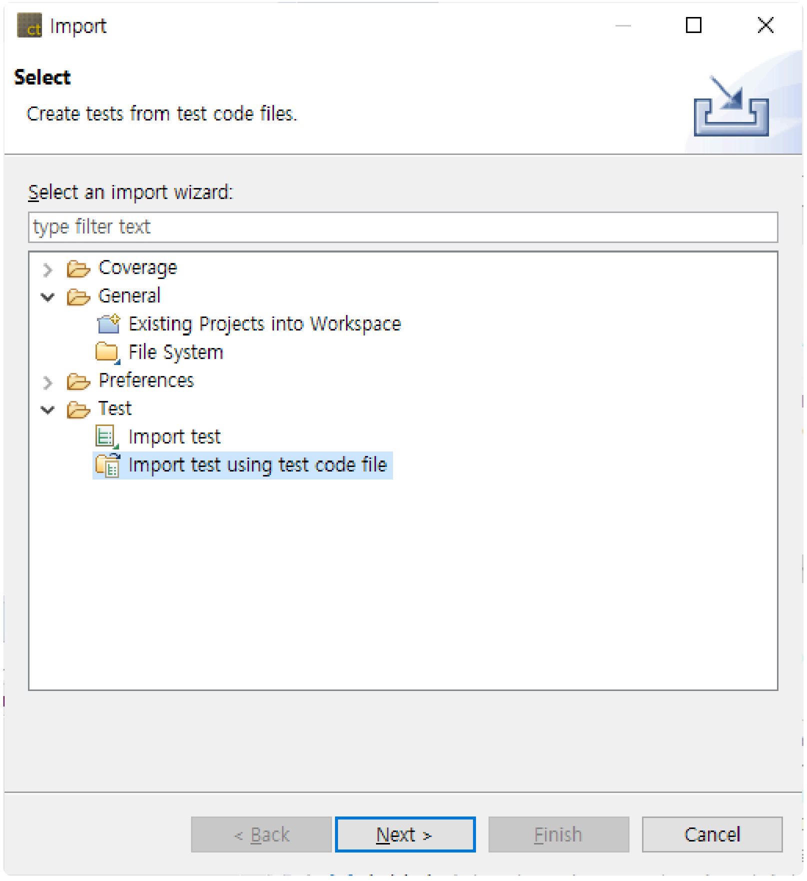


- If [testinfo.export] file exists in the test path to be imported, select the directory containing the file.
  If you import the information exported separately from Controller Tester 2.6.14 or less version, select the higher-level directory containing the information exported.

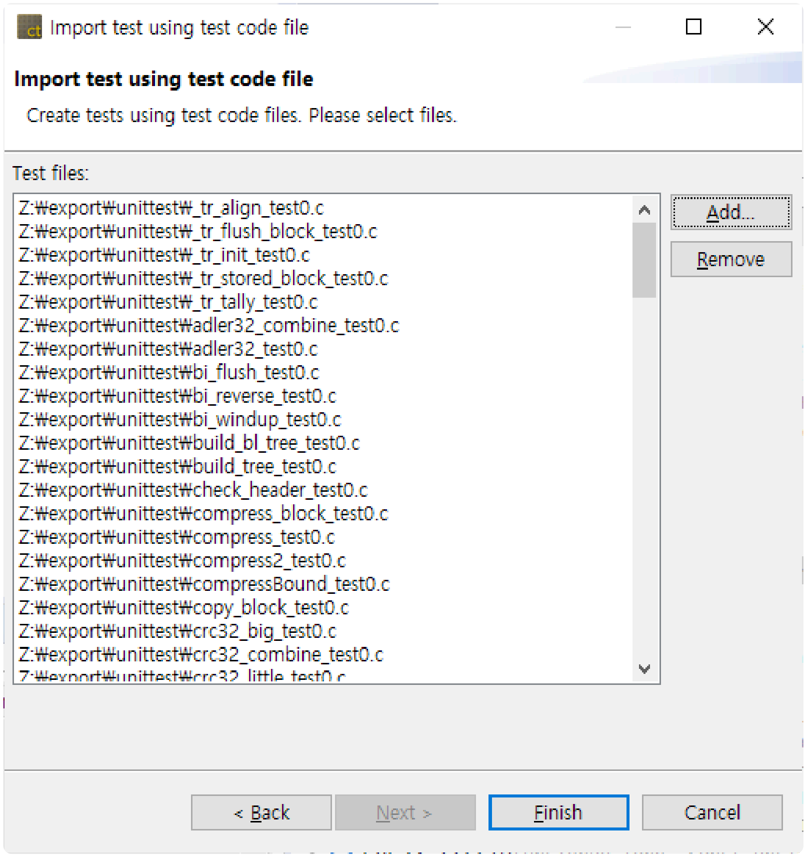
2. In [Unit Test] group, check whether to import [Test] and [Test data] respectively.
3. In [Integration Test] group, check whether to import [Test].
   - The test and data must always be in the same directory, and if it is not, the data is not imported.
4. In [Stub] group, select the stub to be imported among [Connected Stubs] and [All stubs].
   - For the stubs created in Controller Tester 2.3 version, or the stubs migrated to Controller Tester 2.6, if the same stubs exist in the project, the import cannot be carried out.
   - For the stubs created in Controller Tester 2.6 version, if the same stubs exist, you can select either not to import them optionally or to create as a new stub additionally.
   - **There is no feature to link the stubs to the test in Controller Tester 2.3 version, so you need to link directly to the test when migrating to version Controller Tester 2.6 or later.**
5. In [Option] group, select whether to overwrite the existing test files if they exist and how to handle them when the same stub exists.

17.3.8. Test – Import test using test code file

1. In the Import Wizard, select [Test] -> [Import test using test code file] and click [Next].



2. Click [Add…] and select the test to be imported.


Import test using test code file
Import test using test code file
Create tests using test code files. Please select files.
Test files:
Add...
Remove
< Back
Next >
Finish
Cancel

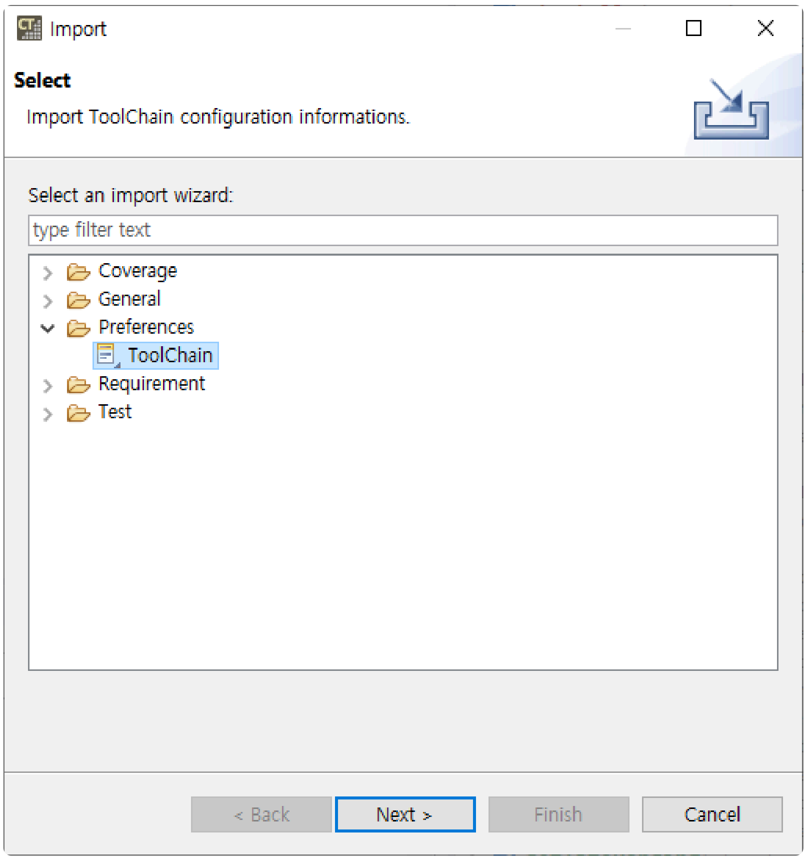
Z:₩export₩unittest₩_tr_align_test0.c
Z:₩export₩unittest₩_tr_flush_block_test0.c
Z:₩export₩unittest₩_tr_init_test0.c
Z:₩export₩unittest₩_tr_stored_block_test0.c
Z:₩export₩unittest₩_tr_tally_test0.c
Z:₩export₩unittest₩adler32_combine_test0.c
Z:₩export₩unittest₩adler32_test0.c
Z:₩export₩unittest₩bi_flush_test0.c
Z:₩export₩unittest₩bi_reverse_test0.c
Z:₩export₩unittest₩bi_windup_test0.c
Z:₩export₩unittest₩build_bl_tree_test0.c
Z:₩export₩unittest₩build_tree_test0.c
Z:₩export₩unittest₩check_header_test0.c
Z:₩export₩unittest₩compress_block_test0.c
Z:₩export₩unittest₩compress_test0.c
Z:₩export₩unittest₩compress2_test0.c
Z:₩export₩unittest₩compressBound_test0.c
Z:₩export₩unittest₩copy_block_test0.c
Z:₩export₩unittest₩crc32_big_test0.c
Z:₩export₩unittest₩crc32_combine_test0.c
Z:₩export₩unittest₩crc32_little_test0.c

3. Click [Finish] to apply the selected test to the selected project.

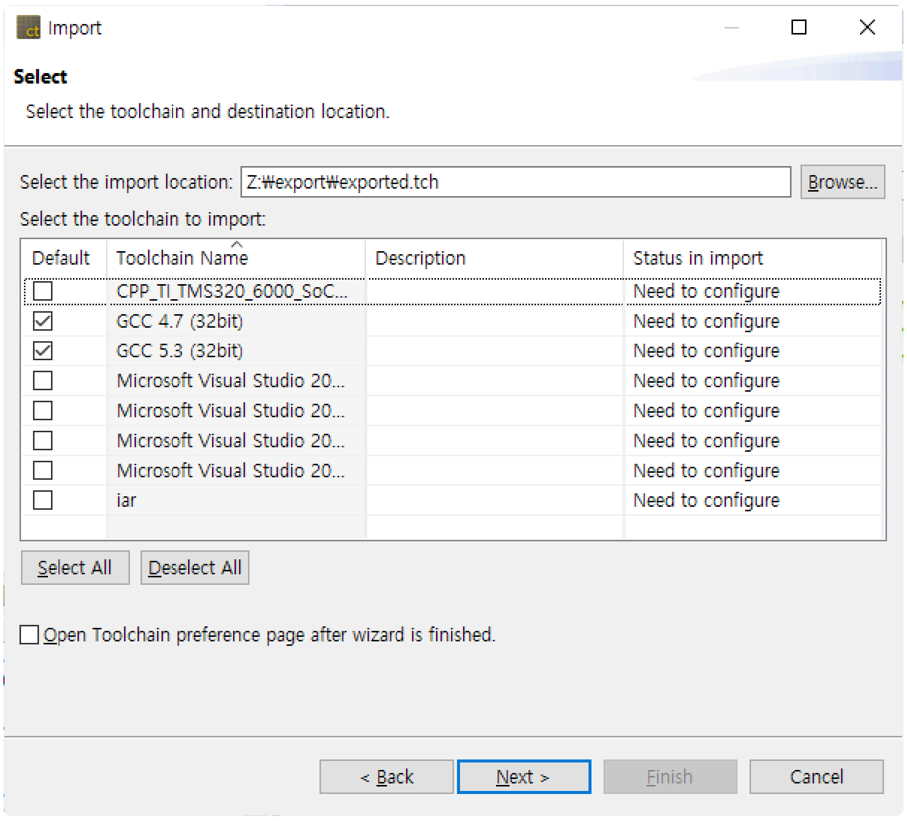
17.3.9. Preferences − ToolChain

You can import the toolchain information exported by using the Import function.

1. In the Import Wizard, select [Preferences] -> [ToolChain] and click [Next].



2. If you select the file (*.tch) to be imported, the list of toolchains included in the selected file are displayed. Select the toolchains to be imported from the toolchain list.



Import

Select

Select the toolchain and destination location.

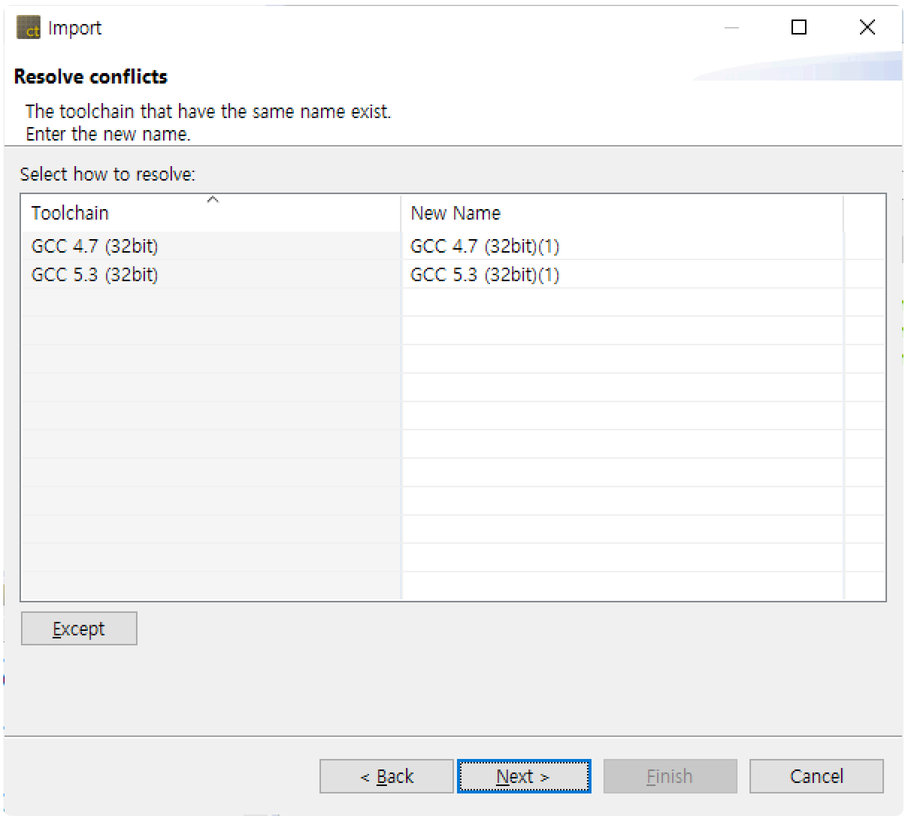
Select the import location: Z:₩export₩exported.tch

Select the toolchain to import:

Default	Toolchain Name	Description	Status in import
☐	CPP_TI_TMS320_6000_SoC...		Need to configure
☑	GCC 4.7 (32bit)		Need to configure
☑	GCC 5.3 (32bit)		Need to configure
☐	Microsoft Visual Studio 20...		Need to configure
☐	Microsoft Visual Studio 20...		Need to configure
☐	Microsoft Visual Studio 20...		Need to configure
☐	Microsoft Visual Studio 20...		Need to configure
☐	iar		Need to configure

☐ Open Toolchain preference page after wizard is finished.

3. If the toolchain name is duplicated with the name of the existing toolchain, the import status becomes “Need to modify”. You can change the toolchain name to be imported in the [Select how to resolve] window displayed when clicking [Next] button.



Import

Resolve conflicts

The toolchain that have the same name exist.
Enter the new name.

Select how to resolve:

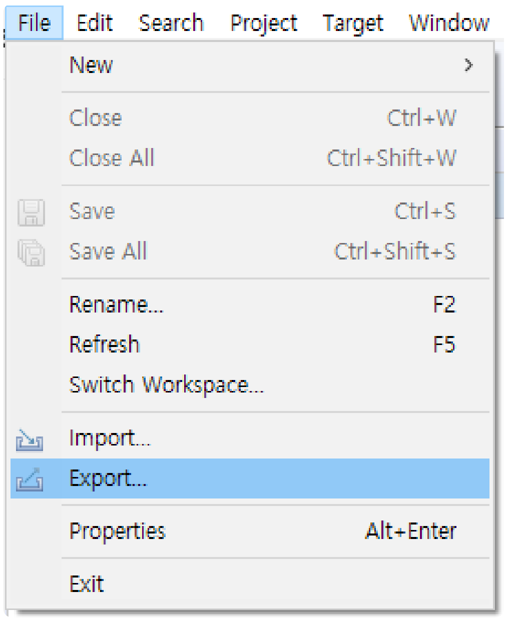
Toolchain	New Name
GCC 4.7 (32bit)	GCC 4.7 (32bit)(1)
GCC 5.3 (32bit)	GCC 5.3 (32bit)(1)

4. Click [Finish].

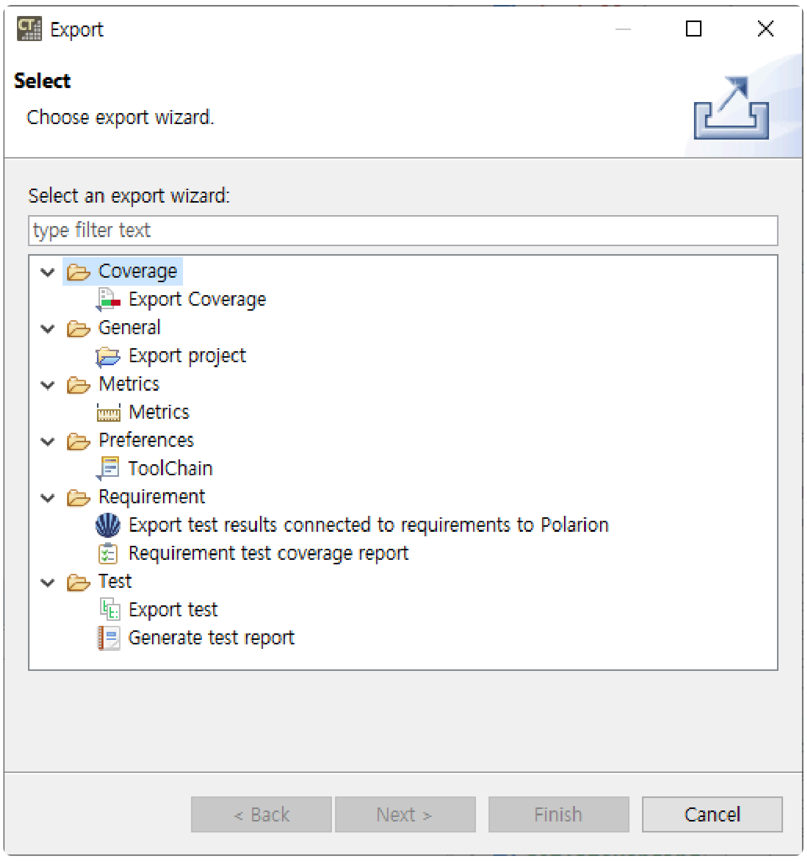
17.4. Export

You can export projects, tests, toolchains, and etc in Controller Tester.

1. Select [File] -> [Export] from the main menu or [Export] from the dashboard to open the Export Wizard.



2. Select a item to export and click [Next].



Export

Select

Choose export wizard.

Select an export wizard:

type filter text

- Coverage
  - Export Coverage
- General
  - Export project
- Metrics
  - Metrics
- Preferences
  - ToolChain
- Requirement
  - Export test results connected to requirements to Polarion
  - Requirement test coverage report
- Test
  - Export test
  - Generate test report

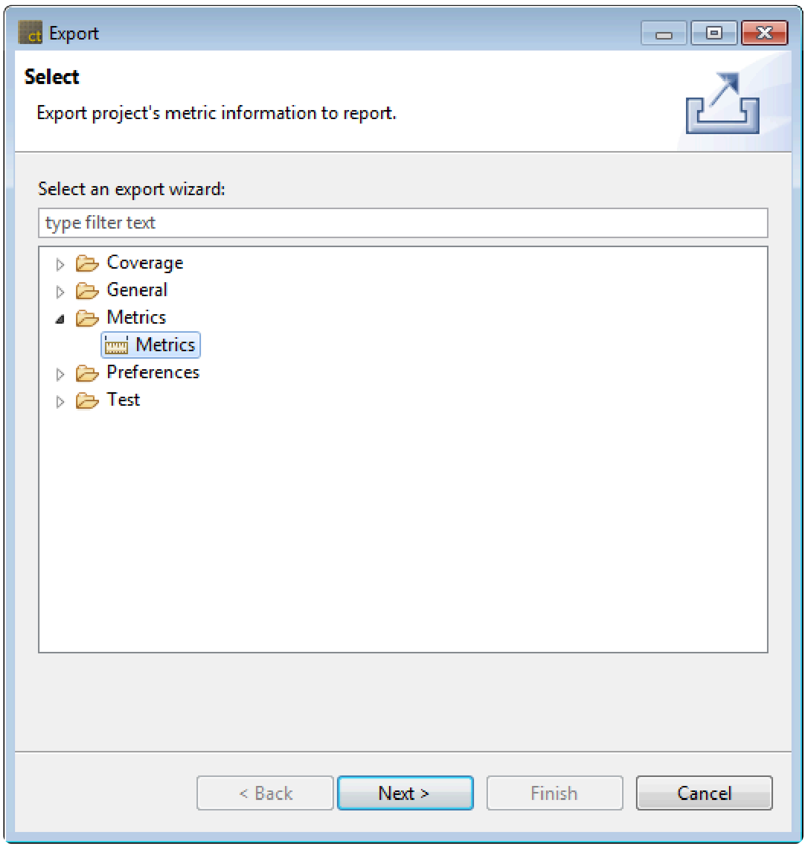
Parent item	Child item	Description
Metrics	Metrics	Export the project’s metrics measurement results in

		a report format.
Requirement	Export test results connected to requirements to Polarion Requirement test coverage report	Export the results of tests associated with requirements to a requirement management tool or to a CSV file.
General	Export project	Export Controller Tester projects.
Coverage	Export Coverage	Export the coverage results in a csd file.
Test	Export test Generate test report	Export tests or generate test reports.
Preferences	ToolChain	Export the toolchain information.

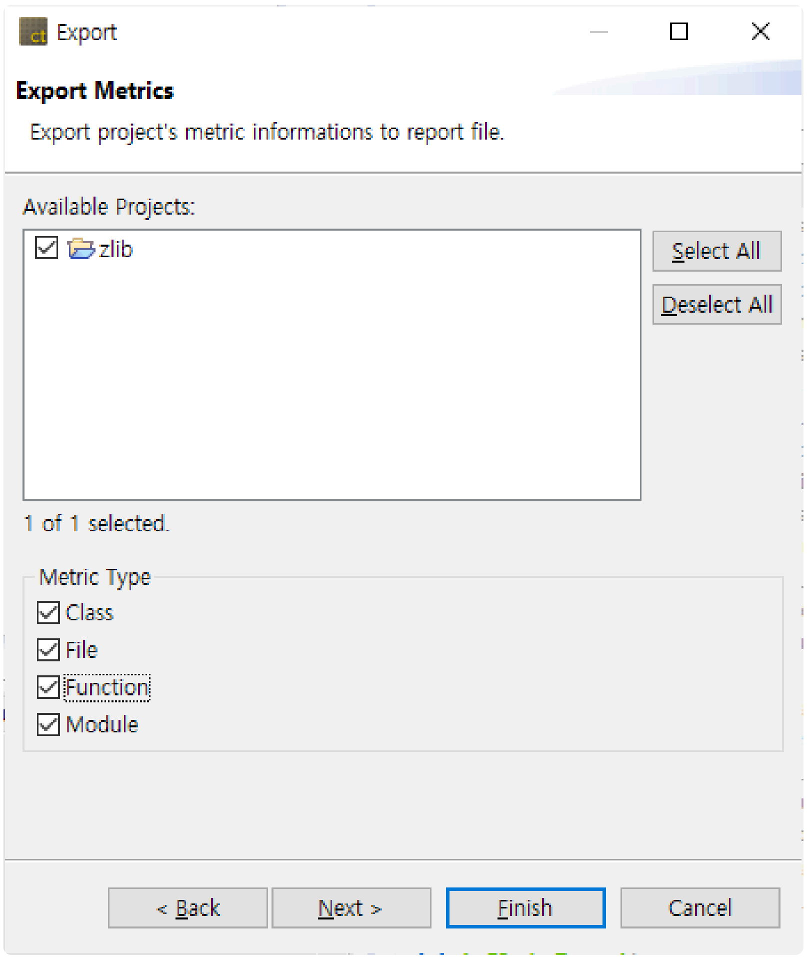
17.4.1. Metrics – Metrics

It exports the metric result of the project in a report file.

1. In the Export Wizard, click [Metric] -> [Metric] and then click the [Next] button.



2. Select the project and metric type to export metric information and click the [Next] button.


Export

Export Metrics

Export project's metric informations to report file.

Available Projects:

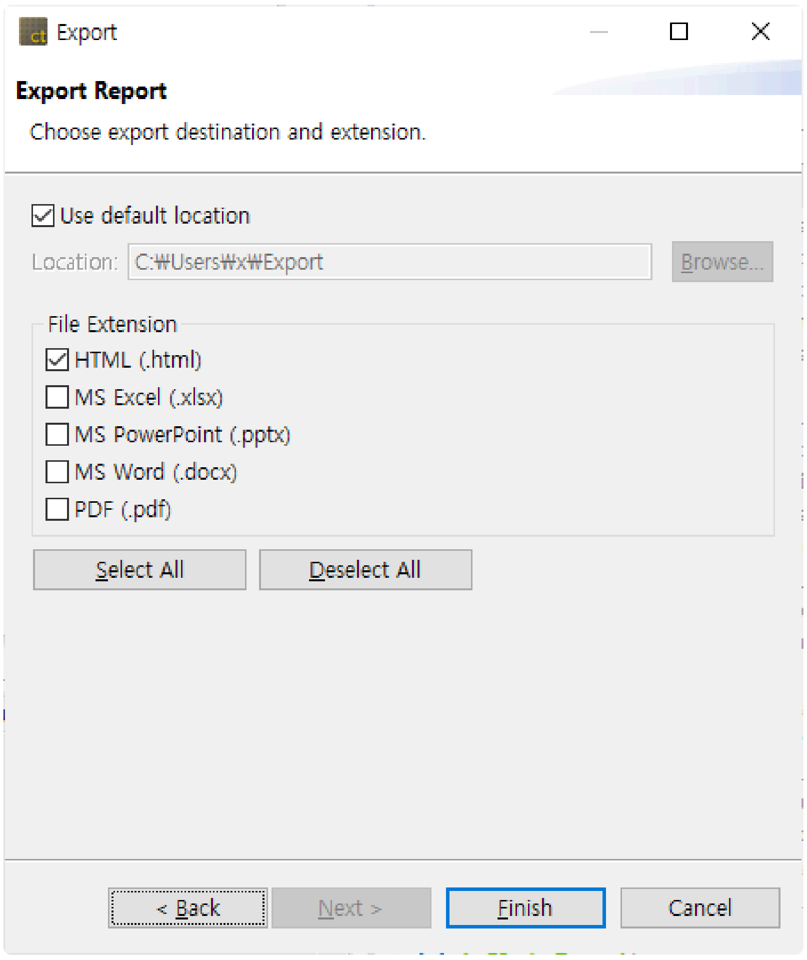
☑ zlib

1 of 1 selected.

Metric Type

☑ Class
☑ File
☑ Function
☑ Module

3. Select the path and report format to export the report and click the [Finish] button.


Export

Export Report

Choose export destination and extension.

☑ Use default location

Location: C:₩Users₩x₩Export

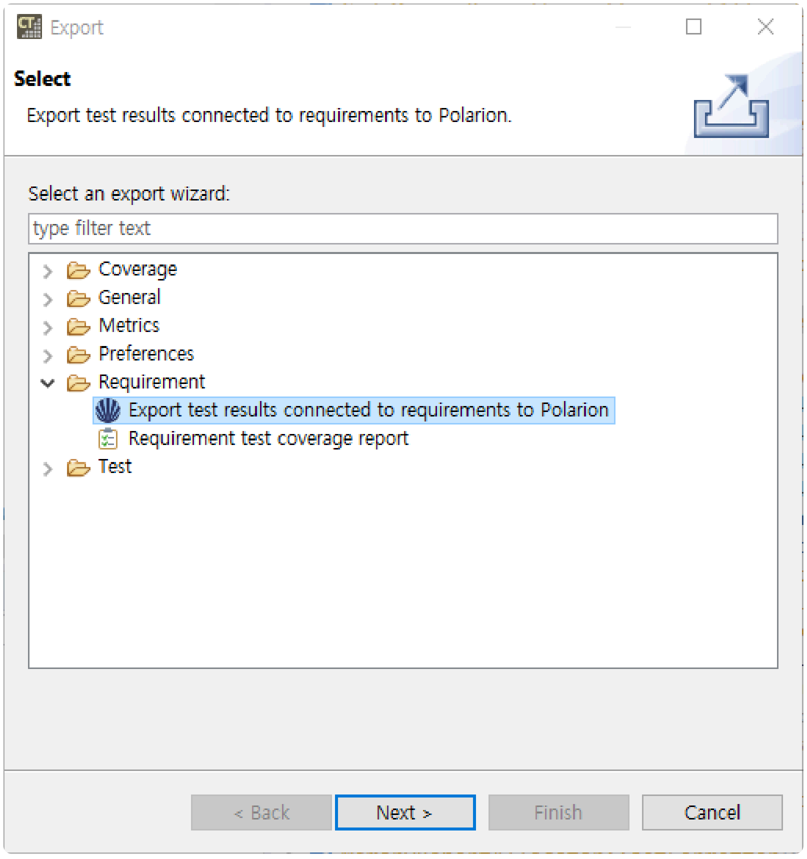
File Extension

☑ HTML (.html)
☐ MS Excel (.xlsx)
☐ MS PowerPoint (.pptx)
☐ MS Word (.docx)
☐ PDF (.pdf)

17.4.2. Requirement – Export test results connected to requirements to Polarion

You can export test results, which is connected to requirement, to Polarion.

1. In the Export Wizard, select [Requirement] -> [Export test results connected to requirements to Polarion] and click [Next].



Export

Select

Export test results connected to requirements to Polarion.

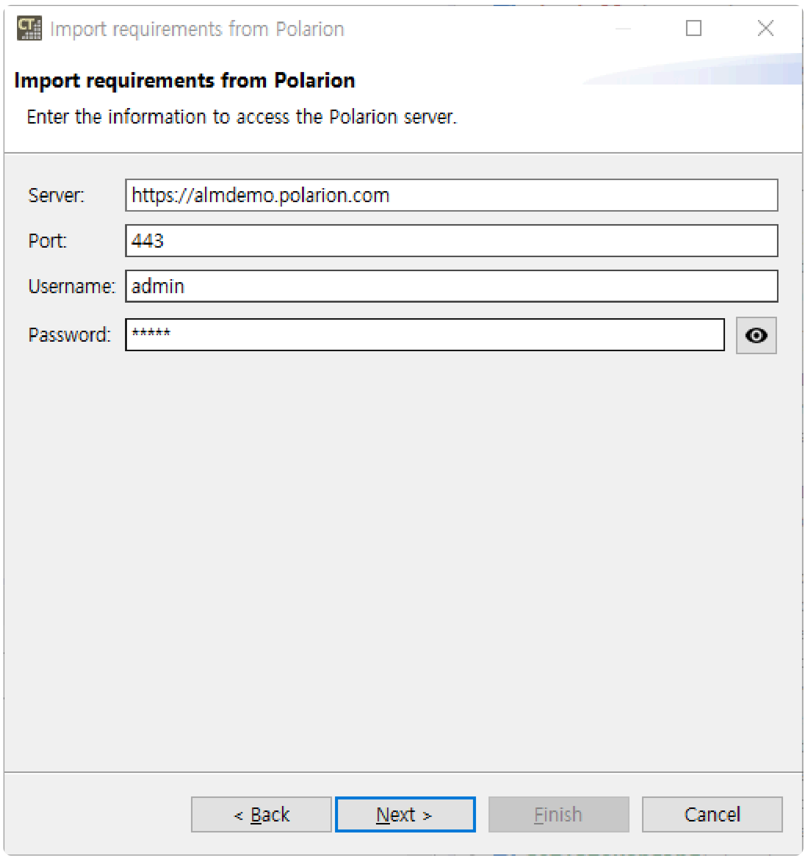
Select an export wizard:

type filter text

- Coverage
- General
- Metrics
- Preferences
- Requirement
  - Export test results connected to requirements to Polarion
  - Requirement test coverage report
- Test

< Back | Next > | Finish | Cancel

2. Enter the information to connect with Polarion server and click [Next]. You can see the entered password to click button.


Import requirements from Polarion

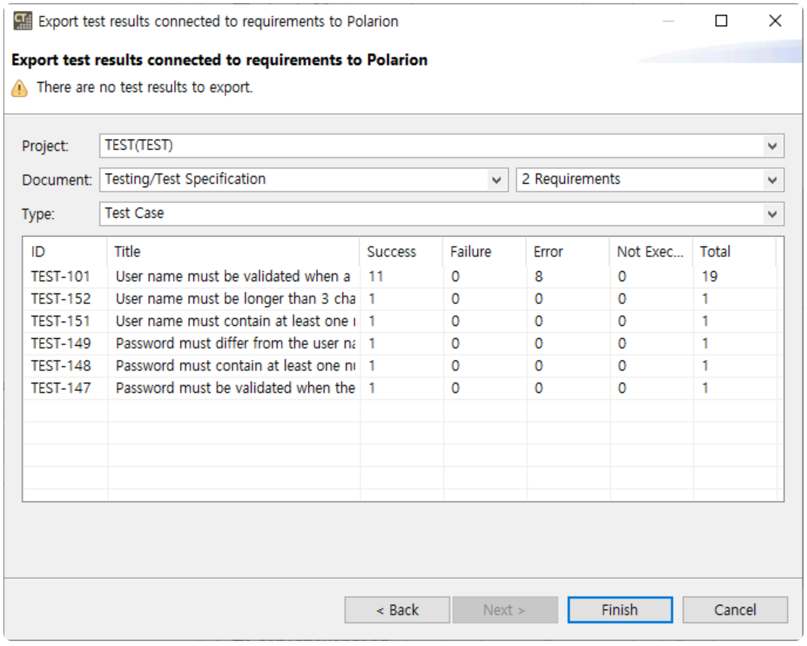
Import requirements from Polarion

Enter the information to access the Polarion server.

Server:	https://almdemo.polarion.com
Port:	443
Username:	admin
Password:	*****

- The information of Polarion's demo server is entered in server and port.
- If you use a local server, enter `http://ip_address` in server and port number of local server in port.

3. Enter the information of target to export test result and click [Finish].


Export test results connected to requirements to Polarion

Export test results connected to requirements to Polarion

There are no test results to export.

Project:	TEST(TEST)
Document:	Testing/Test Specification / 2 Requirements
Type:	Test Case

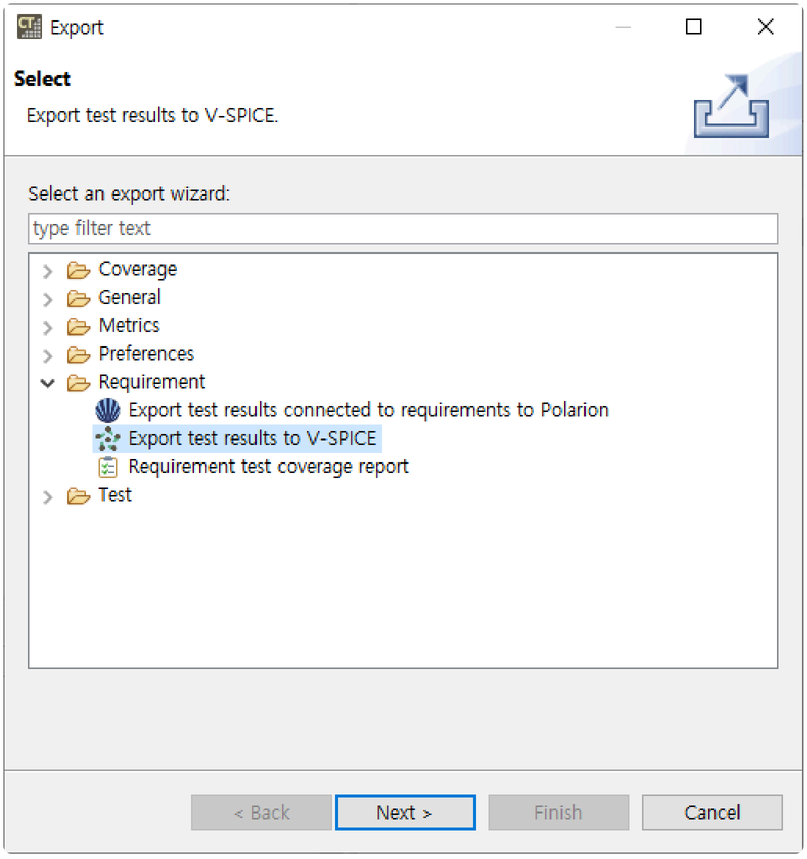
ID	Title	Success	Failure	Error	Not Exec...	Total
TEST-101	User name must be validated when a	11	0	8	0	19
TEST-152	User name must be longer than 3 cha	1	0	0	0	1
TEST-151	User name must contain at least one i	1	0	0	0	1
TEST-149	Password must differ from the user na	1	0	0	0	1
TEST-148	Password must contain at least one nı	1	0	0	0	1
TEST-147	Password must be validated when the	1	0	0	0	1

- Project : Select a project to export test results. The project from which the requirements were imported is selected by default.
- Document : Select a document and a content to export the test results. You can export test results without selecting a document.
- Type : Select a type of work item to export the test results.

17.4.3. Requirement − Export test results to V-SPICE

You can export test results to V-SPICE.

1. In the Export Wizard, select [Requirement] -> [Export test result to V-SPICE] and click [Next].



Export

Select

Export test results to V-SPICE.

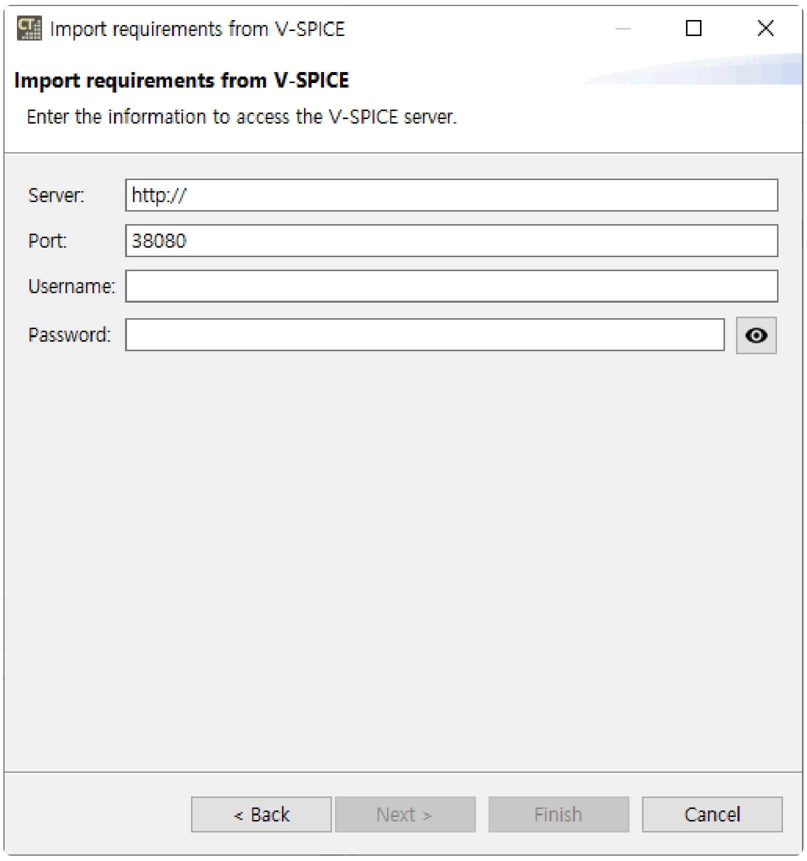
Select an export wizard:

type filter text

- Coverage
- General
- Metrics
- Preferences
- Requirement
  - Export test results connected to requirements to Polarion
  - Export test results to V-SPICE
  - Requirement test coverage report
- Test

< Back | Next > | Finish | Cancel

2. Enter the information to connect with V-SPICEserver and click [Next]. You can see the entered password to click 👁 button.



Import requirements from V-SPICE

Enter the information to access the V-SPICE server.

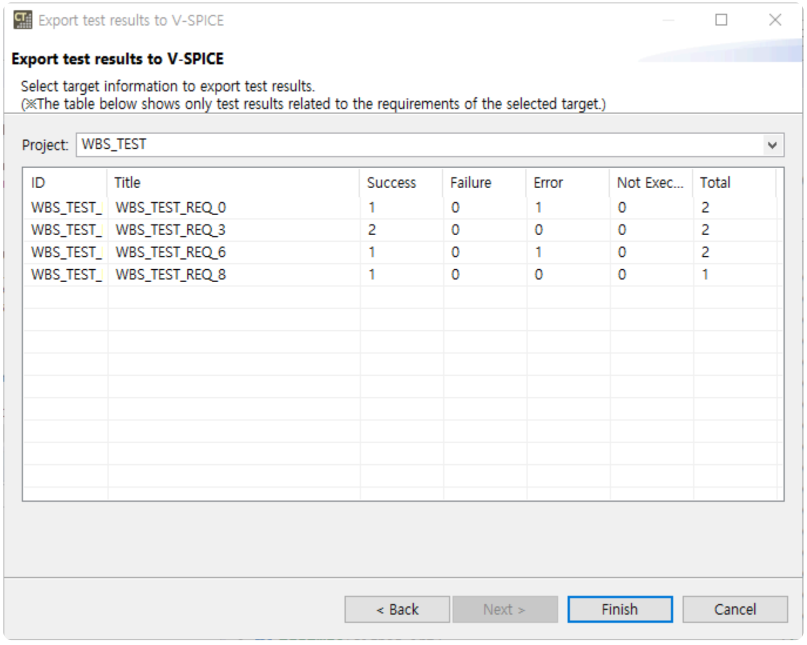
Server: http://

Port: 38080

Username:

Password:

3. Enter the information of target to export test result and click [Finish].



Export test results to V-SPICE

Select target information to export test results.
(※The table below shows only test results related to the requirements of the selected target.)

Project: WBS_TEST

ID	Title	Success	Failure	Error	Not Exec...	Total
WBS_TEST_	WBS_TEST_REQ_0	1	0	1	0	2
WBS_TEST_	WBS_TEST_REQ_3	2	0	0	0	2
WBS_TEST_	WBS_TEST_REQ_6	1	0	1	0	2
WBS_TEST_	WBS_TEST_REQ_8	1	0	0	0	1

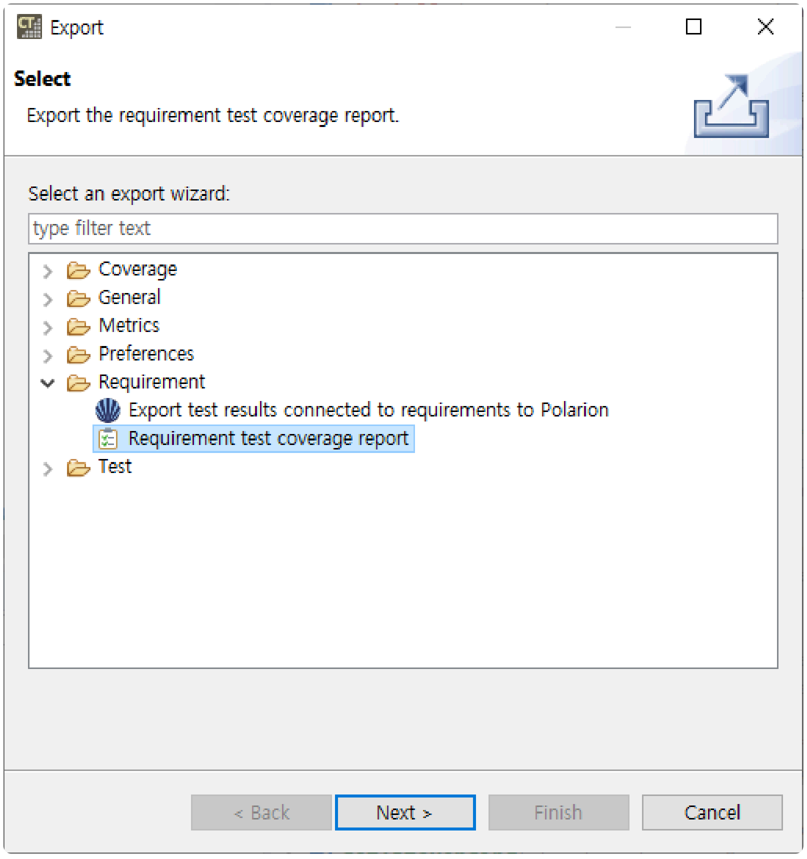
- Project : Select a project to export test results. The project from which the requirements were imported is selected by default.

If there are no tests connected with a requirement in the selected V-SPICE project, the list of requirements is not displayed. All test information is exported even if the requirements list is not displayed.

17.4.4. Requirement − Requirement test coverage report

You can generate requirement test coverage report in excel format.

1. In the Export Wizard, select [Requirement] -> [Requirement test coverage report] and click [Next].



Export

Select

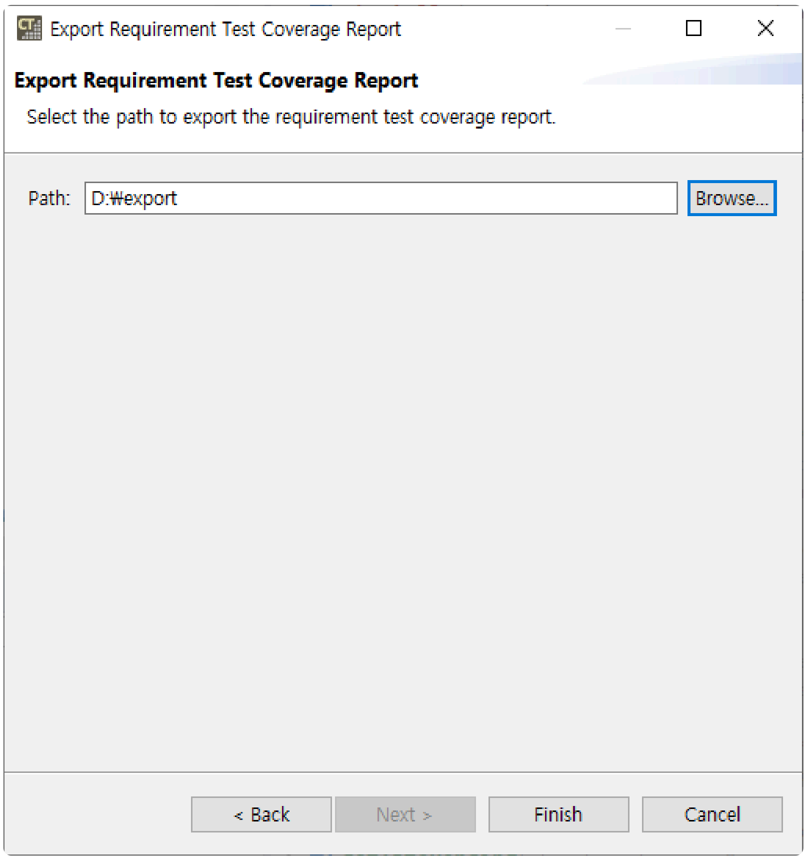
Export the requirement test coverage report.

Select an export wizard:

type filter text

- Coverage
- General
- Metrics
- Preferences
- Requirement
  - Export test results connected to requirements to Polarion
  - Requirement test coverage report
- Test

2. Select the path to export requirement test coverage report and click [Finish].

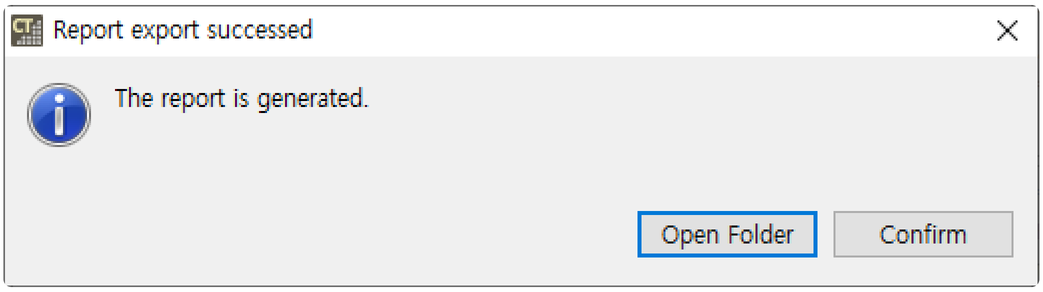


Export Requirement Test Coverage Report

Select the path to export the requirement test coverage report.

Path: D:₩export

3. You can check the exported report by clicking [Open Folder] .

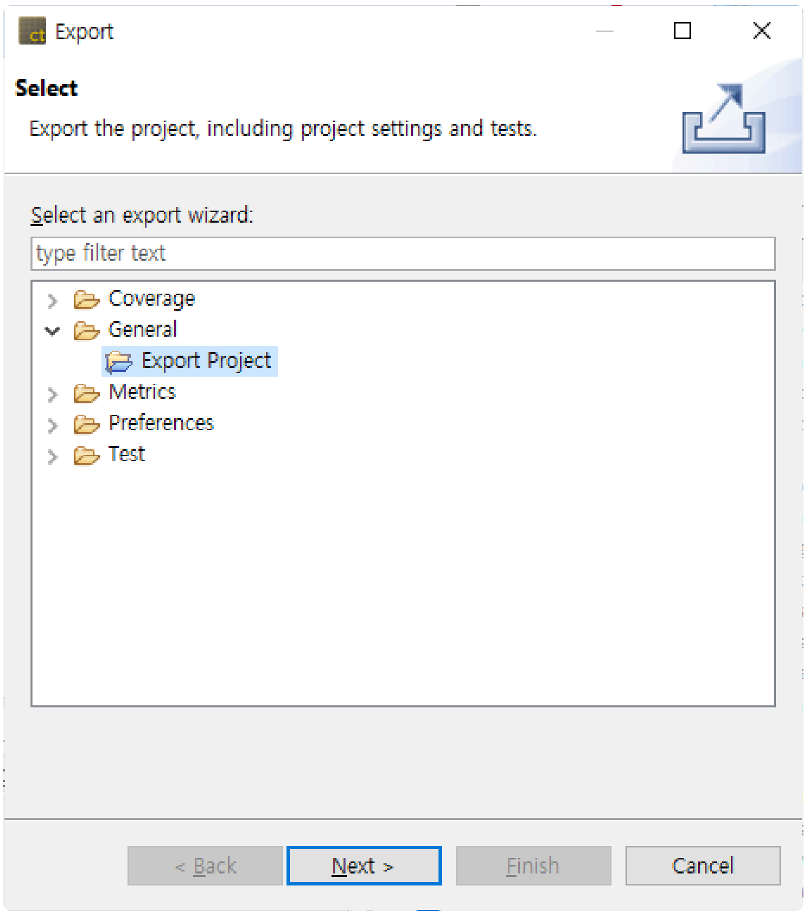


The report is generated.

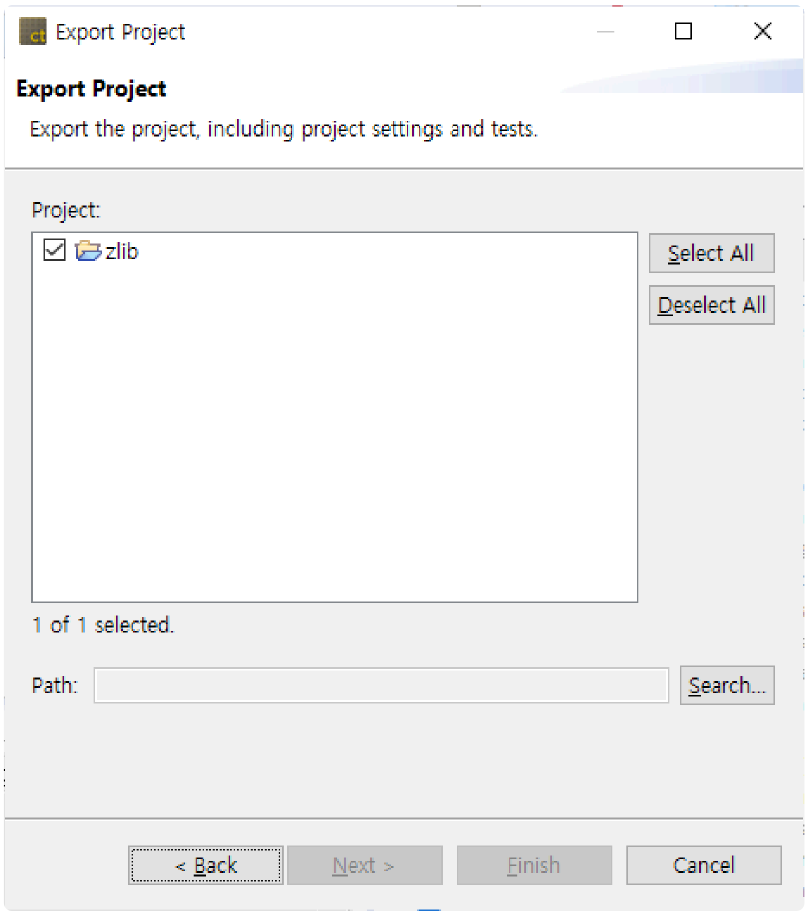
17.4.5. General – Export project

The project can be exported including the project settings and the test. The exported project can be imported with [Import Project].

1. In the Export Wizard, click [General] -> [Export Project].



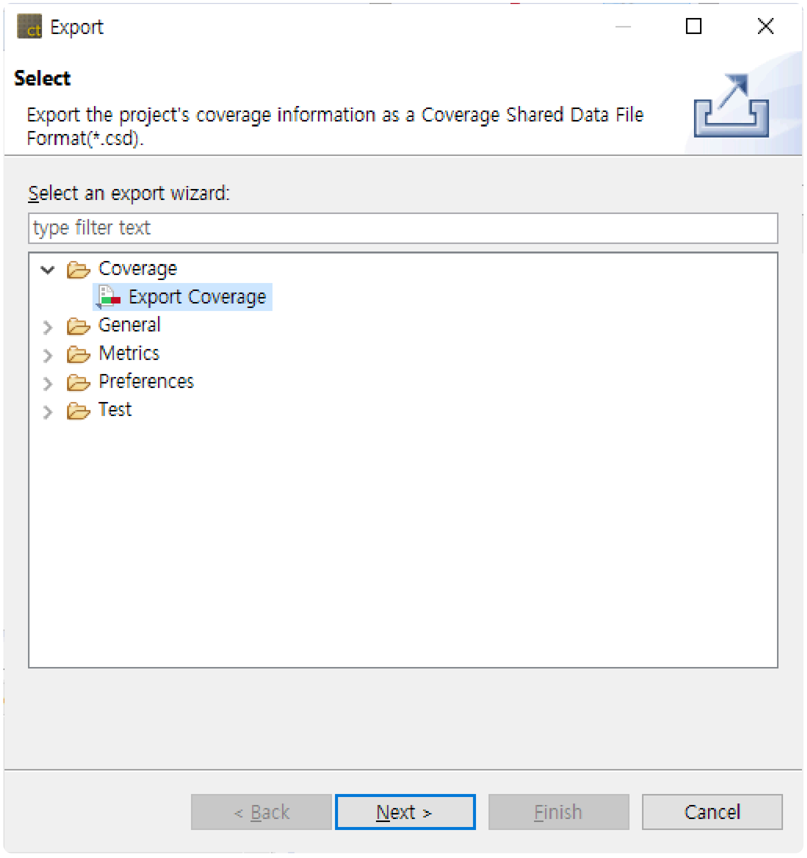
2. Select the project to be exported and the export path and click [Finish].


Export Project
Export Project
Export the project, including project settings and tests.
Project:
zlib
Select All
Deselect All
1 of 1 selected.
Path:
Search...
< Back
Next >
Finish
Cancel

17.4.6. Coverage – Export Coverage

You can export the coverage information measured in the project as a file in Coverage Shared Data (*.csd) format. The exported coverage can be imported with [Import Coverage].

1. In the Export Wizard, select [Coverage] -> [Export Coverage] and click [Next].



Export

Select

Export the project's coverage information as a Coverage Shared Data File Format(*.csd).

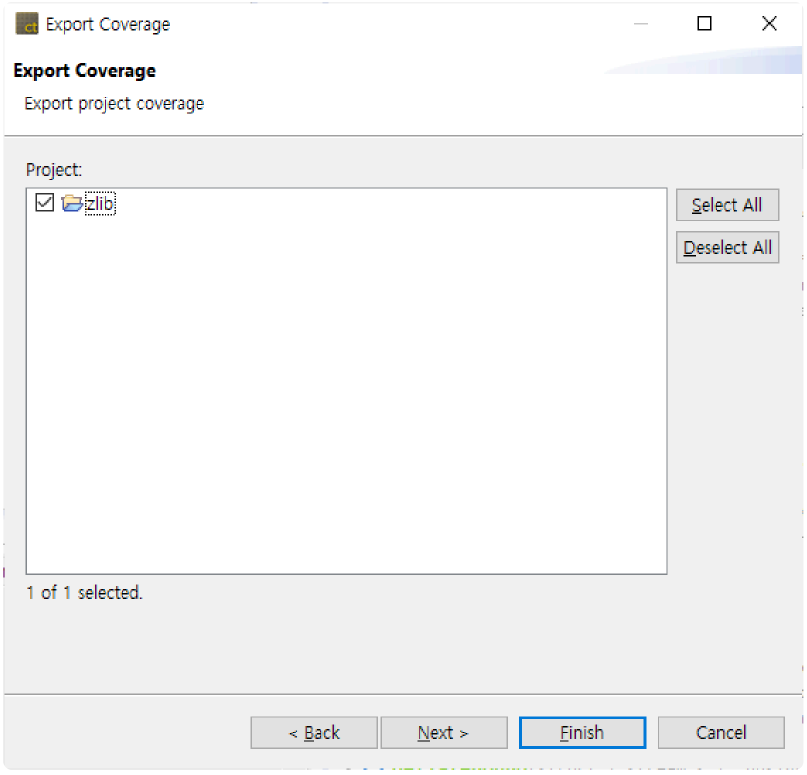
Select an export wizard:

type filter text

- Coverage
  - Export Coverage
- General
- Metrics
- Preferences
- Test

< Back | Next > | Finish | Cancel

2. Select the project that you want to export coverage information and click [Next].



Export Coverage

Export Coverage

Export project coverage

Project:

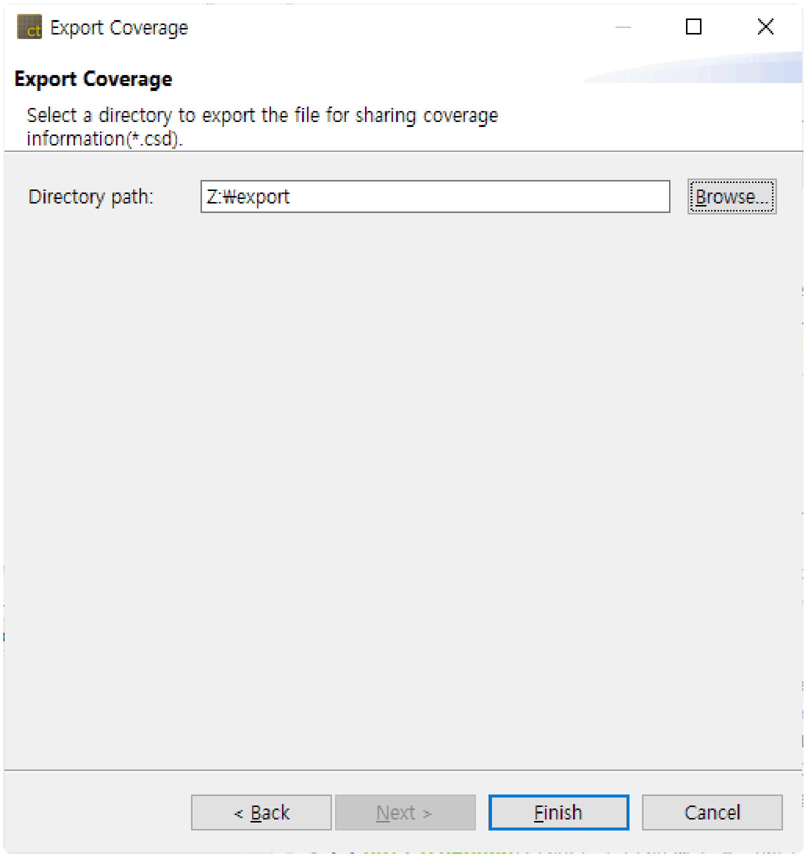
☑ zlib

Select All | Deselect All

1 of 1 selected.

< Back | Next > | Finish | Cancel

3. Enter the directory path to export and click [Finish].



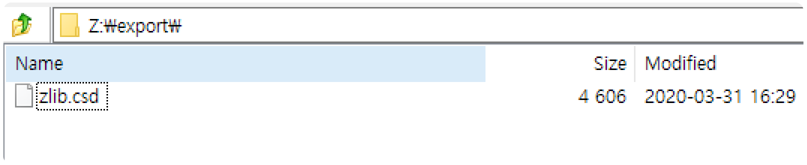
Export Coverage

Export Coverage

Select a directory to export the file for sharing coverage information(*.csd).

Directory path: Z:₩export

4. A file with the same name as the project name is created.



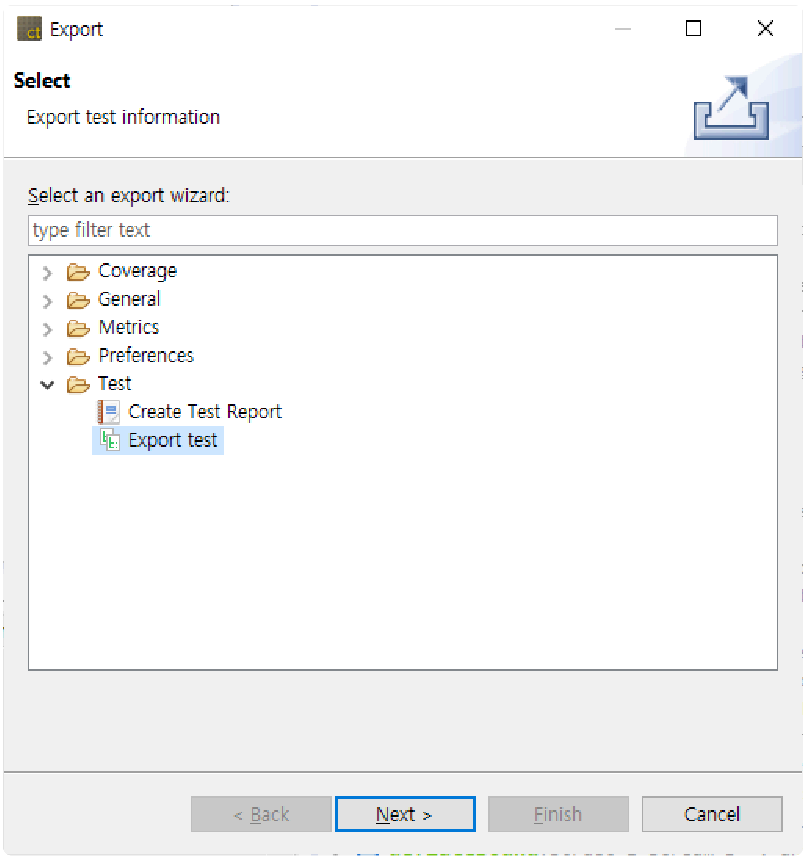
Z:₩export₩

Name	Size	Modified
zlib.csd	4 606	2020-03-31 16:29

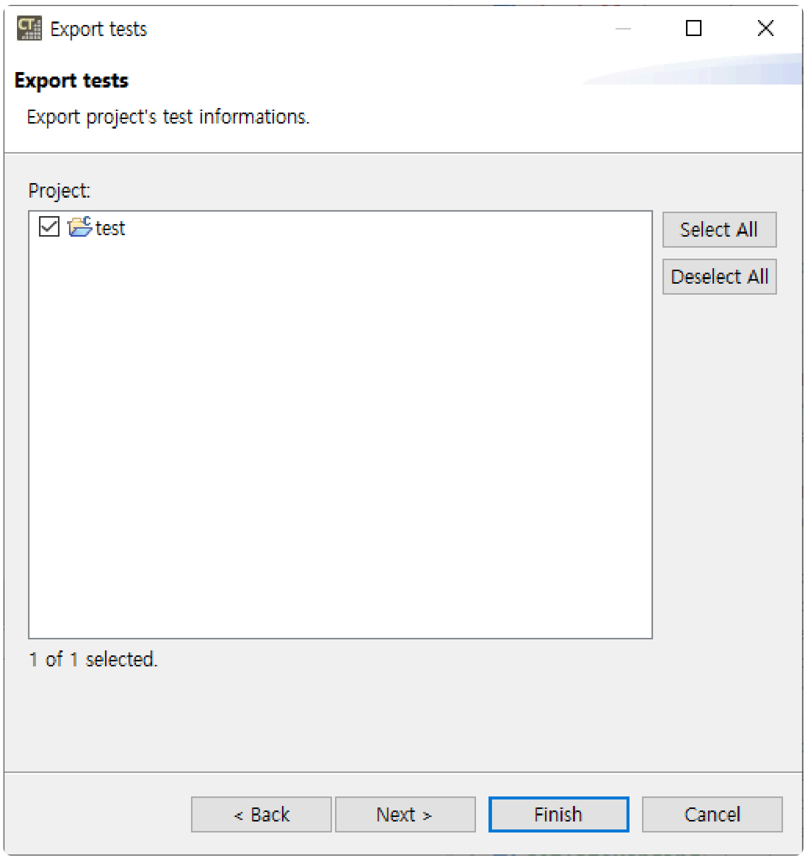
17.4.7. Test – Export test

The test information created in the project can be exported at once. Before a project is not analyzed or if there is no test information (Unit/Integration Test, Stub) created, the export cannot be carried out.

1. Click [Test] -> [Export Test].



2. Select the project that tests are exported and click [Next].


Export tests

Export tests

Export project's test informations.

Project:

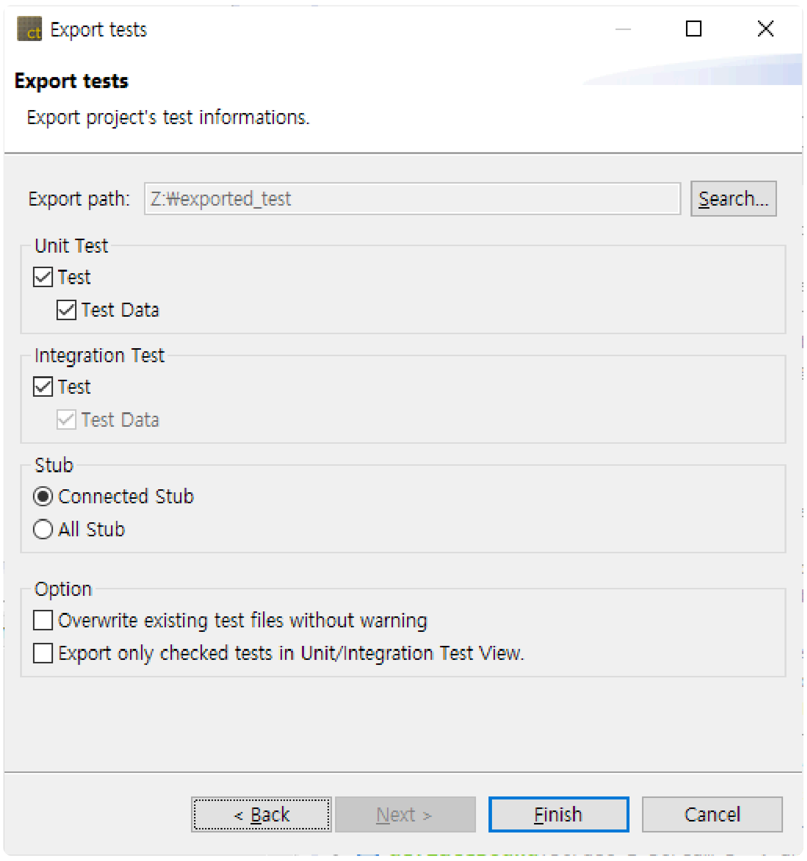
☑ test

Select All | Deselect All

1 of 1 selected.

< Back | Next > | Finish | Cancel

3. Select the export path, the unit test items, the integration test items, the stub items, and the options, and click [Finish].


Export tests

Export tests

Export project's test informations.

Export path: Z:₩exported_test | Search...

Unit Test
- ☑ Test
  - ☑ Test Data

Integration Test
- ☑ Test
  - ☑ Test Data

Stub
- ● Connected Stub
- ○ All Stub

Option
- ☐ Overwrite existing test files without warning
- ☐ Export only checked tests in Unit/Integration Test View.

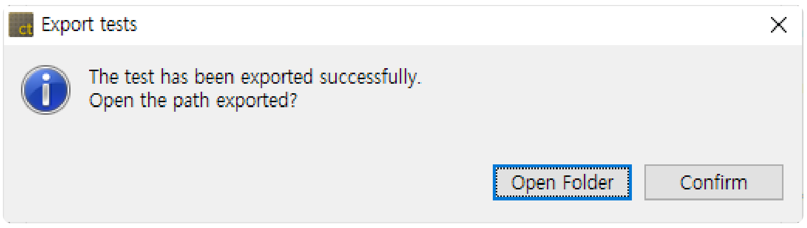
< Back | Next > | Finish | Cancel

a. In [Export path], enter the path to export the test.
b. In [Unit Test] group, check whether to export [Test] and [Test Data] respectively.
c. In [Integration Test] group, check whether to export [Test].
   - When exporting the integration test, it is exported with the test data in a set.

d. [Stub] group, select the stub to be exported among [Connected stubs] and [All stubs].
   - **Connected stubs**: The stubs connected with the test to be exported. If the stubs have no link with the test or the test to be exported is not selected, it does not export that stubs.
   - **All Stub**: It exports all the stubs created in the project.

e. In [Option] group, choose whether to overwrite the existing test file when they exist, and whether to export only the tests checked in the Unit/Integration Test view.

4. Click [Open Folder] button in the message “Test has been exported successfully.” to check the test exported in the folder where it is saved, or click [Confirm] to finish the export.


Export tests

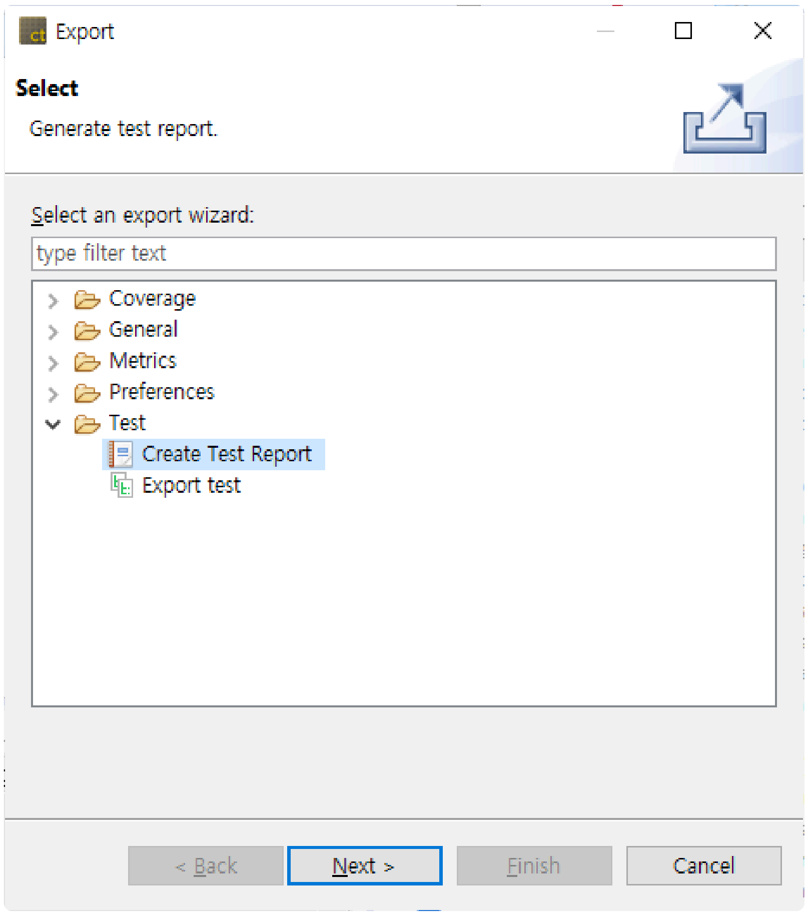
The test has been exported successfully.
Open the path exported?

From Controller Tester 2.6.14 or later version, when exporting tests, [testinfo.export] file is created in the project directory exported.
(**testinfo.export**: the file that records the exported information)

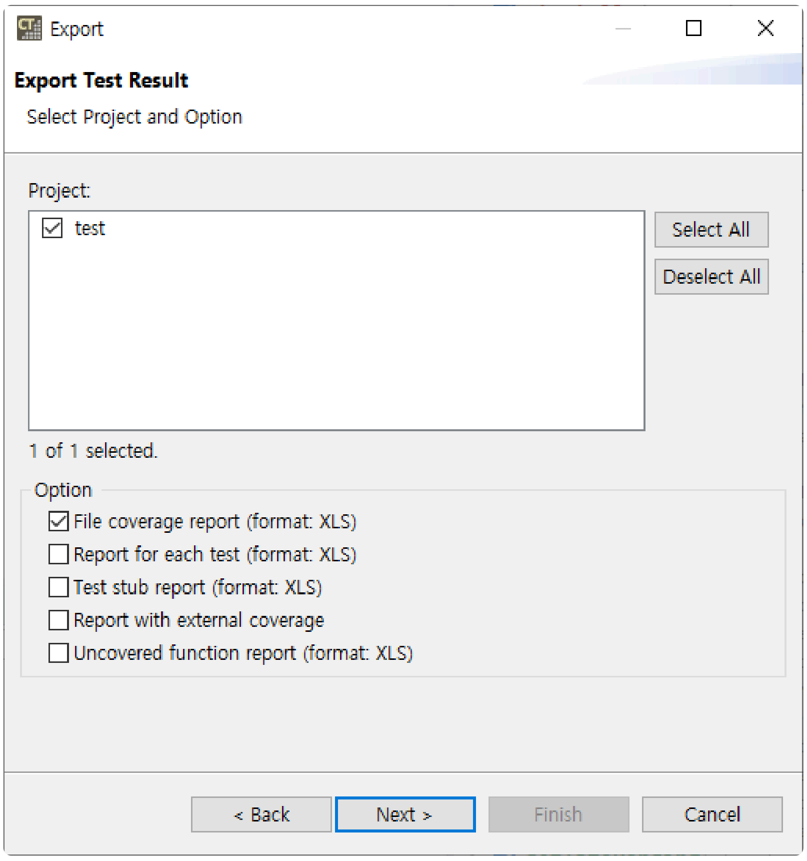
17.4.8. Test − Generate test report

You can create the test result report in various formats by using Export.

1. In the Export Wizard, click [Test] -> [Create Test Report] and click [Next].



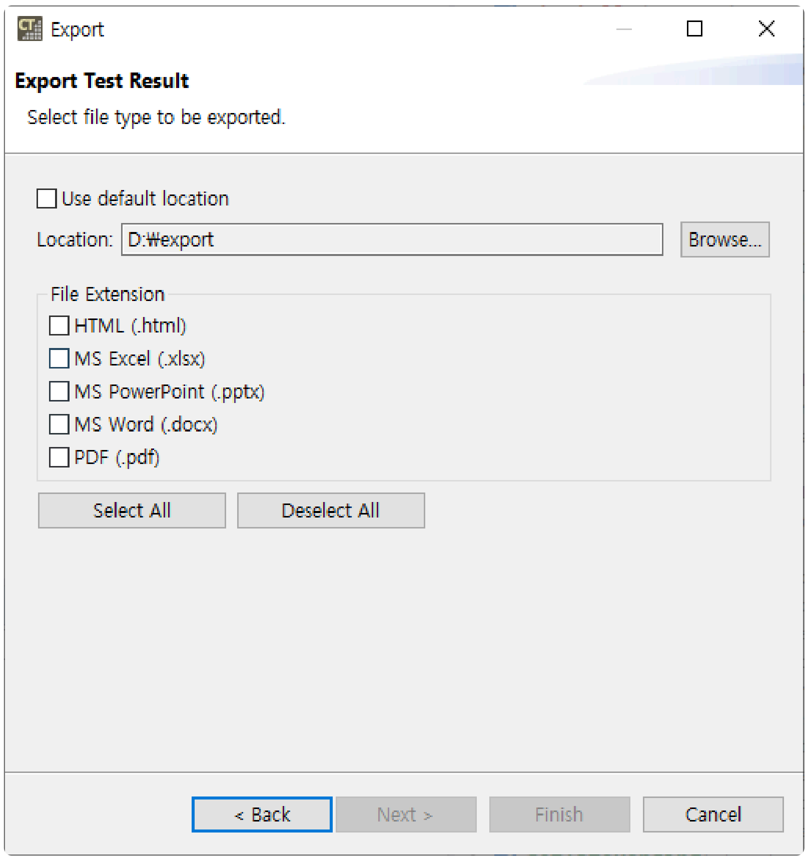
2. Select the project that you want to generate the report and the report type.


Export
Export Test Result
Select Project and Option
Project:
☑ test
Select All
Deselect All
1 of 1 selected.
Option
☑ File coverage report (format: XLS)
☐ Report for each test (format: XLS)
☐ Test stub report (format: XLS)
☐ Report with external coverage
☐ Uncovered function report (format: XLS)
< Back
Next >
Finish
Cancel

a. In [Project], select the project that you want to generate the report
b. In [Option], check each report to be exported.

Report type	Description
File coverage report	Generate reports of covered functions for each files in the selected project.
Report for each test	Generate reports of test result and coverage for each test in the selected project.
Test stub report	Generate a report of stubs created in the selected project.
Report with external coverage	Generates a report containing the external coverage in the selected project.
Uncovered function report	Generate a report of the uncovered function in the selected project.

3. Select the location where the reports are exported and the report file extensions and click [Finish].

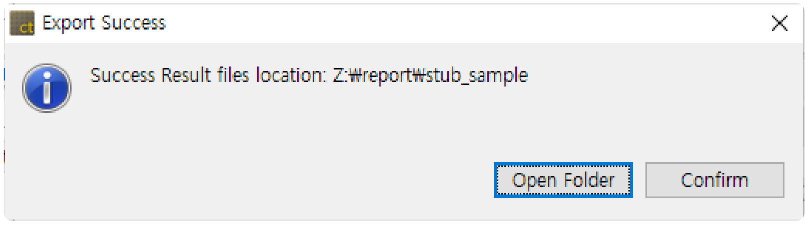

Export
Export Test Result
Select file type to be exported.

☐ Use default location
Location: D:₩export
Browse...

File Extension
☐ HTML (.html)
☐ MS Excel (.xlsx)
☐ MS PowerPoint (.pptx)
☐ MS Word (.docx)
☐ PDF (.pdf)

a. Selecting the checkbox [Use default location] specified “User Account\Export” directory by default.
b. [File Extension] provides the report file format with html, pdf, docx, pptx and xlsx. The report file extension can be selected in duplicate.

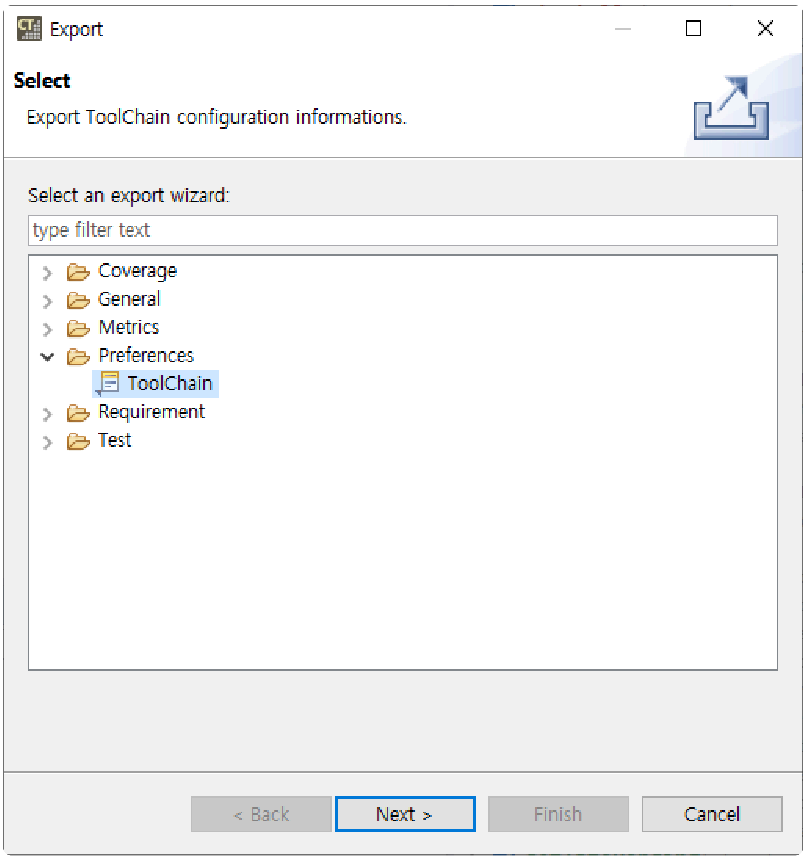
1. Click [Open Folder] button in the message “Report has been created” to check the report in the folder where it is saved.


Export Success
Success Result files location: Z:₩report₩stub_sample

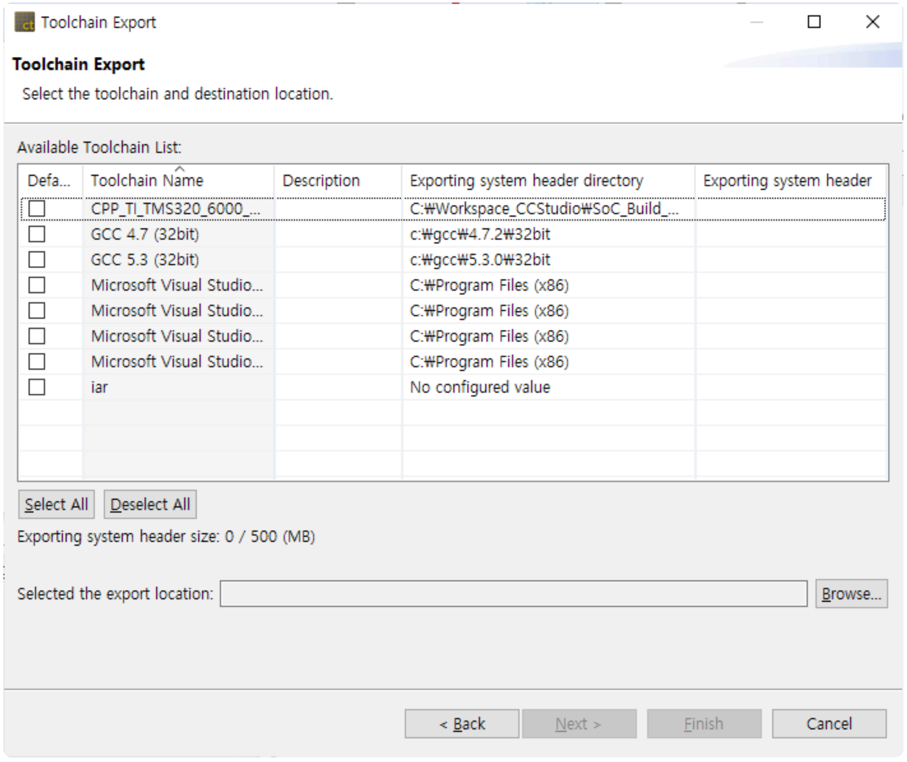
17.4.9. Preferences – ToolChain

You can export the information of the toolchain created.

1. In the Export Wizard, click [Preferences] -> [ToolChain] and click [Next].



2. The list of toolchains registered currently is displayed. Check [Exporting system header] to export including system header. Enter the export path and click [Finish].



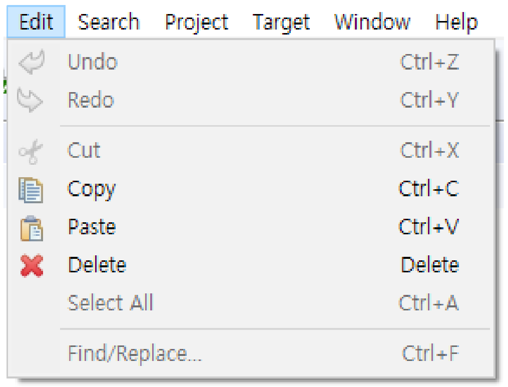
Defa...	Toolchain Name	Description	Exporting system header directory	Exporting system header
☐	CPP_TI_TMS320_6000_...		C:₩Workspace_CCStudio₩SoC_Build_...	
☐	GCC 4.7 (32bit)		c:₩gcc₩4.7.2₩32bit	
☐	GCC 5.3 (32bit)		c:₩gcc₩5.3.0₩32bit	
☐	Microsoft Visual Studio...		C:₩Program Files (x86)	
☐	Microsoft Visual Studio...		C:₩Program Files (x86)	
☐	Microsoft Visual Studio...		C:₩Program Files (x86)	
☐	Microsoft Visual Studio...		C:₩Program Files (x86)	
☐	iar		No configured value	

Exporting system header size: 0 / 500 (MB)

Selected the export location:

18. Edit Menu

In the Edit menu, you can carry out the functions such as Cut, Copy, Paste, Delete and Find/Replace the items selected in the view or editor, or undo or redo the last action performed.

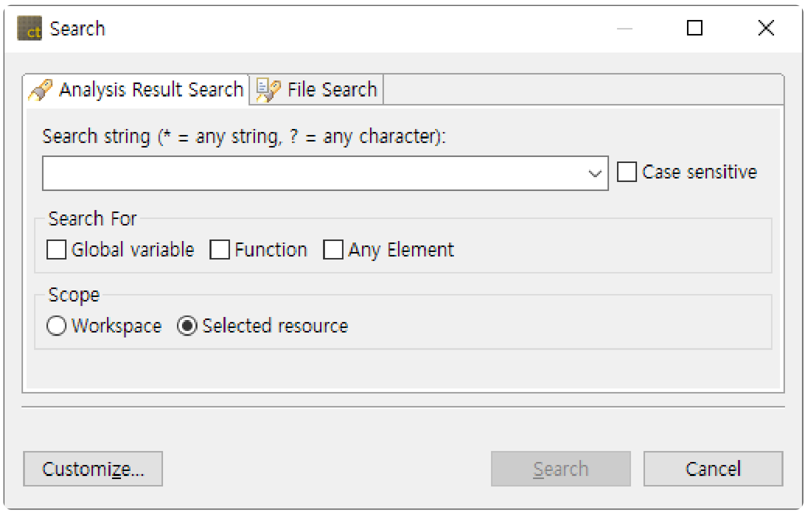


The menu may vary depending on the selected view or editor.

19. Search Menu

Search Analysis Result

You can search the result created after analysis.



Search string (* = any string, ? = any character):

☐ Case sensitive

Search For

☐ Global variable ☐ Function ☐ Any Element

Scope

○ Workspace ● Selected resource

Search word

Enter characters to be searched.
The available wildcards are displayed in the Search dialog box.

- “*” Wildcard string: matches the set of characters containing the empty string.
- “?” Wildcard character: matches all characters.

Search target

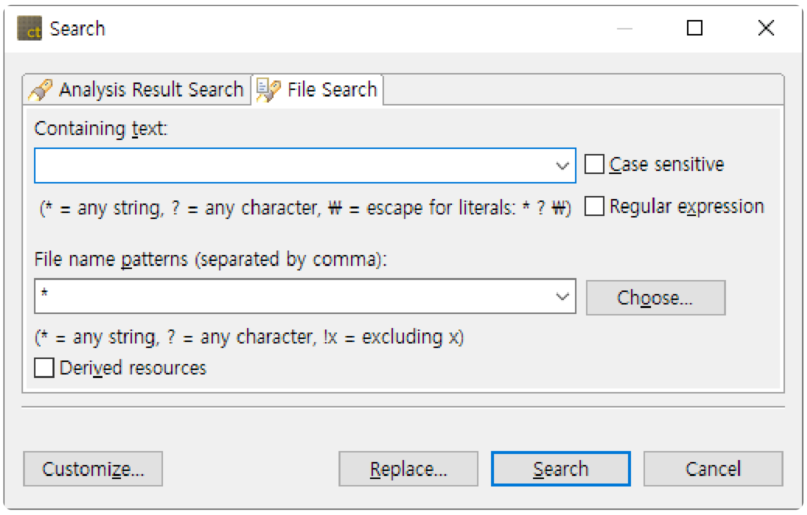
Select the target to be searched. The global variable, function or all targets can be searched.

Search range

Select the searching range. It can be searched within the workspace or the selected item range.

File search

A file can be searched.



Containing text:

Case sensitive

(* = any string, ? = any character, ₩ = escape for literals: * ? ₩)

Regular expression

File name patterns (separated by comma):

*

Choose...

(* = any string, ? = any character, !x = excluding x)

Derived resources

Text included

Enter a character to be searched. To search a file, the field must be empty.
Click [▼] to select the characters searched recently.
The available wildcards are displayed in the Search dialog box.

- “*” Wildcard string: matches the set of characters containing the blank string.
- “?” Wildcard character: matches all characters.
- To search “*”, “?” or “\” character, enter a backslash before the characters in order to indicate that you do not use these characters by “\ *” wildcards. (Ex: “\?” or “\ \”)

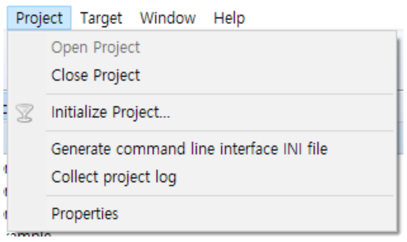
File Name Pattern

Enter the pattern of all file names for the files to be searched by using the specific expression.
The wildcards that can use the file name pattern are displayed in the Search dialog box.

- “*” Wildcard string: matches the set of characters containing the blank string.
- “?” Wildcard character: matches all characters.

20. Project Menu

In the Project menu, you can execute the operations for the project (open, close, initialize).



Open Project

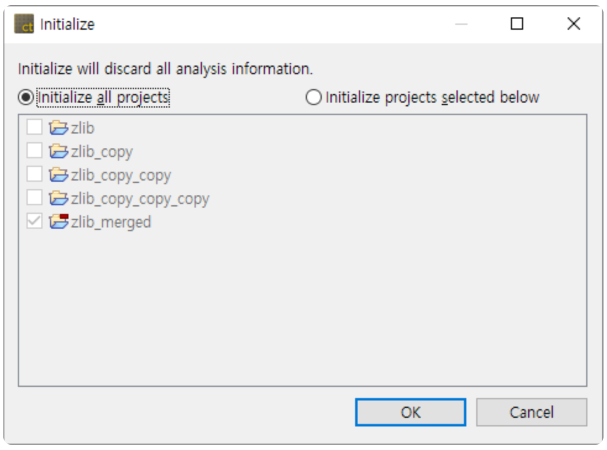
You can open a closed project selected in the Test Navigator view.

Close Project

You can close an open project selected in the Test Navigator view.

Initialize Project

You can initialize all the open projects in the workspace or the selected projects in the project list below. If you initialize the project, all analysis results are cleared.


Initialize

Initialize will discard all analysis information.

[✓ Initialize all projects] Initialize projects selected below

- [ ] zlib
- [ ] zlib_copy
- [ ] zlib_copy_copy
- [ ] zlib_copy_copy_copy
- [x] zlib_merged

Generate Command Line Interface INI File

Based on the project information selected in the Test Navigator, you can create the configuration file needed to execute the Controller Tester in CLI environment.

Collect Project Log

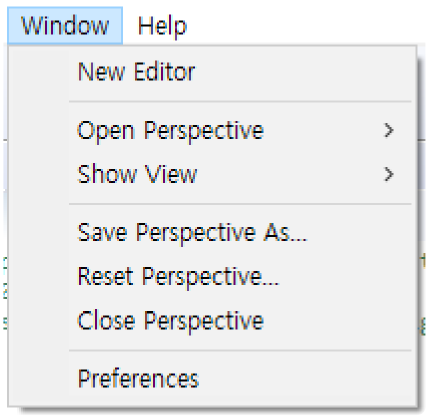
You can export the log file of the project selected in the Test Navigator view into the specified path.

Properties

You can see the information or change the settings for the project selected in the Test Navigator view.

21. Window Menu

In the Window menu, you can open the same new editor as an active editor, open a perspective or a new view, and see the preferences.



New Editor

It copies the selected source code editor or test editor.

Open Perspective

You can select and open the perspective registered in Controller Tester.

Show View

You can select and open the view registered in Controller Tester.

Save Perspective As

Saves the perspective reconfigured by the user as the other name.

Reset Perspective

Resets the perspective into the initial state.

Close Perspective

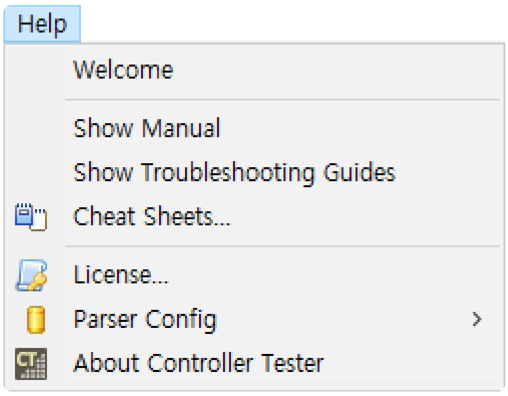
Closes the perspective currently open.

Preferences

You can check or change the settings currently applied to the tool.
For more information, please refer to Preferences

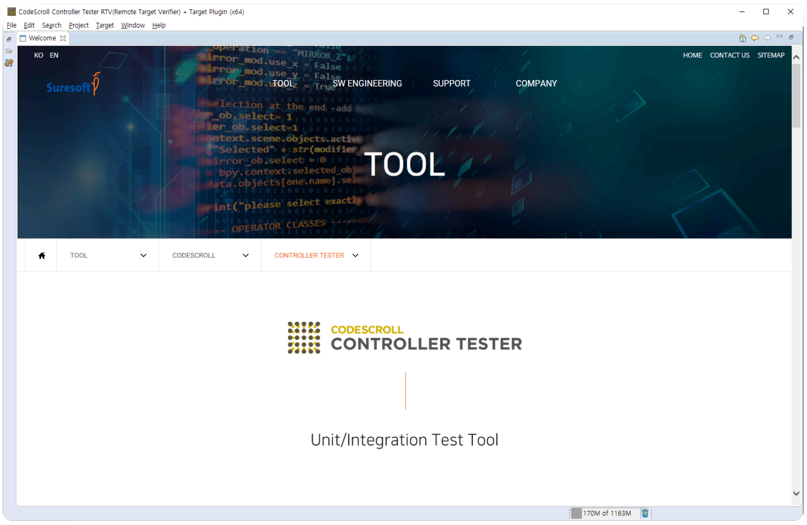
22. Help Menu

In the Help menu, you can find manuals, troubleshooting guides, tutorials, license settings, changing and reverting analysis settings, and information about the installed product.



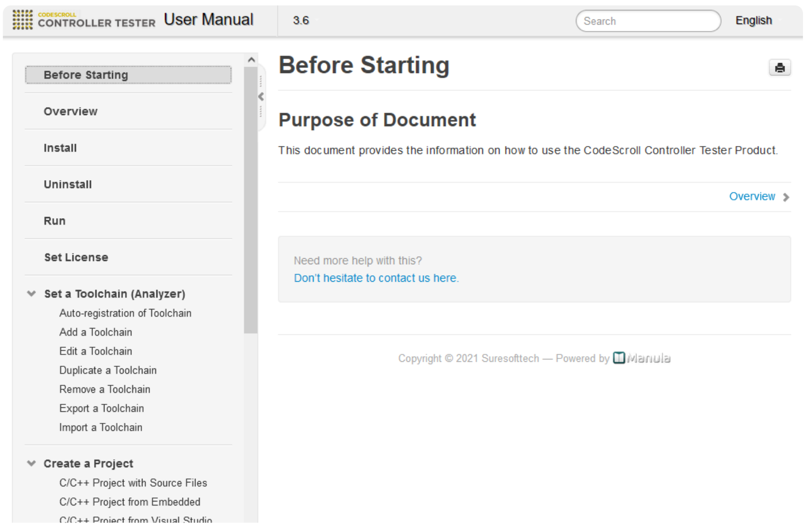
Welcome

You can see the welcome page that appears when the tool is executed for the first time.


CodeScroll Controller Tester RTV(Remote Target Verifier) + Target Plugin (x64)
File Edit Search Project Target Window Help
Welcome
KO EN
HOME CONTACT US SITEMAP
Suresoft
TOOL SW ENGINEERING SUPPORT COMPANY
TOOL
TOOL CODESCROLL CONTROLLER TESTER
CODESCROLL
CONTROLLER TESTER
Unit/Integration Test Tool
170M of 1163M

Show Manual

You can see the Controller Tester User Manual.



Before Starting

Purpose of Document

This document provides the information on how to use the CodeScroll Controller Tester Product.

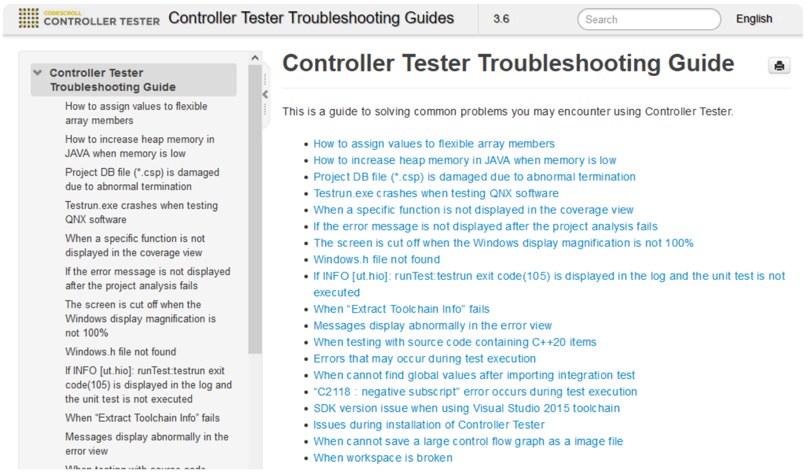
Overview

Need more help with this?
Don't hesitate to contact us here.

Copyright © 2021 Suresofttech — Powered by Manula

Show Troubleshooting Guides

You can see the Controller Tester Troubleshooting Guides.


CODESCROLL CONTROLLER TESTER
Controller Tester Troubleshooting Guides
3.6
Search
English

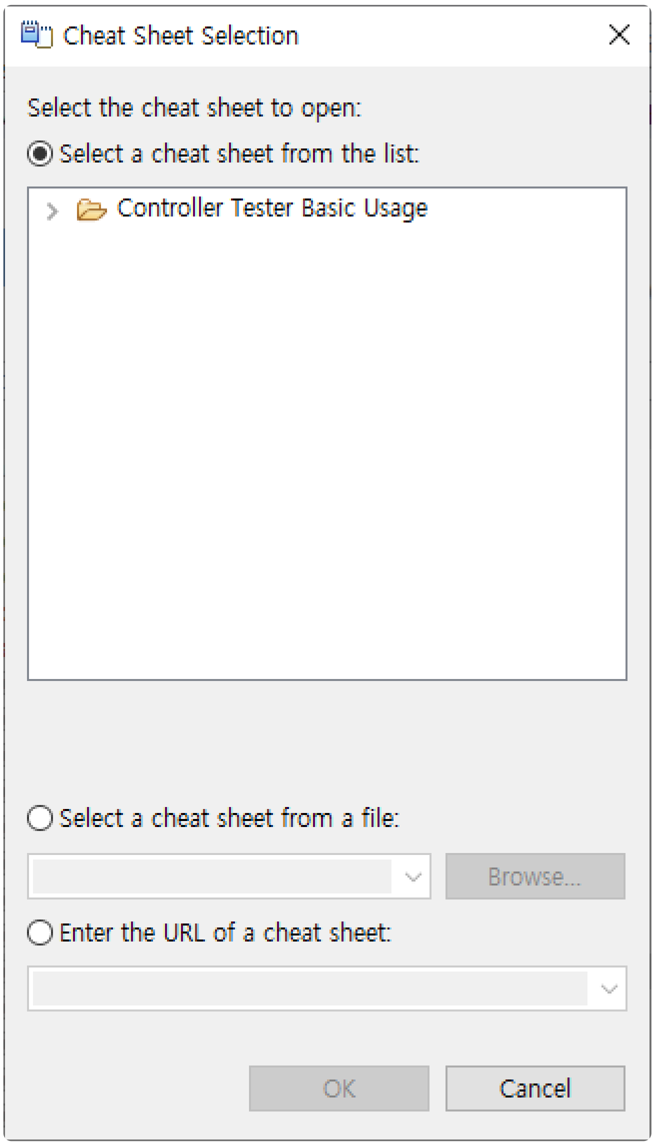
Controller Tester Troubleshooting Guide

This is a guide to solving common problems you may encounter using Controller Tester.

- How to assign values to flexible array members
- How to increase heap memory in JAVA when memory is low
- Project DB file (*.csp) is damaged due to abnormal termination
- Testrun.exe crashes when testing QNX software
- When a specific function is not displayed in the coverage view
- If the error message is not displayed after the project analysis fails
- The screen is cut off when the Windows display magnification is not 100%
- Windows.h file not found
- If INFO [ut.hio]: runTest:testrun exit code(105) is displayed in the log and the unit test is not executed
- When "Extract Toolchain Info" fails
- Messages display abnormally in the error view
- When testing with source code containing C++20 items
- Errors that may occur during test execution
- When cannot find global values after importing integration test
- "C2118 : negative subscript" error occurs during test execution
- SDK version issue when using Visual Studio 2015 toolchain
- Issues during installation of Controller Tester
- When cannot save a large control flow graph as a image file
- When workspace is broken

Cheat Sheets

You can run cheat sheets on how to use Controller Tester.

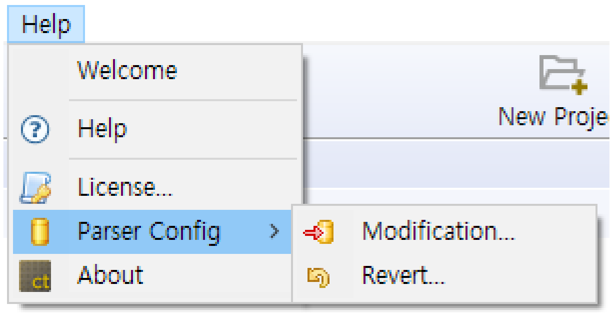

Cheat Sheet Selection
Select the cheat sheet to open:
Select a cheat sheet from the list:
Controller Tester Basic Usage
Select a cheat sheet from a file:
Browse...
Enter the URL of a cheat sheet:
OK
Cancel

Modify Parser Config

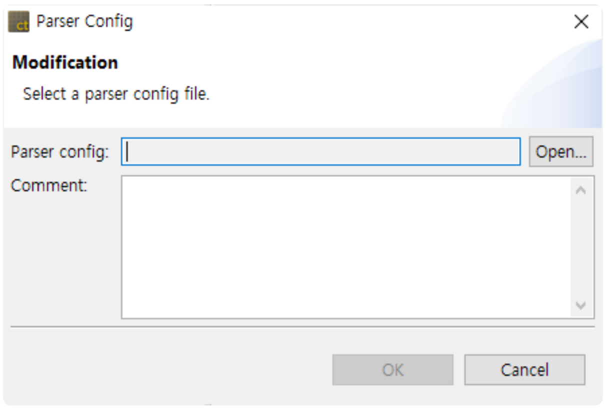
You can modify the parser config by entering the compressed file provided by SureSoft Technologies, Inc.

How to use

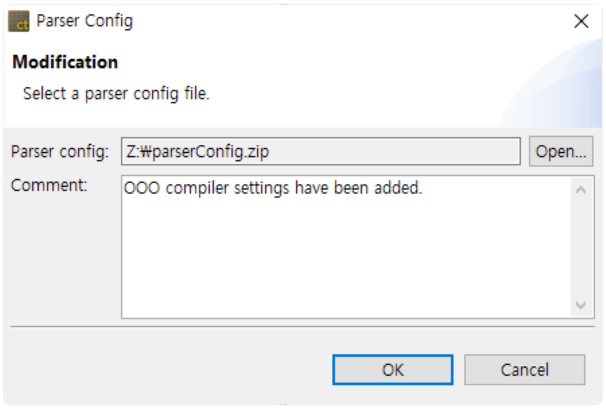
1. Select [Help] > [Parser Config] > [Modification…] menu.



2. Click [Open…] to select the compressed analysis setting file and enter the changes of analysis settings to [Comment] text as an option.



3. Click [OK].

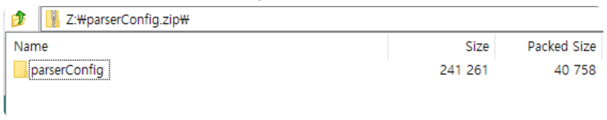


Parser config: Z:₩parserConfig.zip

Comment: OOO compiler settings have been added.

Format of the parser config file

- The directory [parserConfig] must exist immediately when opening the compressed file as shown in the figure below.
- The extension is “zip”.



Z:₩parserConfig.zip₩

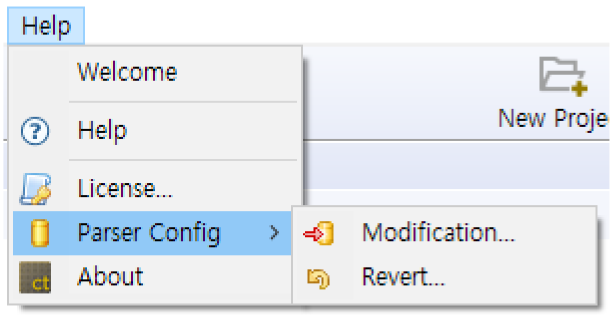
Name	Size	Packed Size
parserConfig	241 261	40 758

Revert the Parser Config

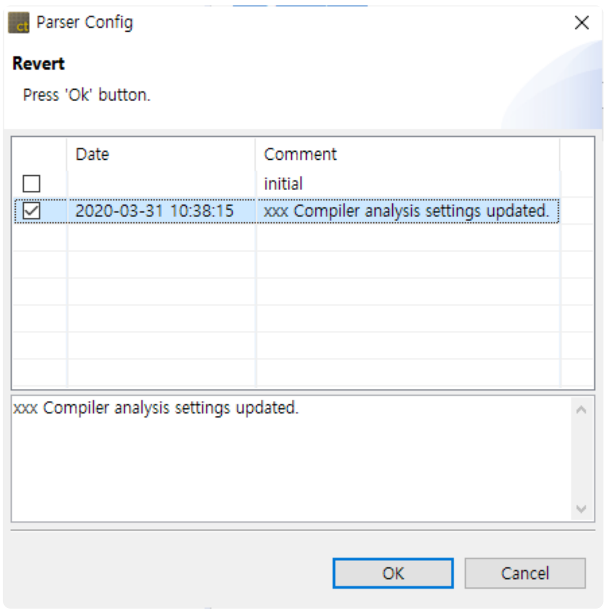
You can revert the parser config by selecting one among the previous parser configs.

How to use

1. Select [Help] > [Parser Config] > [Revert] menu.



2. Check the parser config to be reverted in the list of the existing parser configs and select [OK].


Parser Config

Revert

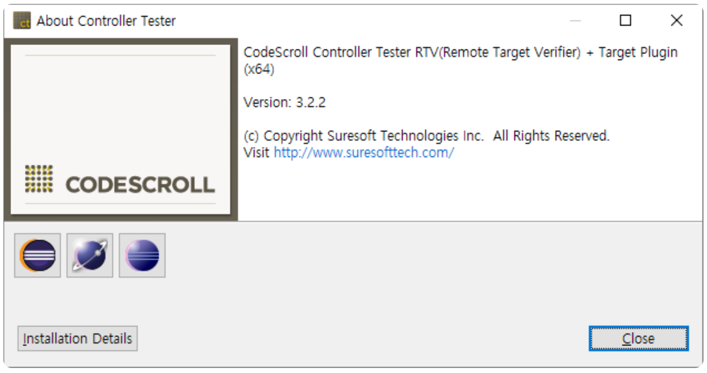
Press 'Ok' button.

	Date	Comment
☐		initial
☑	2020-03-31 10:38:15	xxx Compiler analysis settings updated.

xxx Compiler analysis settings updated.

Information

You can see the information and version of the product installed.


About Controller Tester

CodeScroll Controller Tester RTV(Remote Target Verifier) + Target Plugin (x64)

Version: 3.2.2

(c) Copyright Suresoft Technologies Inc. All Rights Reserved.
Visit http://www.suresofttech.com/

Click [Installation Details] to see the features installed and plug-in.

23. Troubleshooting

If it conflicts with the security program at installation

Some security programs may stop running the tool installation package. If an error occurred, temporarily stop the security program operation and proceed with the installation again.

If the product does not operate after specifying the workspace when executing it

When executing the product for the first time, the global data of CodeScroll is stored in \APPDATA\ path.
If access to this path is restricted, the product may not be operated.
To solve this problem, please use the feature to set the global data path.
Setting method: Enter the global data path to be set instead of –g default (default value) in CodeScroll.ini file. (the same if a case of -g or –global and csc.ini file)
If the -g option is not given, the dialog for setting any global data path when executing the product for the first time is displayed. If canceled here, it is set to the default path.

If it is installed and run in Windows Vista/7

It can only be run with the User Access Control (UAC) features disabled.
If you want to use it without disabling UAC, change the directory during installation so that it is not installed under the Program Files.
In addition, the Windows accounts for installation and execution must be the same and must be installed with an administrator account.

If an analysis is failed or Compile (pre-processing) error occurred

It is the state of source code that the test cannot be run. Please check the compile/link flag and header file/library settings.
You can check the settings in [Preferences] -> [Toolchain settings].
If all settings are correct (if it is possible to build without any problems in the actual development environment (IDE etc.)), please contact SureSoft Technologies, Inc.

If it fails to run all test cases

This is because the test engine operation is blocked by the firewall. The test engine loaded in memory when executing the test must be added as an exception to the firewall setting to run normally.

If it fails to register toolchain automatically

If it fails to register toolchain automatically due to some problem with toolchain information installed on

PC, the toolchain auto-registration feature can be turned off. (`--disableAutoToolchain option`)

- Add `--disableAutoToolchain` option to CodeScroll.ini file

Etc.

For other issues, please refer to the Troubleshooting Guide.

Technical support

If you find any problems, please contact the Technical support contact below.

- help@suresofttech.com
- +82-2-6472-2800

24. CONTROLLER TESTER Target Plug-in

Introduction

Controller Tester Target Plug-in complements the functionality of the default Controller Tester. Controller Tester allows you to automate testing in your own host environment. In other words, you run the test in a software development environment (normal PC). Controller Tester Target Plug-in allows you to run tests of Controller Tester in a real embedded target environment. This makes it easy to check whether the test results are the same in the host and target environment and to run tests that cannot be executed in the host environment because of factors dependent on the target environment.

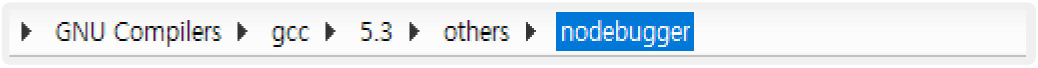
24.1. Target Environment Settings

To run tests in a target environment using Controller Tester Target Plug-in, you need to enter information about the target environment.
Controller Tester Target Plug-in builds a test harness using information about the target environment entered by the user and automatically gets the results of running in the target environment.

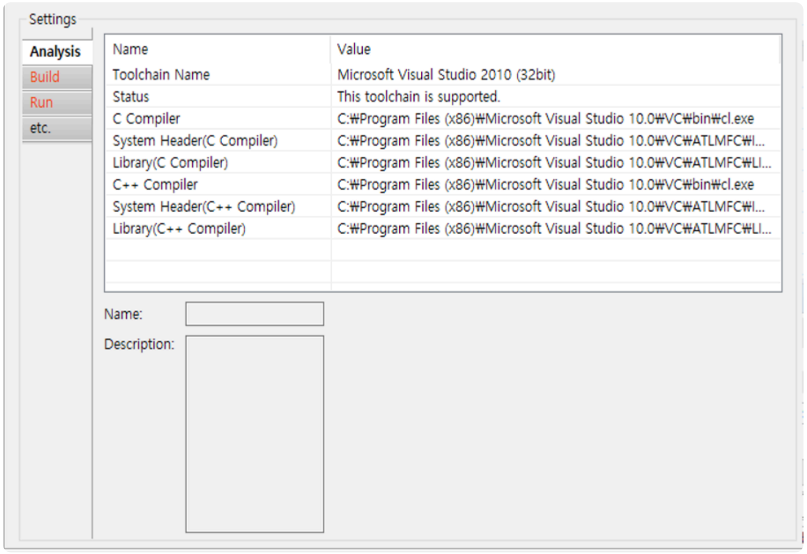
The target environment can be set in the project properties page or in the new target test project wizard.

Target environment settings

Target environment settings are divided into basic information and detailed settings.



After entering the basic information, detailed settings that require input are displayed.



Name	Value
Toolchain Name	Microsoft Visual Studio 2010 (32bit)
Status	This toolchain is supported.
C Compiler	C:₩Program Files (x86)₩Microsoft Visual Studio 10.0₩VC₩bin₩cl.exe
System Header(C Compiler)	C:₩Program Files (x86)₩Microsoft Visual Studio 10.0₩VC₩ATLMFC₩I...
Library(C Compiler)	C:₩Program Files (x86)₩Microsoft Visual Studio 10.0₩VC₩ATLMFC₩LI...
C++ Compiler	C:₩Program Files (x86)₩Microsoft Visual Studio 10.0₩VC₩bin₩cl.exe
System Header(C++ Compiler)	C:₩Program Files (x86)₩Microsoft Visual Studio 10.0₩VC₩ATLMFC₩I...
Library(C++ Compiler)	C:₩Program Files (x86)₩Microsoft Visual Studio 10.0₩VC₩ATLMFC₩LI...

Name:

Description:

Target environment detailed settings

Target environment detailed settings are divided into the analysis, build, run, and etc.

Category	Description
Analysis	The toolchain information is displayed, and in the case of a target test project, the target compiler related settings required for analysis are displayed.
Build	The settings for building the test software are displayed.
Run	Settings for running tests and getting results in the target environment are displayed.
etc.	Other settings are displayed. (Program entry point, etc.)

Required settings for each category are indicated in red. Depending on whether the required settings for each category are entered or not, the behavior when clicking the [Run] button is different as shown below.

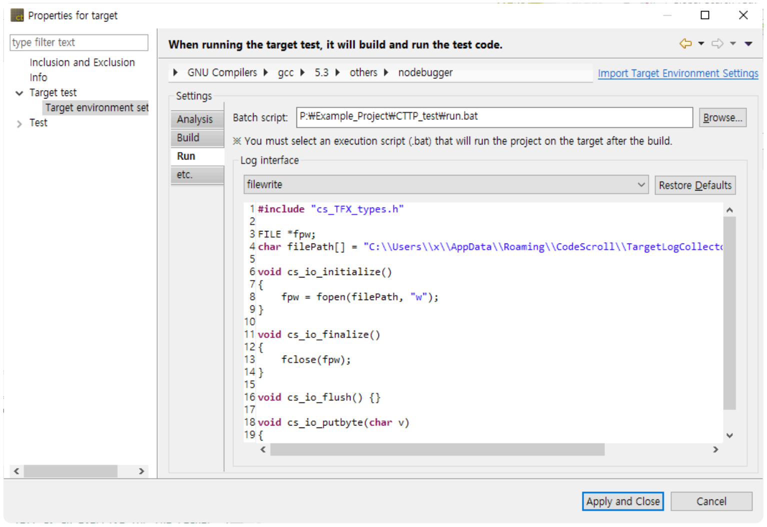
Required settings completed category	Description
None	Test run impossible
Analysis	If you click [Run], it overwrites the original source code with the test code. To perform the test, the user must manually build and run the test.
Analysis, Build	If you click [Run], it builds the test code. To perform the test, the user has to manually run the test on the target.
Analysis, Build, Run	Automatically run tests in the target environment.

Import target test results

Controller Tester Target Plug-in saves and imports the result of running the test in the target environment in log format.
If you do not use the debugger, you need the settings for saving the target test results(Log interface) and the settings for importing(Target Log Collector – Preferences).

Log interface

Log interface is a setting for saving the test results in the target environment. Log interface is written in the form of a source code that is actually run in the target environment.



When running the target test, it will build and run the test code.

Batch script: P:₩Example_Project₩CTTP_test₩run.bat

※ You must select an execution script (.bat) that will run the project on the target after the build.

Log interface: filewrite

```
#include "cs_TFX_types.h"

FILE *fpw;
char filePath[] = "C:\\Users\\x\\AppData\\Roaming\\CodeScroll\\TargetLogCollect

void cs_io_initialize()
{
    fpw = fopen(filePath, "w");
}

void cs_io_finalize()
{
    fclose(fpw);
}

void cs_io_flush() {}

void cs_io_putbyte(char v)
{
```

Log interface structure

Function	Description
`viod cs_io_initialize()`	Initial function for transfer
`void_cs_io_finalize()`	Transfer end function
`void cs_io_flush()`	Remaining data transfer function
`void cs_io_putbyte(codescroll_byte v)`	1-byte data transfer function

Import target log automatically

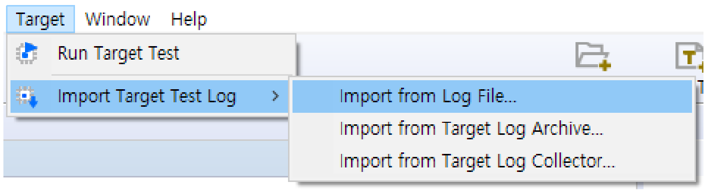
The target log, which is the result of the test execution, can be automatically imported through the target log collector. For the target log collector settings, please refer to [Target Log Collector] in Target Log Collector and Target Test Preferences.

Import target log manually

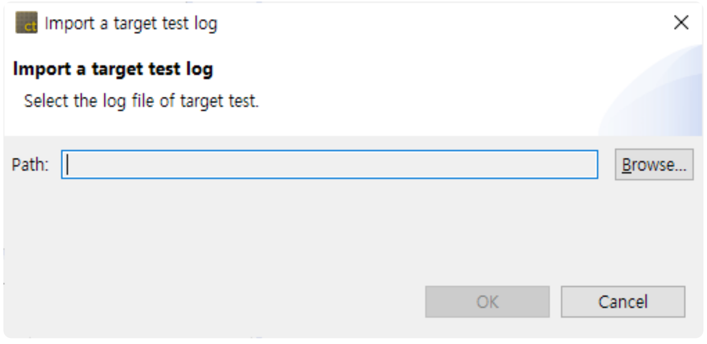
If the target log cannot be imported automatically, you can import the target log manually.

Import from a log file

1. After selecting an analyzed project, click [Target] -> [import Target Test Log] -> [Import from Log File…] in the global menu.



2. Select a target test log file and click the [OK] button.


Import a target test log

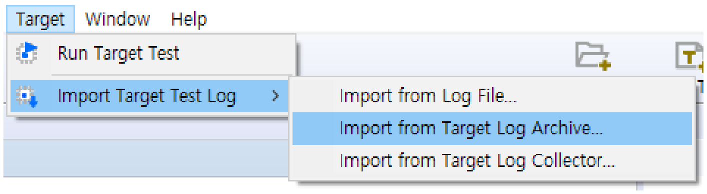
Import a target test log

Select the log file of target test.

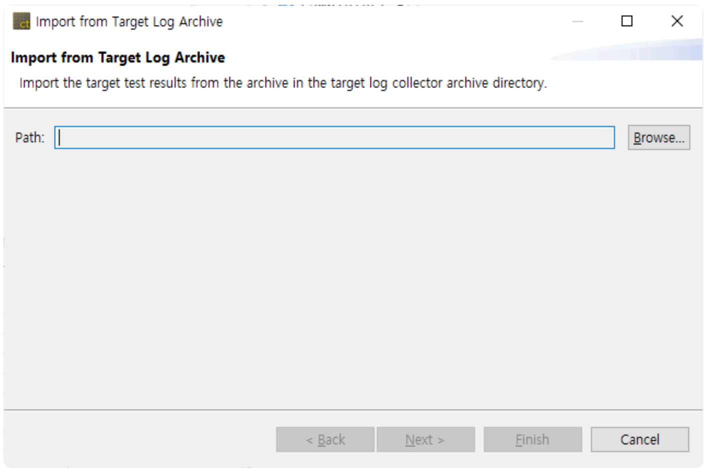
Path:

Import from a target log archive

1. After selecting an analyzed project, click [Target] -> [import Target Test Log] -> [Import from Target Log Archive…] in the global menu.



2. Select a target log archive file and click the [Next] button.



Import from Target Log Archive

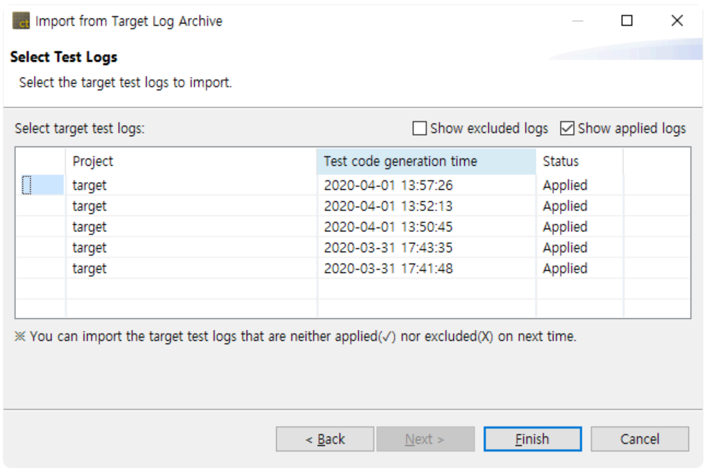
Import from Target Log Archive

Import the target test results from the archive in the target log collector archive directory.

Path: Browse...

< Back | Next > | Finish | Cancel

3. Check a target test log file and click the [Finish] button.



Import from Target Log Archive

Select Test Logs

Select the target test logs to import.

Select target test logs: ☐ Show excluded logs ☑ Show applied logs

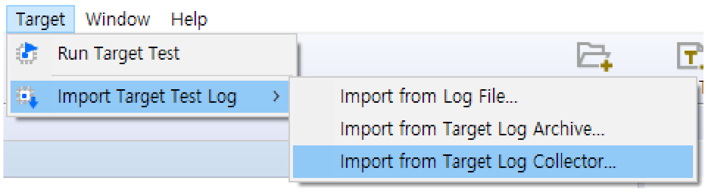
	Project	Test code generation time	Status
☐	target	2020-04-01 13:57:26	Applied
	target	2020-04-01 13:52:13	Applied
	target	2020-04-01 13:50:45	Applied
	target	2020-03-31 17:43:35	Applied
	target	2020-03-31 17:41:48	Applied

※ You can import the target test logs that are neither applied(✓) nor excluded(X) on next time.

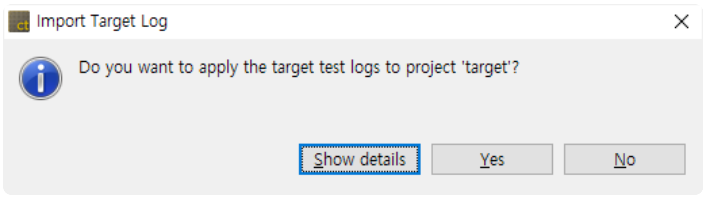
< Back | Next > | Finish | Cancel

Import from target log collector

1. To get logs from the target log collector, you need to select ‘Use the default target log collector’ from [Preferences] -> [Target Test] -> [Target Log Collector].
2. After selecting an analyzed project, click [Target] -> [import Target Test Log] -> [Import from Target Log Collector…] in the global menu.



3. Click the [Yes] button to import all the new target test logs or click the [Show details] button.

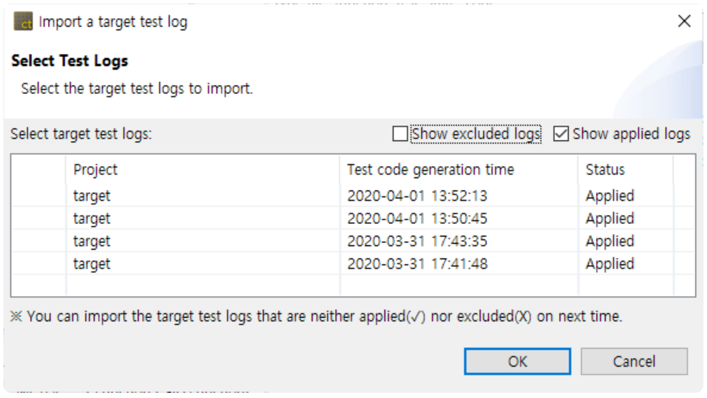


Import Target Log

Do you want to apply the target test logs to project 'target'?

Show details | Yes | No

4. If you click the [Show details] button, check the target test log to be imported and click the [OK] button.



Import a target test log

Select Test Logs

Select the target test logs to import.

Select target test logs: ☐ Show excluded logs ☑ Show applied logs

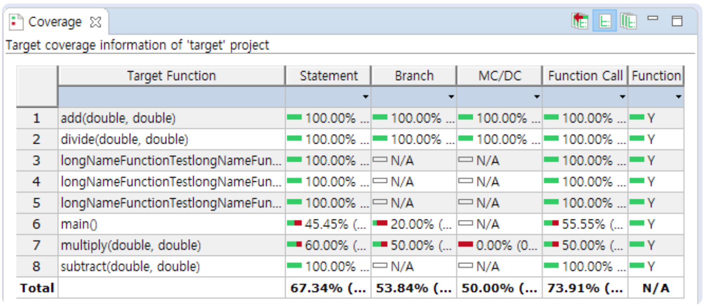
	Project	Test code generation time	Status
	target	2020-04-01 13:52:13	Applied
	target	2020-04-01 13:50:45	Applied
	target	2020-03-31 17:43:35	Applied
	target	2020-03-31 17:41:48	Applied

※ You can import the target test logs that are neither applied(✓) nor excluded(X) on next time.

OK Cancel

Result

After the import is completed, you can check the target coverage information in the coverage view.



Coverage

Target coverage information of 'target' project

	Target Function	Statement	Branch	MC/DC	Function Call	Function
1	add(double, double)	100.00% ...	100.00% ...	100.00% ...	100.00% ...	Y
2	divide(double, double)	100.00% ...	100.00% ...	100.00% ...	100.00% ...	Y
3	longNameFunctionTestlongNameFun...	100.00% ...	N/A	N/A	100.00% ...	Y
4	longNameFunctionTestlongNameFun...	100.00% ...	N/A	N/A	100.00% ...	Y
5	longNameFunctionTestlongNameFun...	100.00% ...	N/A	N/A	100.00% ...	Y
6	main()	45.45% (...	20.00% (...	N/A	55.55% (...	Y
7	multiply(double, double)	60.00% (...	50.00% (...	0.00% (0...	50.00% (...	Y
8	subtract(double, double)	100.00% ...	N/A	N/A	100.00% ...	Y
Total		**67.34% (...**	**53.84% (...**	**50.00% (...**	**73.91% (...**	**N/A**

[Import Target Test Log] may fail because the target test run information and the host test information are not valid if the host test case, source file, function information, etc. are changed before importing the log of the target test result.

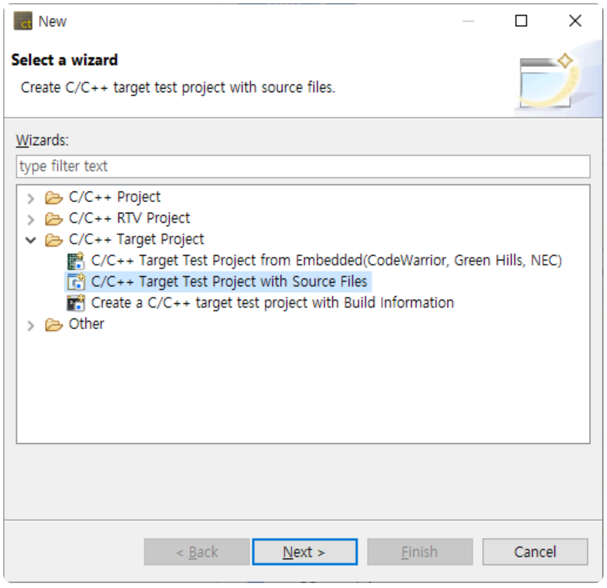
24.2. C/C++ Target Test Project

The C / C ++ target test project (hereinafter referred to as the target test project) is a project for target environment testing. Target testing projects do not support host testing.

Create a target test project

C/C++ Target Test Project with Source Files

1. Create a project by selecting [File]-> [New]-> [Other …] in the global menu and clicking [C / C ++ Target Test Project with Source Files].



New

Select a wizard

Create C/C++ target test project with source files.

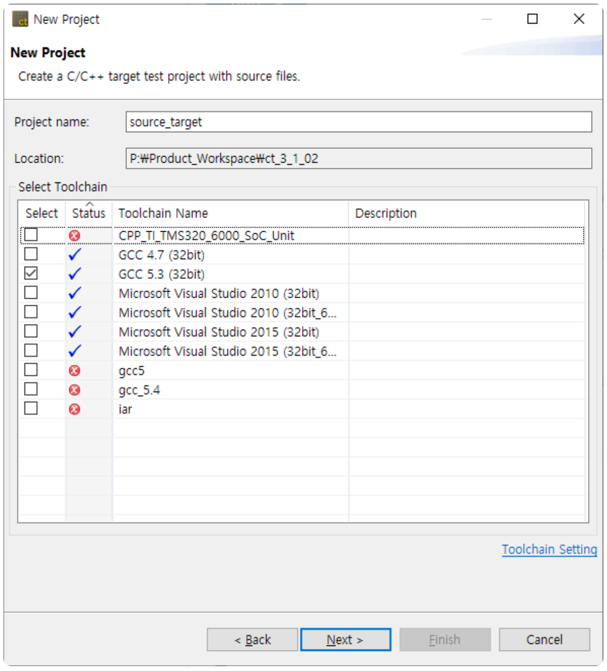
Wizards:

type filter text

- C/C++ Project
- C/C++ RTV Project
- C/C++ Target Project
  - C/C++ Target Test Project from Embedded(CodeWarrior, Green Hills, NEC)
  - C/C++ Target Test Project with Source Files
  - Create a C/C++ target test project with Build Information
- Other

< Back | Next > | Finish | Cancel

2. Enter a project name and select a toolchain to use.



New Project

New Project

Create a C/C++ target test project with source files.

Project name: source_target

Location: P:₩Product_Workspace₩ct_3_1_02

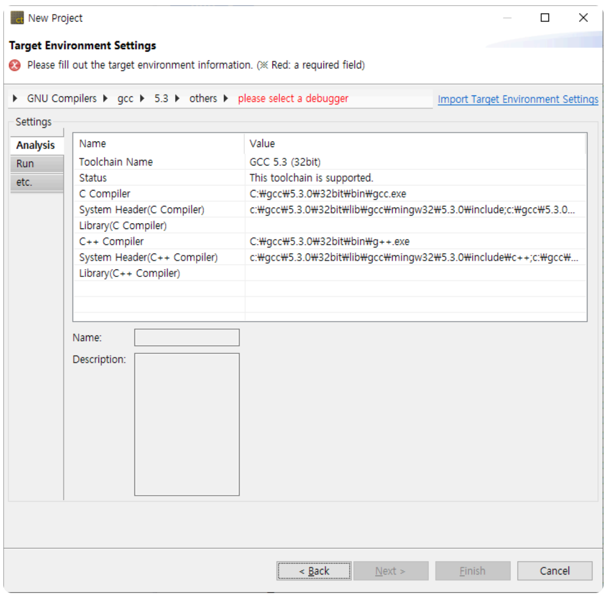
Select Toolchain

Select	Status	Toolchain Name	Description
☐	⊗	CPP_TI_TMS320_6000_SoC_Unit	
☐	✓	GCC 4.7 (32bit)	
☑	✓	GCC 5.3 (32bit)	
☐	✓	Microsoft Visual Studio 2010 (32bit)	
☐	✓	Microsoft Visual Studio 2010 (32bit_6...	
☐	✓	Microsoft Visual Studio 2015 (32bit)	
☐	✓	Microsoft Visual Studio 2015 (32bit_6...	
☐	⊗	gcc5	
☐	⊗	gcc_5.4	
☐	⊗	iar	

Toolchain Setting

< Back | Next > | Finish | Cancel

3. After selecting the basic information of the target environment, enter the detailed settings for each category and click the [Next] button.



New Project

Target Environment Settings

Please fill out the target environment information. (※ Red: a required field)

GNU Compilers ▸ gcc ▸ 5.3 ▸ others ▸ please select a debugger   Import Target Environment Settings

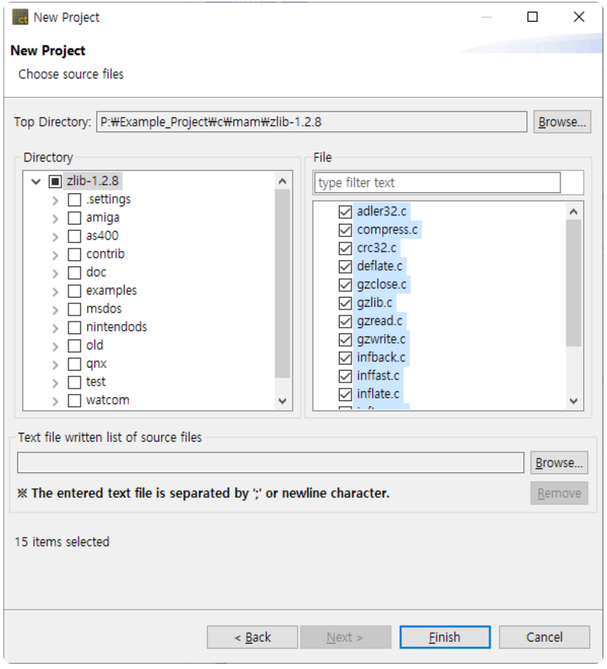
Settings: Analysis | Run | etc.

Name	Value
Toolchain Name	GCC 5.3 (32bit)
Status	This toolchain is supported.
C Compiler	C:₩gcc₩5.3.0₩32bit₩bin₩gcc.exe
System Header(C Compiler)	c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include;c:₩gcc₩5.3.0...
Library(C Compiler)	
C++ Compiler	C:₩gcc₩5.3.0₩32bit₩bin₩g++.exe
System Header(C++ Compiler)	c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include₩c++;c:₩gcc₩...
Library(C++ Compiler)	

Name:

Description:

4. Select the source files under test and click the [Finish] button.



New Project

New Project

Choose source files

Top Directory: P:₩Example_Project₩c₩mam₩zlib-1.2.8

Directory:
- ▣ zlib-1.2.8
  - ☐ .settings
  - ☐ amiga
  - ☐ as400
  - ☐ contrib
  - ☐ doc
  - ☐ examples
  - ☐ msdos
  - ☐ nintendods
  - ☐ old
  - ☐ qnx
  - ☐ test
  - ☐ watcom

File: type filter text
- ☑ adler32.c
- ☑ compress.c
- ☑ crc32.c
- ☑ deflate.c
- ☑ gzclose.c
- ☑ gzlib.c
- ☑ gzread.c
- ☑ gzwrite.c
- ☑ infback.c
- ☑ inffast.c
- ☑ inflate.c

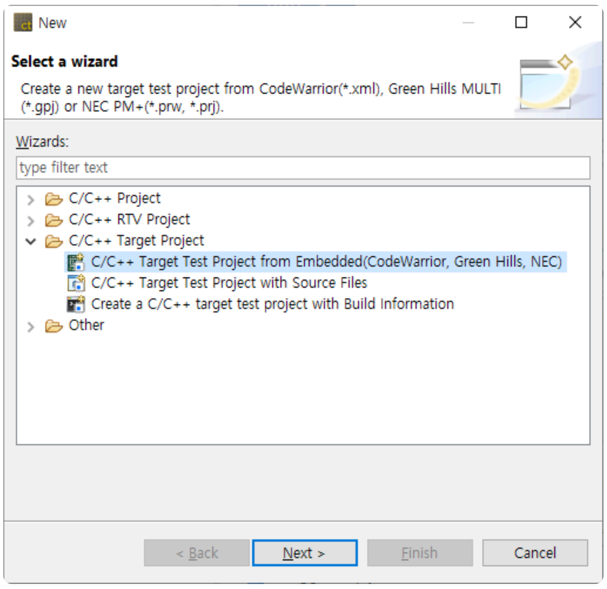
Text file written list of source files

※ The entered text file is separated by ';' or newline character.

15 items selected

C/C++ Target Test Project from Embedded(CodeWarrior, Green Hills, NEC)

1. Create a project by selecting [File]-> [New]-> [Other …] in the global menu and clicking [C/C++ Target Test Project from Embedded(CodeWarrior, Green Hills, NEC)].



Select a wizard

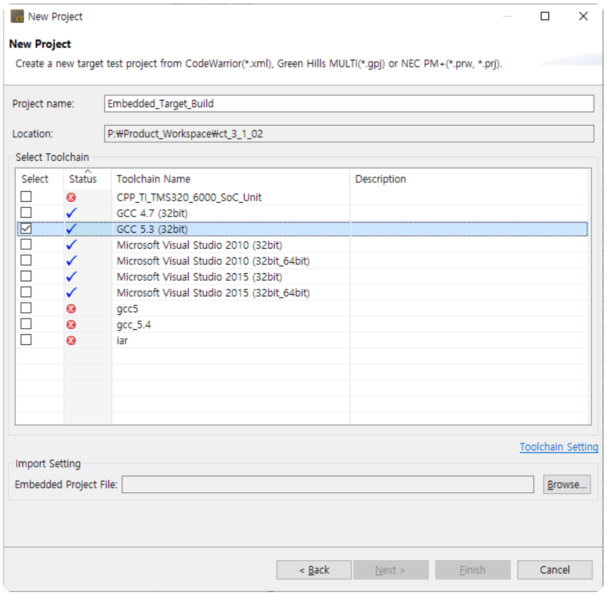
Create a new target test project from CodeWarrior(*.xml), Green Hills MULTI (*.gpj) or NEC PM+(*.prw, *.prj).

Wizards:

type filter text

- C/C++ Project
- C/C++ RTV Project
- C/C++ Target Project
  - C/C++ Target Test Project from Embedded(CodeWarrior, Green Hills, NEC)
  - C/C++ Target Test Project with Source Files
  - Create a C/C++ target test project with Build Information
- Other

2. Enter a project name and select a toolchain to use. After selecting the toolchain, import the embedded project file to test. Currently, embedded projects supported by Controller Tester are CodeWarrior, Green Hills, and NEC.



New Project

Create a new target test project from CodeWarrior(*.xml), Green Hills MULTI(*.gpj) or NEC PM+(*.prw, *.prj).

Project name: Embedded_Target_Build

Location: P:₩Product_Workspace₩ct_3_1_02

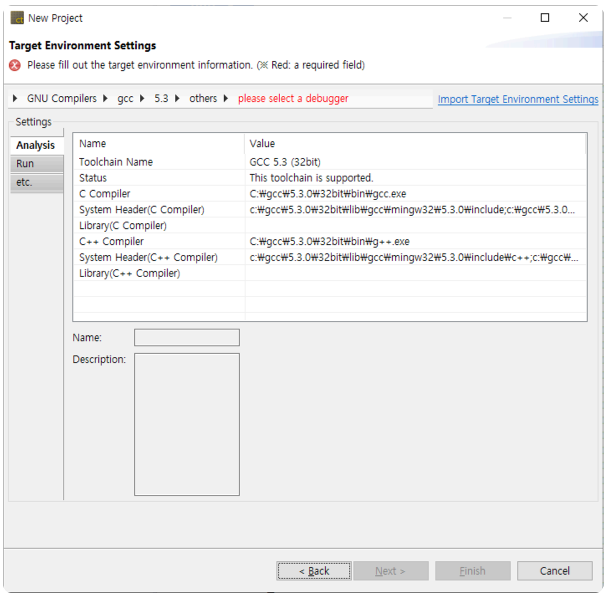
Select Toolchain

Select	Status	Toolchain Name	Description
☐	✗	CPP_TI_TMS320_6000_SoC_Unit	
☐	✓	GCC 4.7 (32bit)	
☑	✓	GCC 5.3 (32bit)	
☐	✓	Microsoft Visual Studio 2010 (32bit)	
☐	✓	Microsoft Visual Studio 2010 (32bit_64bit)	
☐	✓	Microsoft Visual Studio 2015 (32bit)	
☐	✓	Microsoft Visual Studio 2015 (32bit_64bit)	
☐	✗	gcc5	
☐	✗	gcc_5.4	
☐	✗	iar	

Import Setting

Embedded Project File:

3. After selecting the basic information of the target environment, enter the detailed settings for each category.



Target Environment Settings

Please fill out the target environment information. (※ Red: a required field)

GNU Compilers ▸ gcc ▸ 5.3 ▸ others ▸ please select a debugger   Import Target Environment Settings

Settings: Analysis | Run | etc.

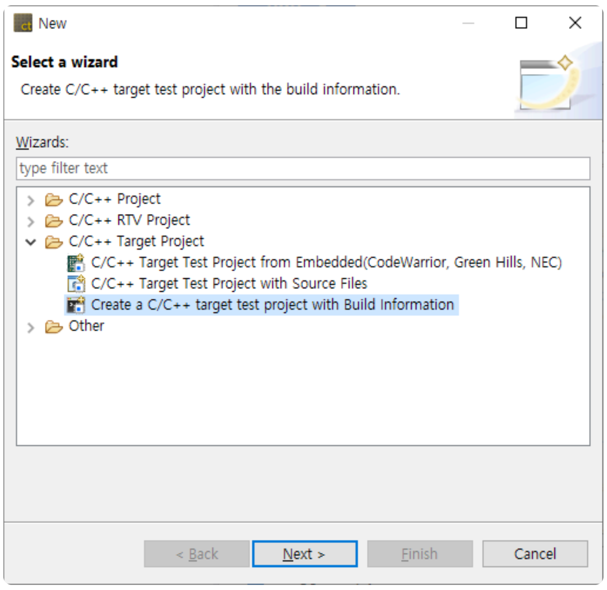
Name	Value
Toolchain Name	GCC 5.3 (32bit)
Status	This toolchain is supported.
C Compiler	C:₩gcc₩5.3.0₩32bit₩bin₩gcc.exe
System Header(C Compiler)	c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include;c:₩gcc₩5.3.0...
Library(C Compiler)	
C++ Compiler	C:₩gcc₩5.3.0₩32bit₩bin₩g++.exe
System Header(C++ Compiler)	c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include₩c++;c:₩gcc₩...
Library(C++ Compiler)	

Name:

Description:

Create a C/C++ Target Test Project with Build Information

1. Create a project by selecting [File]-> [New]-> [Other …] in the global menu and clicking [Create a C/C++ Target Test Project with Build Information].



Select a wizard

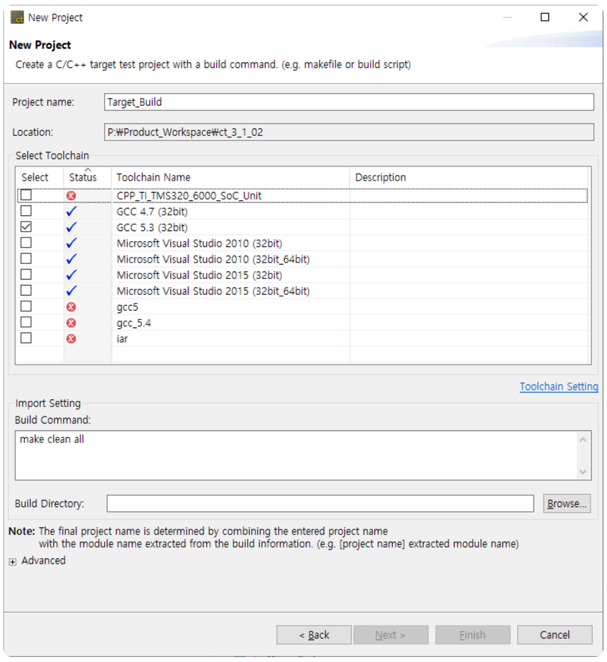
Create C/C++ target test project with the build information.

Wizards:

type filter text

- C/C++ Project
- C/C++ RTV Project
- C/C++ Target Project
  - C/C++ Target Test Project from Embedded(CodeWarrior, Green Hills, NEC)
  - C/C++ Target Test Project with Source Files
  - Create a C/C++ target test project with Build Information
- Other

2. Enter a project name and select a toolchain to use. After selecting the toolchain, Specify the path of the created Makefile and build script as the build directory and write the build command. You can choose a script file to set the build-environment from the [Advanced] menu.



New Project

New Project

Create a C/C++ target test project with a build command. (e.g. makefile or build script)

Project name: Target_Build

Location: P:₩Product_Workspace₩ct_3_1_02

Select Toolchain

Select	Status	Toolchain Name	Description
☐	✗	CPP_TI_TMS320_6000_SoC_Unit	
☐	✓	GCC 4.7 (32bit)	
☑	✓	GCC 5.3 (32bit)	
☐	✓	Microsoft Visual Studio 2010 (32bit)	
☐	✓	Microsoft Visual Studio 2010 (32bit_64bit)	
☐	✓	Microsoft Visual Studio 2015 (32bit)	
☐	✓	Microsoft Visual Studio 2015 (32bit_64bit)	
☐	✗	gcc5	
☐	✗	gcc_5.4	
☐	✗	iar	

Toolchain Setting

Import Setting

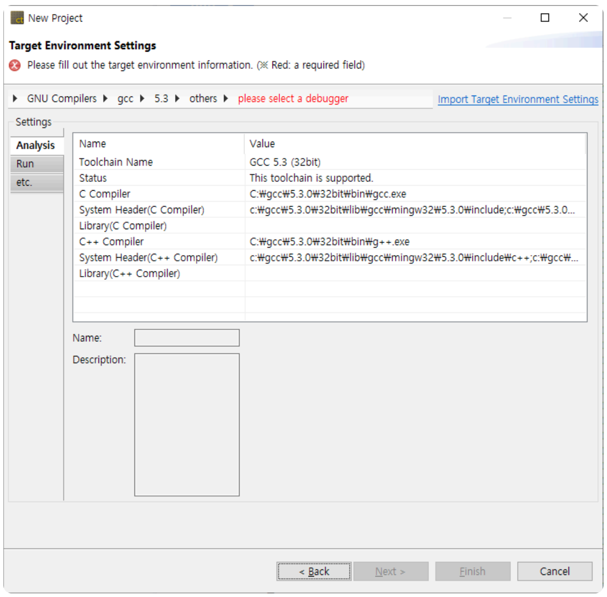
Build Command:

```
make clean all
```

Build Directory:

Note: The final project name is determined by combining the entered project name with the module name extracted from the build information. (e.g. [project name] extracted module name)

3. After selecting the basic information of the target environment, enter the detailed settings for each category.



New Project

Target Environment Settings

Please fill out the target environment information. (※ Red: a required field)

GNU Compilers ▸ gcc ▸ 5.3 ▸ others ▸ please select a debugger

Import Target Environment Settings

Settings

Name	Value
Toolchain Name	GCC 5.3 (32bit)
Status	This toolchain is supported.
C Compiler	C:₩gcc₩5.3.0₩32bit₩bin₩gcc.exe
System Header(C Compiler)	c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include;c:₩gcc₩5.3.0...
Library(C Compiler)	
C++ Compiler	C:₩gcc₩5.3.0₩32bit₩bin₩g++.exe
System Header(C++ Compiler)	c:₩gcc₩5.3.0₩32bit₩lib₩gcc₩mingw32₩5.3.0₩include₩c++;c:₩gcc₩...
Library(C++ Compiler)	

Name:

Description:

! Toolchains with invalid compiler paths cannot be selected when creating a target test project.

24.3. Target Test Run Settings

You can check the target test execution settings on the target test page in [Project]-> [Properties].

Coverage kind

You can select the type of coverage(Statement, Branch, MC/DC) to be measured for the target test.

Target for coverage measurement

In addition to the functions under test, you can select functions to measure coverage.

All functions called by the target function	Measures coverages for all functions called by the function under test.
The functions called by the previous test run	Includes functions whose coverage was measured from the previous test.

Testcase run

You can choose how to run the test case.

Run at once	Loads and runs all test cases on target at once. Each test case is affected by the previous test case run results.
Run one by one	Repeats loading and running each test case on target. It takes longer than running at once but uses less memory.

24.4. Target Log Collector

The target log collector is a server that collects target test results and sends them to Controller Tester. Collecting target test results methods are largely divided into communication and file scanning. Supported communication protocols and scannable file formats are as follows.

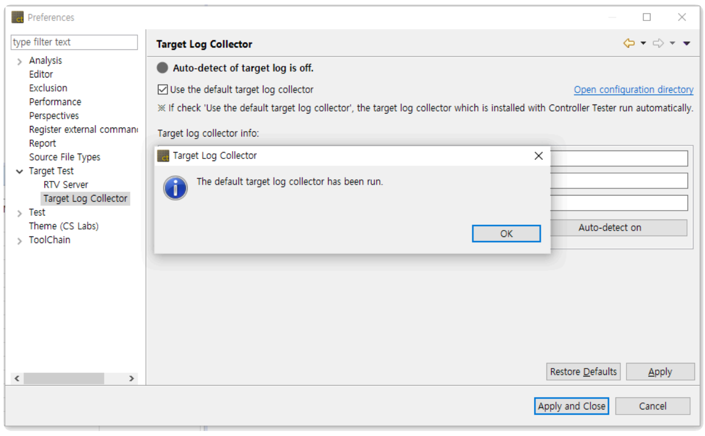
Protocol	TCP, UDP, UART
File format	Target log(text), memory dump(Hex, Intel HEX)

Installation

The target log collector is automatically installed when Controller Tester is installed.

Run

When [Use the default target log collector] is checked in [Preferences] -> [Target Test] -> [Target Log Collector], the target log collector starts collecting target test results.
If you use TargetLogCollector.zip after extracting it, run TargetLogCollector.exe in the unzipped directory at the Windows command prompt.


Target Log Collector
Auto-detect of target log is off.
☑ Use the default target log collector
※ If check 'Use the default target log collector', the target log collector which is installed with Controller Tester run automatically.
Target log collector info:
The default target log collector has been run.

Settings

It can be set through the ‘settings.ini’ file in the target log collector installation path, and the options are as follows.

[LogReceiveServer]	Settings for receiving target test results
port	TCP, UDP communication port
protocol	Communication protocol for receiving target test results
timeout	Connection timeout
lastString	String representing the end of the data
serialPort	Serial communication port

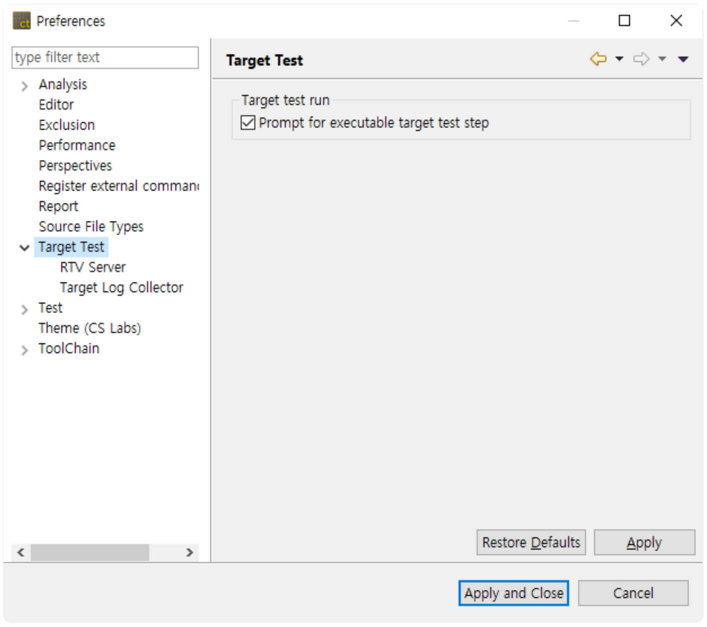
	(Windows: COM#, Linux: /dev/ttyS#)
baudRate	Serial communication settings
dataBits	Serial communication settings
stopBits	Serial communication settings
parity	Serial communication settings
flowControl	Serial communication settings
[ScanLog]	Settings for file scanning
dir	Directory to scan
fileExtension	File extensions to scan(Scan all files if blank)
[LogSendServer]	Settings for communication with Controller Tester
port	Target log file transfer port

timeout: If there is no data transmission for the specified number of seconds from the last reception, the received data is saved.
dir: When a target log file (text, hex) is entered in the specified directory, the target log collector recognizes it.

24.5. Preferences

Target Test

You can set whether to open the target test step notification dialog when the target test is run.



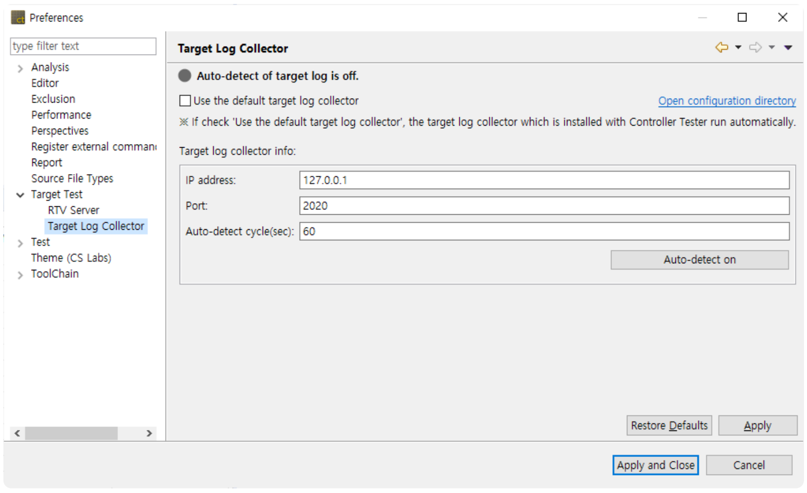
Target Test

Target test run

☑ Prompt for executable target test step

Target Log Collector

Set target log collector information to use and whether to automatically detect target test results. If you turn on automatic target log detection by clicking the [Atuto-detect on] button, a new target test result is received from the target log collector at a specified automatic detection cycle.



Target Log Collector

● Auto-detect of target log is off.

☐ Use the default target log collector

※ If check 'Use the default target log collector', the target log collector which is installed with Controller Tester run automatically.

Target log collector info:

IP address: 127.0.0.1

Port: 2020

Auto-detect cycle(sec): 60

Target Log Collector Setting	Description
Auto-detect cycle(sec)	Cycle to check for new target test results
IP	IP on the server or PC where the target log collector runs
Port	Target log collector's communication port

! When using the default target log collector, set only the auto-detection interval(sec).

25. CONTROLLER TESTER RTV(Remote Target Verifier)

Introduction

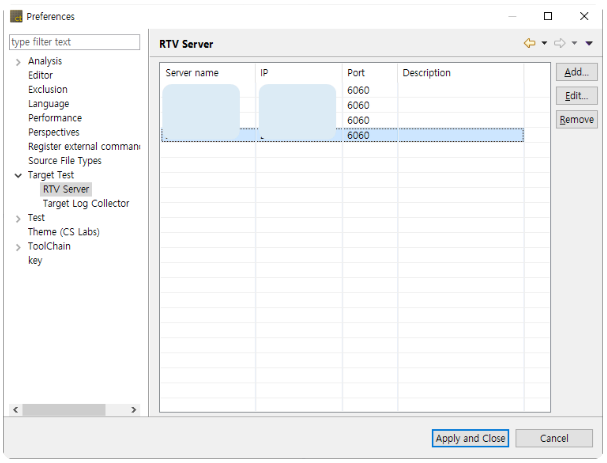
Controller Tester RTV helps you perform automated testing in your Linux environment.
After installing the Controller Tester RTV server in your Linux environment and completing the default configuration, you can use the Controller Tester RTV client to perform the RTV test as easily as you would in a hosted environment.
For information on how to install the Controller Tester RTV server in your Linux environment, please contact the Technical support contact on bottom of the Troubleshooting page of this document.

Supported Operating Systems

Server: Linux (RHEL, Ubuntu, Debian, Fedora based)
Client: Windows 7/10

25.1. RTV Server Settings

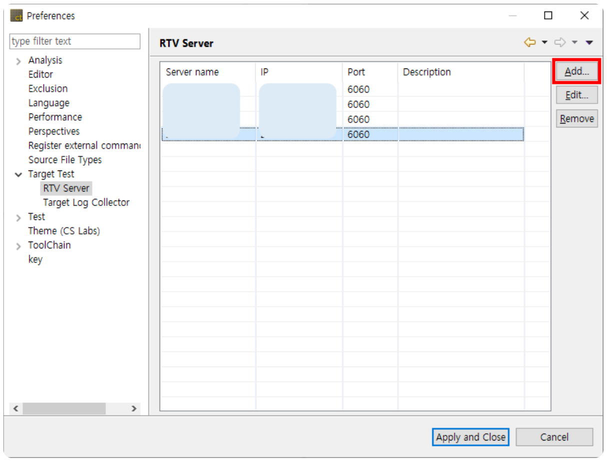
In order to use Controller Tester RTV, you need to add a RTV server with Controller Tester RTV server installed.
The RTV server can be added in [Window] -> [Preferences] -> [RTV Server].



Server name	IP	Port	Description
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	

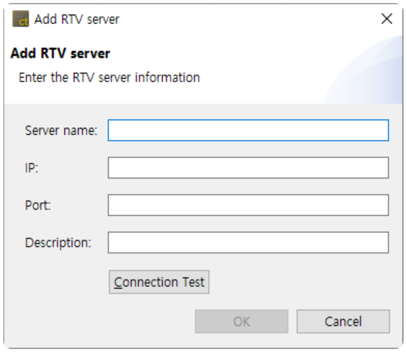
Add a RTV server

1. Click [Add] in [Window] -> [Preferences] -> [RTV Server].



Server name	IP	Port	Description
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	

2. In the [Add RTV Server] window, enter the RTV server information.

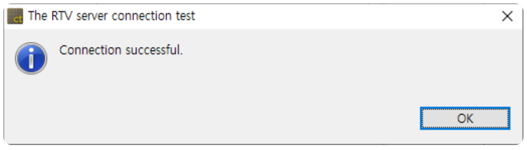


Add RTV server
Enter the RTV server information

Server name:	
IP:	
Port:	
Description:	

! The server name only accepts characters that can be used as Windows file names and can not be modified after adding the RTV server.

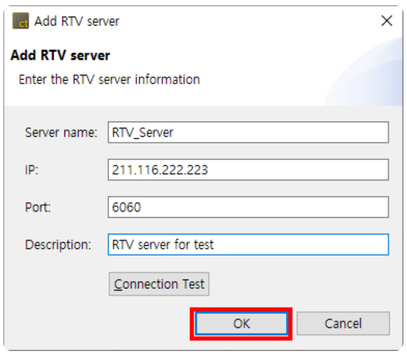
3. Click the [Connection Test] button to check the connection status with the RTV server you entered.



The RTV server connection test

Connection successful.

4. If the connection test with the RTV server is successful, click the [OK] button to add the RTV server.



Add RTV server

Add RTV server

Enter the RTV server information

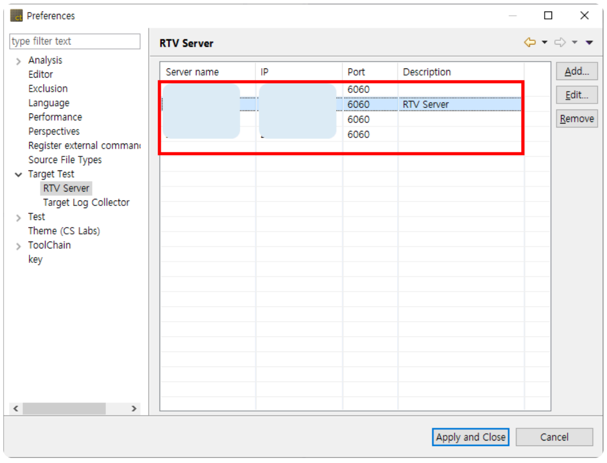
Server name: RTV_Server

IP: 211.116.222.223

Port: 6060

Description: RTV server for test

5. You can see that the RTV server has been added.



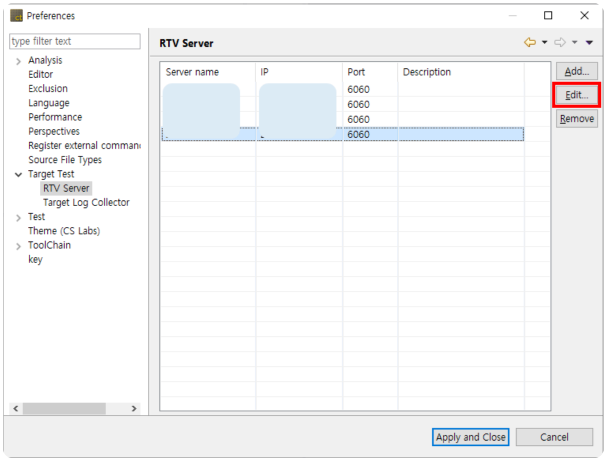
Preferences

RTV Server

Server name	IP	Port	Description
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	RTV Server
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	

Edit a RTV server

1. Double-click the server in the RTV server list, or select the server and click the [Edit] button.

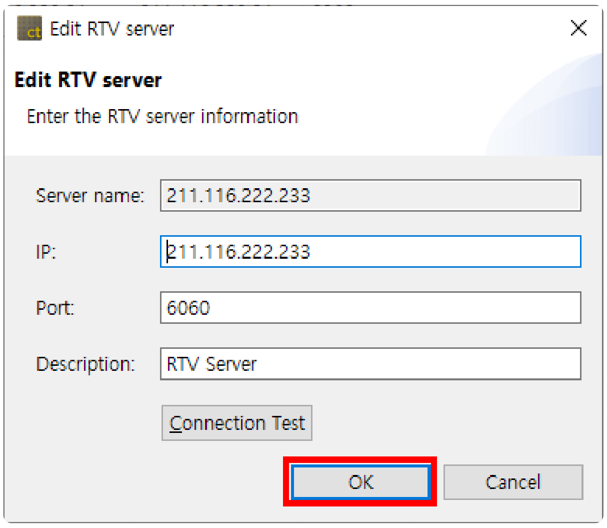


Preferences

RTV Server

Server name	IP	Port	Description
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	
[redacted]	[redacted]	6060	

2. On the [Edit RTV server] window, edit the server information and then click [OK].

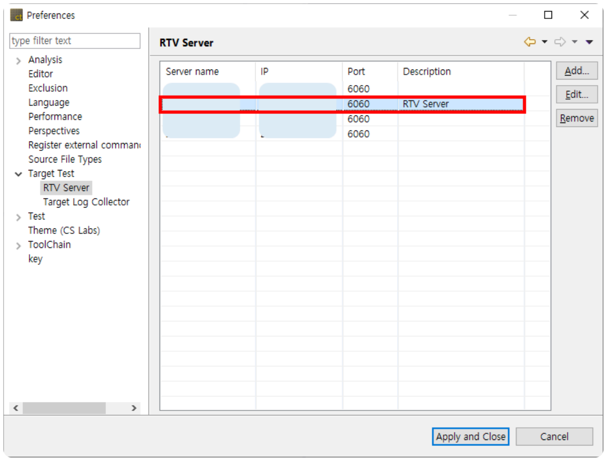

Edit RTV server

Edit RTV server

Enter the RTV server information

Server name:	211.116.222.233
IP:	211.116.222.233
Port:	6060
Description:	RTV Server

3. You can see that the RTV server information has been edited.

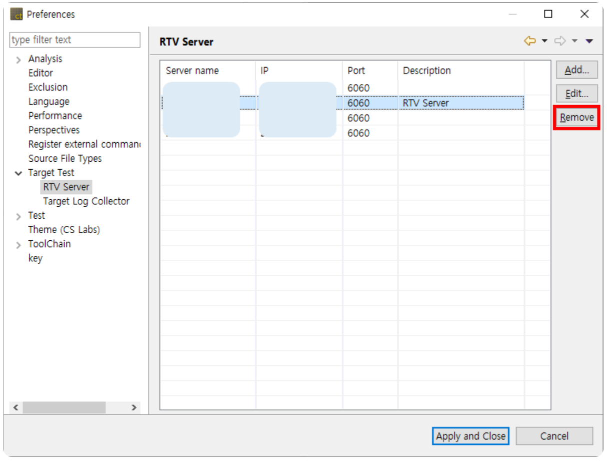


Server name	IP	Port	Description
		6060	
		6060	RTV Server
		6060	
		6060	

Remove a RTV server

If you no longer use the RTV server, you can remove it.
When you remove a RTV server, the toolchain or project resources associated with the RTV server are deleted from the client environment(Can not be deleted if a RTV toolchain added from that RTV server exists).

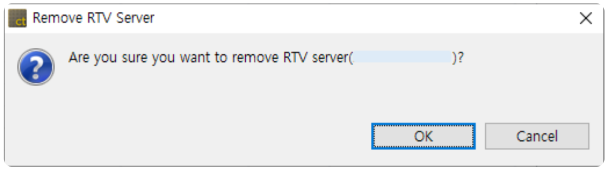
1. Select a server from the list of RTV servers and click the [Remove] button.



Server name	IP	Port	Description
		6060	
		6060	RTV Server
		6060	
		6060	

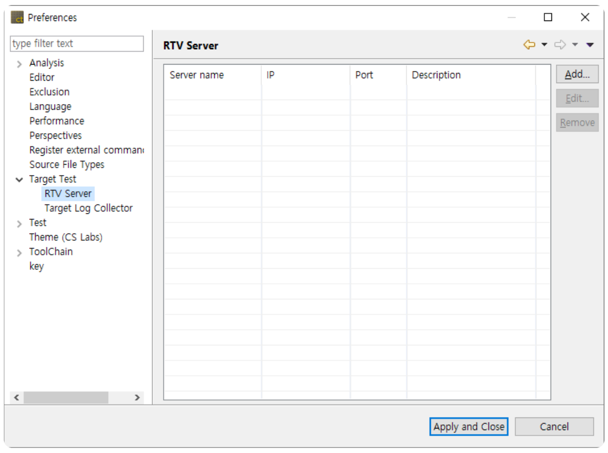
2. Click the [OK] button in the [Remove RTV Server] window(Depending on the size of the RTV

server resource, it may take a minute or two).


Remove RTV Server

Are you sure you want to remove RTV server( )?

3. You can see that the RTV server has been removed.



Server name	IP	Port	Description

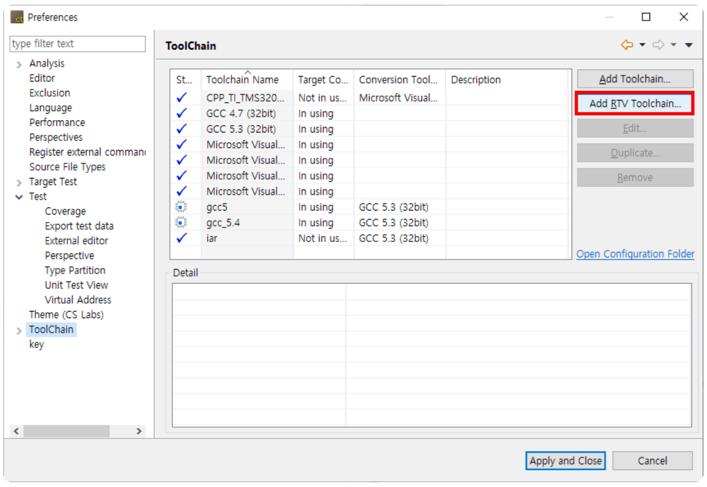
25.2. RTV Toolchain Settings

RTV toolchain

To build and run a test in a RTV environment with Controller Tester RTV, you need to set the toolchain (compiler) information for the source file being tested.
This chapter describes how to add, edit, and delete the RTV toolchain information that has previously extracted from the RTV environment where the Controller Tester RTV Server is installed.
(For extracting toolchain information from your RTV environment, please contact the Technical support contact at the bottom of this document Troubleshooting page.)

Add an RTV toolchain

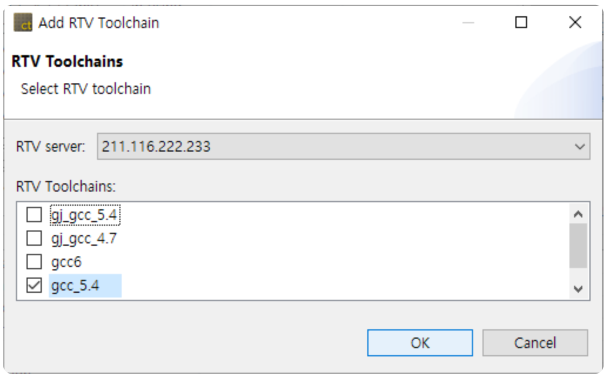
1. Click the [Add RTV Toolchain] button in the [Window] -> [Preferences] -> [Toolchain] window.



St...	Toolchain Name	Target Co...	Conversion Tool...	Description
✓	CPP_TI_TMS320...	Not in us...	Microsoft Visual...	
✓	GCC 4.7 (32bit)	In using		
✓	GCC 5.3 (32bit)	In using		
✓	Microsoft Visual...	In using		
✓	Microsoft Visual...	In using		
✓	Microsoft Visual...	In using		
✓	Microsoft Visual...	In using		
	gcc5	In using	GCC 5.3 (32bit)	
	gcc_5.4	In using	GCC 5.3 (32bit)	
✓	iar	Not in us...	GCC 5.3 (32bit)	

✻ If you do not have a RTV server, the [Add RTV Server] window will appear first.

2. If you select the RTV server in the [Add RTV Toolchain] window, you can see the list of RTV toolchain extracted from the RTV server. Select the toolchain you want to add and click the [OK] button.

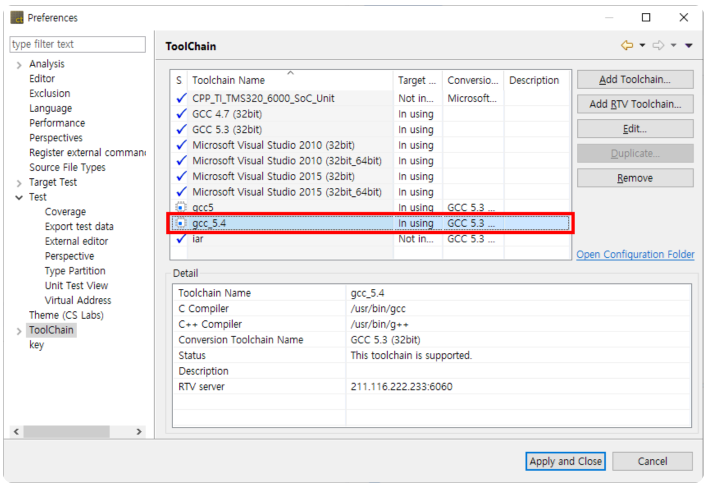


RTV Toolchains
Select RTV toolchain

RTV server: 211.116.222.233

RTV Toolchains:
- ☐ gj_gcc_5.4
- ☐ gj_gcc_4.7
- ☐ gcc6
- ☑ gcc_5.4

3. The toolchain information is imported from the RTV server (Depending on the size of the system header, it may take 1 to 2 minutes). When the operation is completed, you can see that the RTV toolchain has been added.



Preferences

ToolChain

S	Toolchain Name	Target ...	Conversio...	Description
✓	CPP_TI_TMS320_6000_SoC_Unit	Not in...	Microsoft...	
✓	GCC 4.7 (32bit)	In using		
✓	GCC 5.3 (32bit)	In using		
✓	Microsoft Visual Studio 2010 (32bit)	In using		
✓	Microsoft Visual Studio 2010 (32bit_64bit)	In using		
✓	Microsoft Visual Studio 2015 (32bit)	In using		
✓	Microsoft Visual Studio 2015 (32bit_64bit)	In using		
	gcc5	In using	GCC 5.3 ...	
	gcc_5.4	In using	GCC 5.3 ...	
✓	iar	Not in...	GCC 5.3 ...	

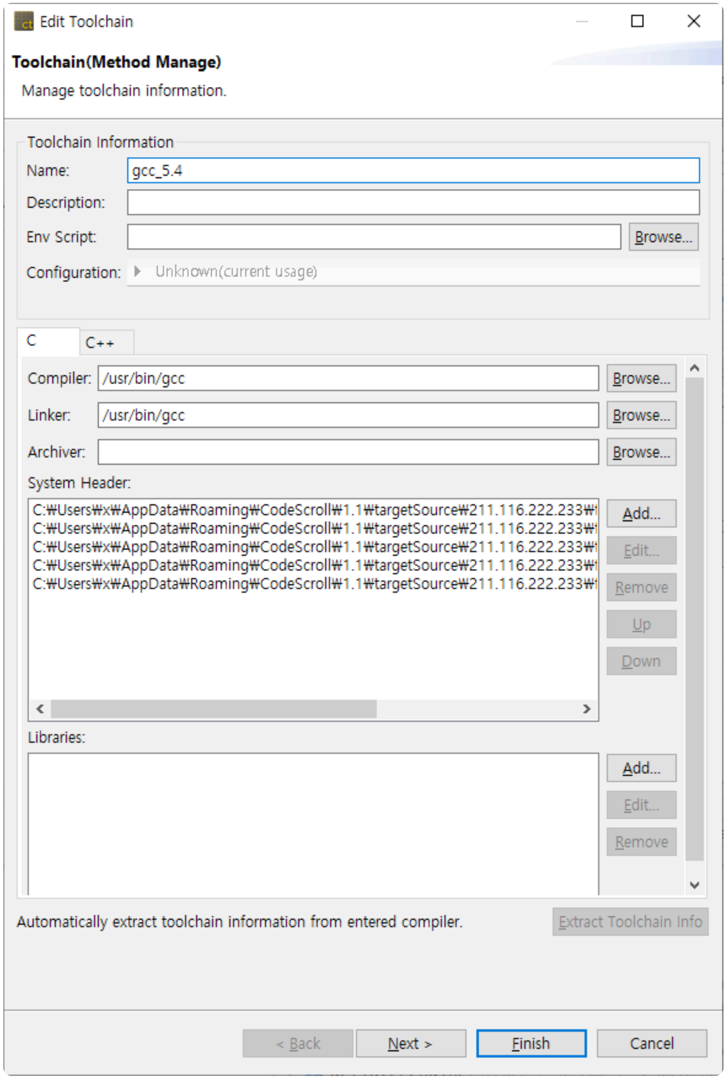
Detail

Toolchain Name	gcc_5.4
C Compiler	/usr/bin/gcc
C++ Compiler	/usr/bin/g++
Conversion Toolchain Name	GCC 5.3 (32bit)
Status	This toolchain is supported.
Description	
RTV server	211.116.222.233:6060

4. If you select the RTV toolchain added, you can see that the information of the RTV server is displayed on the [Detail].

Edit an RTV toolchain

1. Select the toolchain to be edited and click the [Edit] button.



Edit Toolchain

Toolchain(Method Manage)

Manage toolchain information.

Toolchain Information

Name: gcc_5.4

Description:

Env Script:

Configuration: Unknown(current usage)

Compiler: /usr/bin/gcc

Linker: /usr/bin/gcc

Archiver:

System Header:

```
C:₩Users₩x₩AppData₩Roaming₩CodeScroll₩1.1₩targetSource₩211.116.222.233₩
C:₩Users₩x₩AppData₩Roaming₩CodeScroll₩1.1₩targetSource₩211.116.222.233₩
C:₩Users₩x₩AppData₩Roaming₩CodeScroll₩1.1₩targetSource₩211.116.222.233₩
C:₩Users₩x₩AppData₩Roaming₩CodeScroll₩1.1₩targetSource₩211.116.222.233₩
C:₩Users₩x₩AppData₩Roaming₩CodeScroll₩1.1₩targetSource₩211.116.222.233₩
```

Libraries:

Automatically extract toolchain information from entered compiler.

2. Edit the RTV toolchain information.
3. Click the [Finish] button.

Duplicate an RTV toolchain

The duplication for an RTV toolchain is not provided.

Remove an RTV toolchain

Select the toolchain to delete and click the [Remove] button.

! If you have a project associated with the toolchain you want to delete, you can not use the project normally after deleting the toolchain.

Import/Export an RTV toolchain

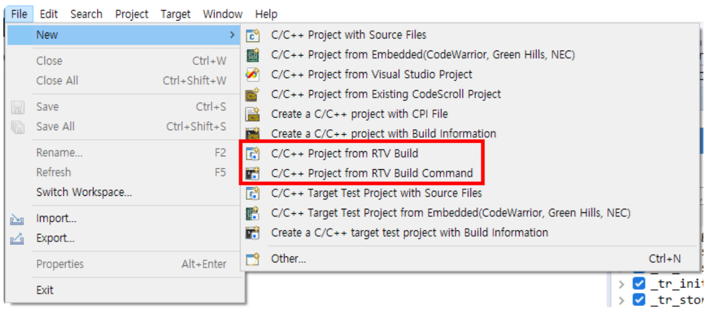
The RTV toolchain can not be imported/exported because it can be added through the RTV server.

25.3. Create a RTV Project

Create an RTV project to test the source files that exist in the RTV environment.

When building source files in the RTV environment, you can extract the information needed to create the RTV project.
This chapter describes how to create an RTV project by using pre-extracted source file build information(using the Controller Tester RTV Server Utility) in the RTV environment, or extracting information at the same time as building the source file.

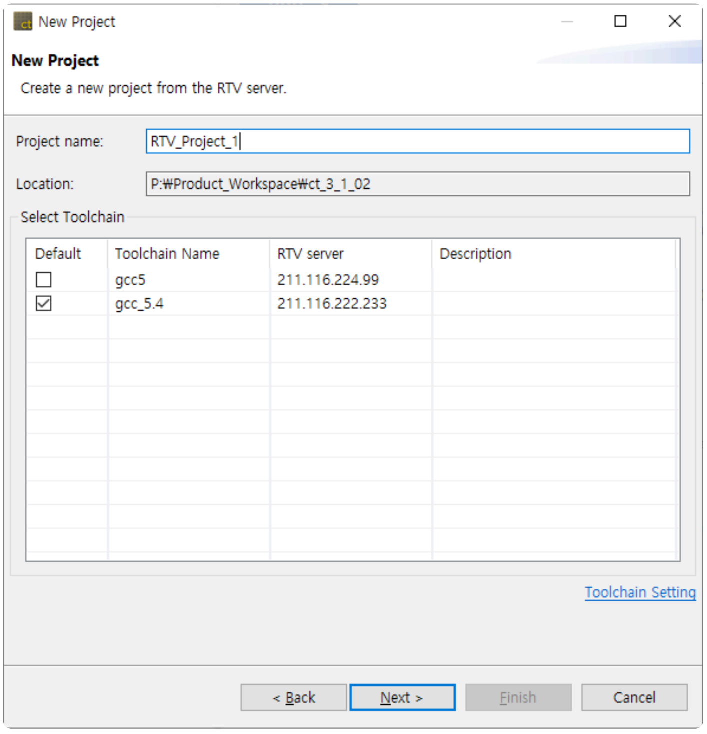
To create an RTV project, run the [Create Project Wizard].
Click [File] -> [New] or Shortcut.


File
Edit
Search
Project
Target
Window
Help
New
Close Ctrl+W
Close All Ctrl+Shift+W
Save Ctrl+S
Save All Ctrl+Shift+S
Rename... F2
Refresh F5
Switch Workspace...
Import...
Export...
Properties Alt+Enter
Exit
C/C++ Project with Source Files
C/C++ Project from Embedded(CodeWarrior, Green Hills, NEC)
C/C++ Project from Visual Studio Project
C/C++ Project from Existing CodeScroll Project
Create a C/C++ project with CPI File
Create a C/C++ project with Build Information
C/C++ Project from RTV Build
C/C++ Project from RTV Build Command
C/C++ Target Test Project with Source Files
C/C++ Target Test Project from Embedded(CodeWarrior, Green Hills, NEC)
Create a C/C++ target test project with Build Information
Other... Ctrl+N

C/C++ Project from RTV Build

It is selected when creating an RTV project using pre-extracted source file build information (using the Controller Tester RTV Server Utility) in the RTV environment.

1. Enter the project name in [Project name].



Create a new project from the RTV server.

Project name: RTV_Project_1

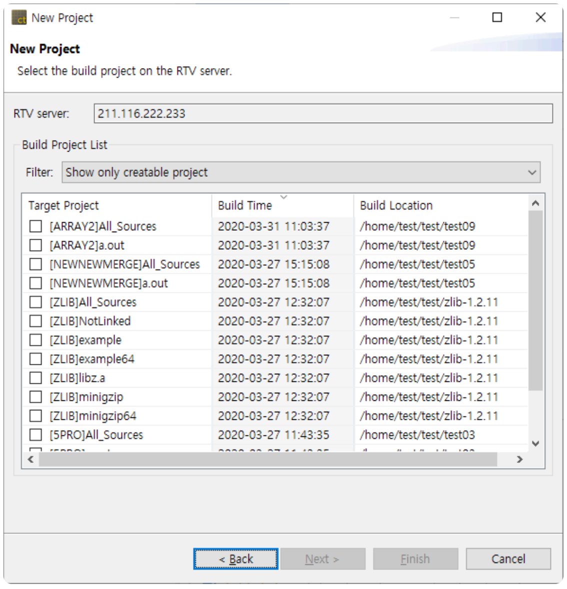
Location: P:₩Product_Workspace₩ct_3_1_02

Select Toolchain

Default	Toolchain Name	RTV server	Description
☐	gcc5	211.116.224.99	
☑	gcc_5.4	211.116.222.233	

2. A list of RTV toolchains appears in the [Select Toolchain]. Select the RTV toolchain to use.

3. After selecting the toolchain, then click the [Next] button. You can see the list of source file builds pre-extracted from the RTV server.



New Project

New Project

Select the build project on the RTV server.

RTV server: 211.116.222.233

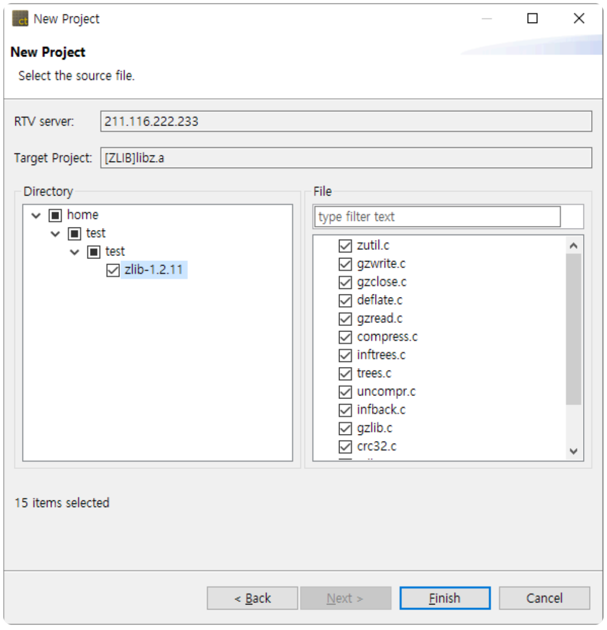
Build Project List

Filter: Show only creatable project

Target Project	Build Time	Build Location
☐ [ARRAY2]All_Sources	2020-03-31 11:03:37	/home/test/test/test09
☐ [ARRAY2]a.out	2020-03-31 11:03:37	/home/test/test/test09
☐ [NEWNEWMERGE]All_Sources	2020-03-27 15:15:08	/home/test/test/test05
☐ [NEWNEWMERGE]a.out	2020-03-27 15:15:08	/home/test/test/test05
☐ [ZLIB]All_Sources	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]NotLinked	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]example	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]example64	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]libz.a	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]minigzip	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]minigzip64	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [5PRO]All_Sources	2020-03-27 11:43:35	/home/test/test/test03

Among the generated projects, 'All_Sources_Project Name' is a project that combines all the source files of the modules captured by csbuild. Since this project is a combined project without considering whether it is built or not, it may not be able to perform the test normally.

4. In the [Build Project List], select the item for which you want to create the RTV project and click the [Next] button.



New Project

New Project

Select the source file.

RTV server: 211.116.222.233

Target Project: [ZLIB]libz.a

Directory
- home
  - test
    - test
      - ☑ zlib-1.2.11

File

type filter text

- ☑ zutil.c
- ☑ gzwrite.c
- ☑ gzclose.c
- ☑ deflate.c
- ☑ gzread.c
- ☑ compress.c
- ☑ inftrees.c
- ☑ trees.c
- ☑ uncompr.c
- ☑ infback.c
- ☑ gzlib.c
- ☑ crc32.c

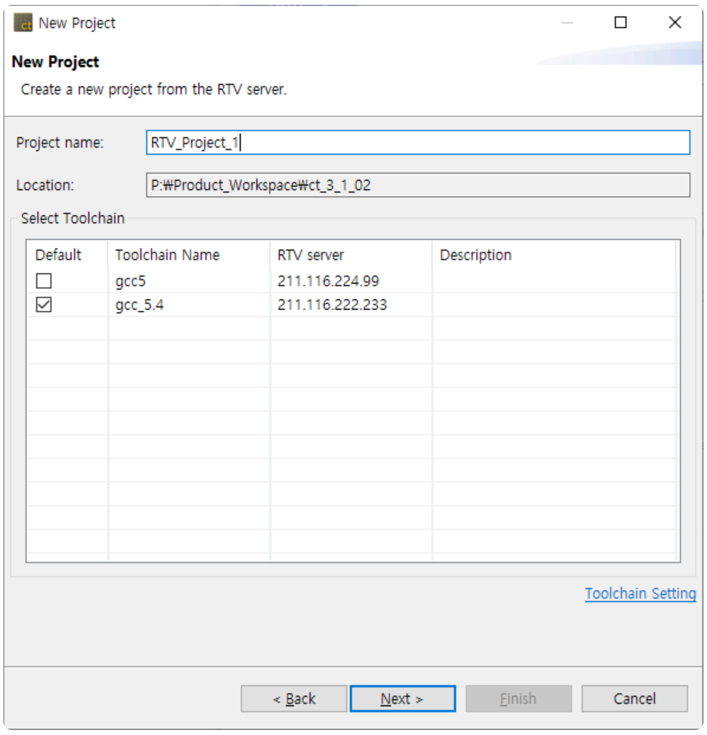
15 items selected

5. After selecting source files to be tested, click the [Finish] button to create the project.

C/C++ Project from RTV Build Command

It is selected when creating an RTV project by extracting information at the same time as building the source file. The user builds the source file on the RTV server using the build command and then creates the RTV project.

1. Enter the project name in [Project name].



New Project

New Project

Create a new project from the RTV server.

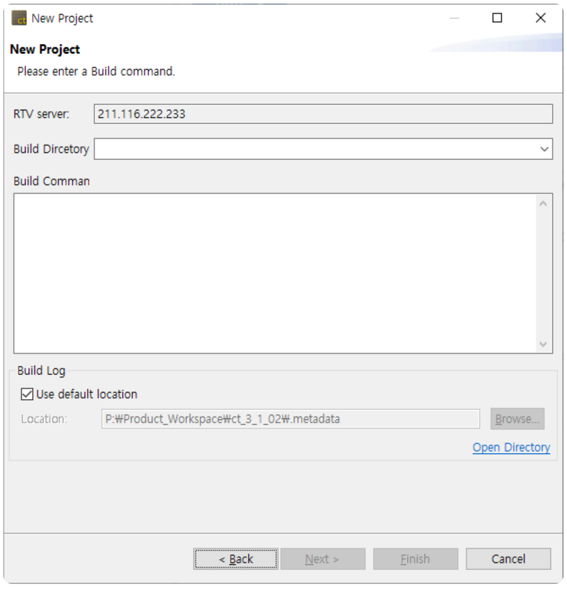
Project name: RTV_Project_1

Location: P:₩Product_Workspace₩ct_3_1_02

Select Toolchain

Default	Toolchain Name	RTV server	Description
☐	gcc5	211.116.224.99	
☑	gcc_5.4	211.116.222.233	

2. A list of RTV toolchains appears in the toolchain list. Select the RTV toolchain to use.
3. After selecting the toolchain, click the [Next] button. The build will be performed on the RTV server from which the selected toolchain was imported.



New Project

New Project

Please enter a Build command.

RTV server: 211.116.222.233

Build Dircetory

Build Comman

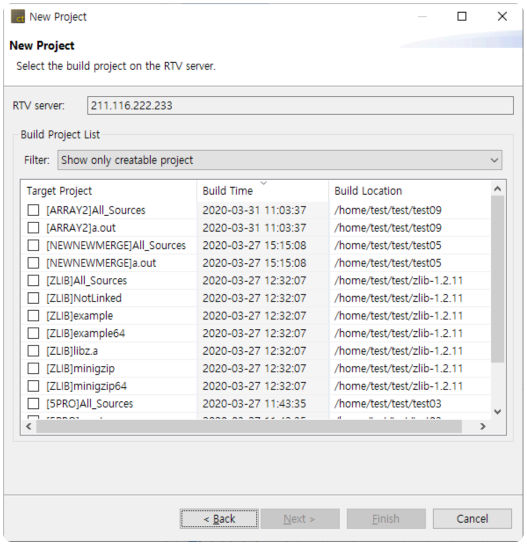
Build Log

☑ Use default location

Location: P:₩Product_Workspace₩ct_3_1_02₩.metadata

4. Enter the path to build from the RTV server (for example, the directory where the make file is located), and enter the build command.
5. In [Build Log], specify the path to the build results file.
   The default location is the .metadata directory of the workspace. If you uncheck [Use default location], you can change the path.
6. After entering the required information for the build, click the [Next] button. It builds the source file on the RTV server with the entered build command (depending on the build target, it can take a lot of time).

7. When the build is complete, a list of built projects appears.



New Project

New Project

Select the build project on the RTV server.

RTV server: 211.116.222.233

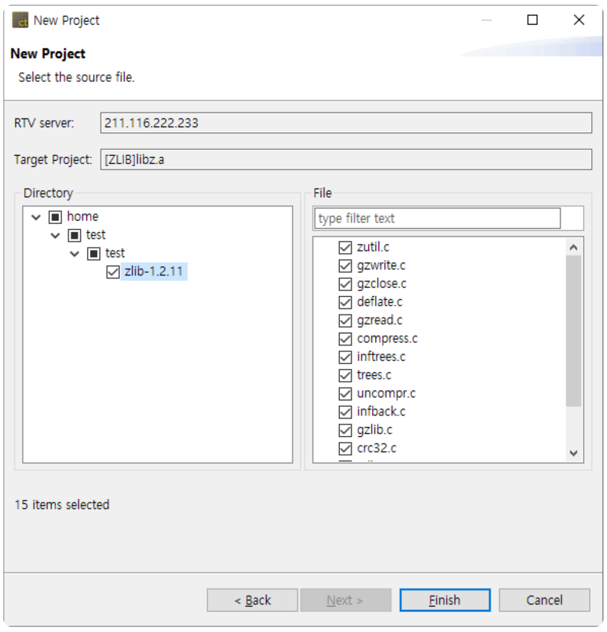
Build Project List

Filter: Show only creatable project

Target Project	Build Time	Build Location
☐ [ARRAY2]All_Sources	2020-03-31 11:03:37	/home/test/test/test09
☐ [ARRAY2]a.out	2020-03-31 11:03:37	/home/test/test/test09
☐ [NEWNEWMERGE]All_Sources	2020-03-27 15:15:08	/home/test/test/test05
☐ [NEWNEWMERGE]a.out	2020-03-27 15:15:08	/home/test/test/test05
☐ [ZLIB]All_Sources	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]NotLinked	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]example	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]example64	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]libz.a	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]minigzip	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [ZLIB]minigzip64	2020-03-27 12:32:07	/home/test/test/zlib-1.2.11
☐ [5PRO]All_Sources	2020-03-27 11:43:35	/home/test/test/test03

Among the generated projects, 'All_Sources_Project Name' is a project that combines all the source files of the modules captured by csbuild. Since this project is a combined project without considering whether it is built or not, it may not be able to perform the test normally.

8. In the [Build Project List], select the item for which you want to create the RTV project and click the [Next] button.



New Project

New Project

Select the source file.

RTV server: 211.116.222.233

Target Project: [ZLIB]libz.a

Directory

- ▣ home
  - ▣ test
    - ▣ test
      - ☑ zlib-1.2.11

File

type filter text

- ☑ zutil.c
- ☑ gzwrite.c
- ☑ gzclose.c
- ☑ deflate.c
- ☑ gzread.c
- ☑ compress.c
- ☑ inftrees.c
- ☑ trees.c
- ☑ uncompr.c
- ☑ infback.c
- ☑ gzlib.c
- ☑ crc32.c

15 items selected

9. When creating the RTV project, select the source file to be included and click the [Finish] button to create the project.

RTV build command

To create a project from build information, you must use the *csbuild* command on the build command.

csbuild command

The cs is a utility that automatically extracts the Controller Tester project configuration information of the source files that are built so that the Controller Tester RTV project can be created.

How to use *csbuild*

Prefix the existing build command with *csbuild*.

- Ex) `make` → `csbuild capture make`

csbuild option

new: Generate the necessary information before extracting build commands. Specify the toolchain with the `--toolchain` option and the project name with the `--project` option.

- Ex) `csbuid new --toolchain=gcc5.4 --project=PRJ`

> ! The `--toolchain` option is required.

capture: Creates an RTV project by performing build command extraction.

- Ex) `csbuild capture make`

convert: Convert a STATIC project to an RTV project.

- Ex) `csbuild convert`

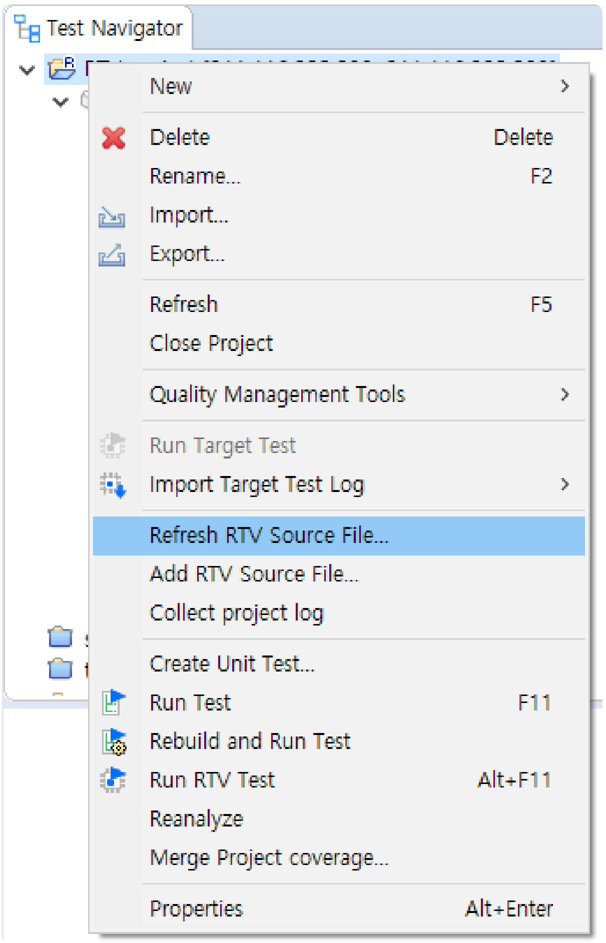
25.4. Refresh/Add RTV Source Files

Refresh RTV source file

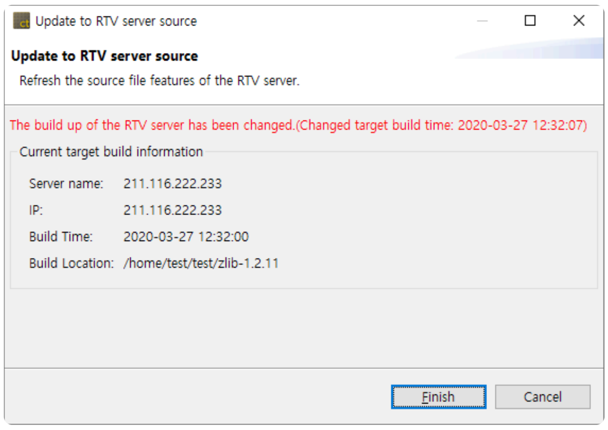
If the source file is modified and rebuilt on the RTV server, the [Refresh RTV Source File] allows the revised content to be reflected in the project.

! If the source file is modified but not rebuilt, the changed contents will not be reflected.
If you modify the source files on the RTV server and then rebuild, you must perform a full build.

1. In the [Test Navigator] view, click the [Refresh RTV Source File] context menu.



2. When you create an RTV project, you can see the latest build information for the source files you selected (display a change notification if the build has changed). Click the [Finish] button to confirm your changes.


Update to RTV server source

Update to RTV server source

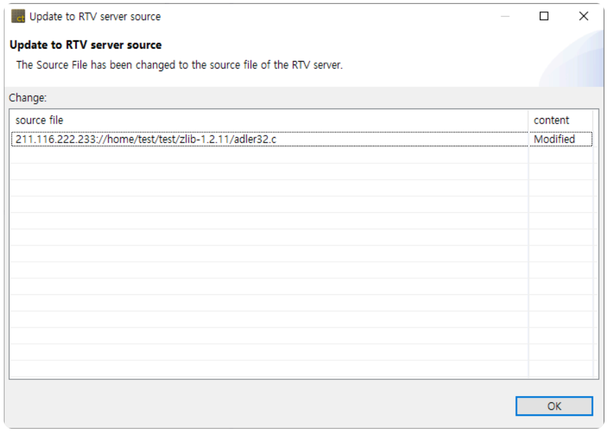
Refresh the source file features of the RTV server.

The build up of the RTV server has been changed.(Changed target build time: 2020-03-27 12:32:07)

Current target build information

Server name:	211.116.222.233
IP:	211.116.222.233
Build Time:	2020-03-27 12:32:00
Build Location:	/home/test/test/zlib-1.2.11

3. After confirming the changes, click the [OK] button.


Update to RTV server source

Update to RTV server source

The Source File has been changed to the source file of the RTV server.

Change:

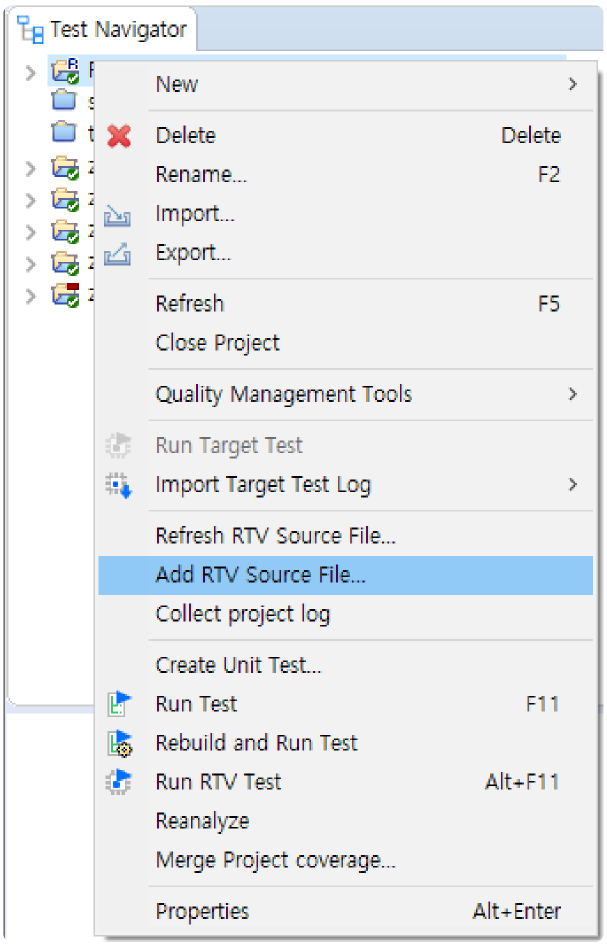
source file	content
211.116.222.233://home/test/test/zlib-1.2.11/adler32.c	Modified

Add RTV source file

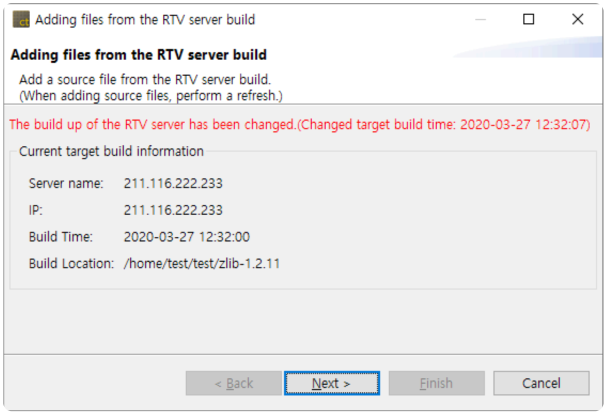
You can add source files to your RTV projects via the [Add RTV Source File] if new source files are added and built on the RTV server, or if only some source files are selected when you create the RTV project.

! If the source file is added but not rebuilt, the changed contents will not be reflected.
If you build the target server after adding the source file, you must perform a full build.

1. In the [Test Navigator] view, click the [Add RTV Source File] context menu.



2. When you create the RTV project, you can see the latest build information for the selected source file (show change notification if the build has changed). Click the [Next] button to confirm the new file list.



Adding files from the RTV server build

Adding files from the RTV server build

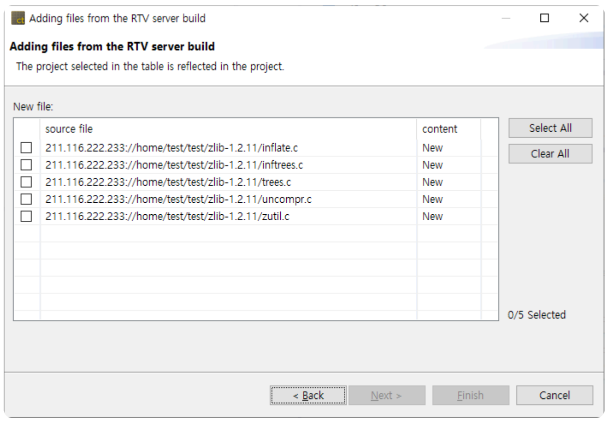
Add a source file from the RTV server build.
(When adding source files, perform a refresh.)

The build up of the RTV server has been changed.(Changed target build time: 2020-03-27 12:32:07)

Current target build information

Server name: 211.116.222.233
IP: 211.116.222.233
Build Time: 2020-03-27 12:32:00
Build Location: /home/test/test/zlib-1.2.11

3. In the [New file], select the file you want to add and click the [Finish] button.



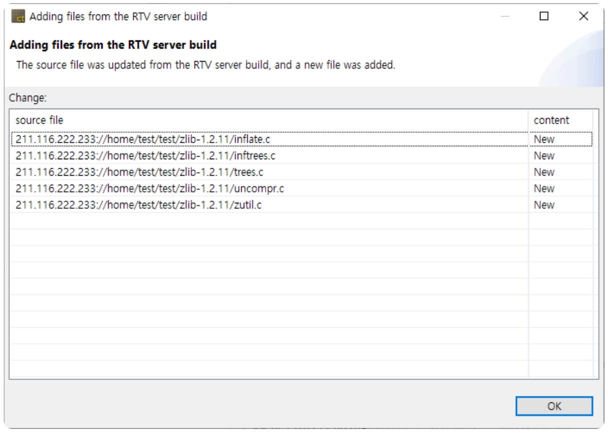
Adding files from the RTV server build

The project selected in the table is reflected in the project.

New file:

	source file	content
☐	211.116.222.233://home/test/test/zlib-1.2.11/inflate.c	New
☐	211.116.222.233://home/test/test/zlib-1.2.11/inftrees.c	New
☐	211.116.222.233://home/test/test/zlib-1.2.11/trees.c	New
☐	211.116.222.233://home/test/test/zlib-1.2.11/uncompr.c	New
☐	211.116.222.233://home/test/test/zlib-1.2.11/zutil.c	New

4. After confirming the changes, click the [OK] button.



Adding files from the RTV server build

The source file was updated from the RTV server build, and a new file was added.

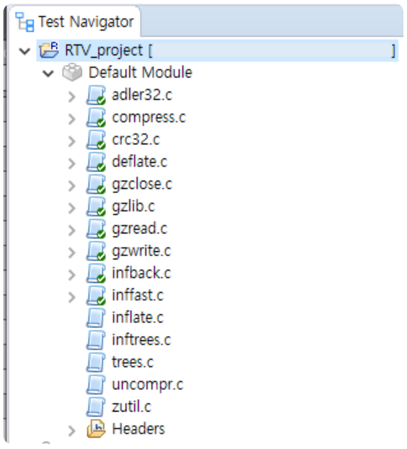
Change:

source file	content
211.116.222.233://home/test/test/zlib-1.2.11/inflate.c	New
211.116.222.233://home/test/test/zlib-1.2.11/inftrees.c	New
211.116.222.233://home/test/test/zlib-1.2.11/trees.c	New
211.116.222.233://home/test/test/zlib-1.2.11/uncompr.c	New
211.116.222.233://home/test/test/zlib-1.2.11/zutil.c	New

25.5. RTV Project Information

Test navigator

1. The icon for the RTV project is displayed as .
2. The RTV server's information ([server name: IP]) is displayed after the name of the RTV project.



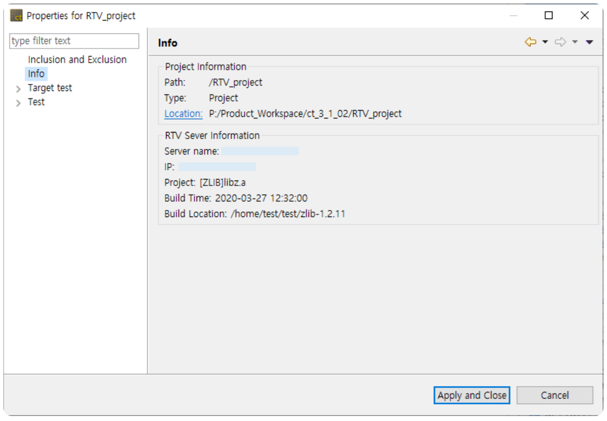
Test Navigator
RTV_project [ ]
Default Module
adler32.c
compress.c
crc32.c
deflate.c
gzclose.c
gzlib.c
gzread.c
gzwrite.c
infback.c
inffast.c
inflate.c
inftrees.c
trees.c
uncompr.c
zutil.c
Headers

3. Source files in the RTV project can not be modified(the source file editor of the RTV project is read-only).

Project property

Info

1. The RTV project displays the RTV server and project information.



Properties for RTV_project

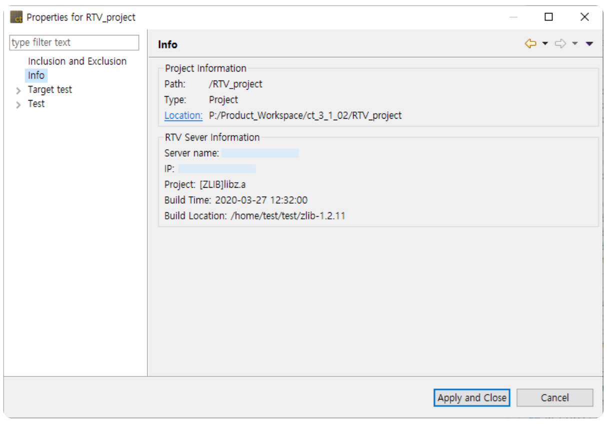
type filter text
Inclusion and Exclusion
Info
Target test
Test

Info

Project Information
Path: /RTV_project
Type: Project
Location: P:/Product_Workspace/ct_3_1_02/RTV_project

RTV Sever Information
Server name: [redacted]
IP: [redacted]
Project: [ZLIB]libz.a
Build Time: 2020-03-27 12:32:00
Build Location: /home/test/test/zlib-1.2.11

2. If the general project has set the toolchain as the RTV toolchain, information about the RTV server from which the RTV toolchain was imported is displayed.



Info

Project Information
Path: /RTV_project
Type: Project
Location: P:/Product_Workspace/ct_3_1_02/RTV_project

RTV Sever Information
Server name:
IP:
Project: [ZLIB]libz.a
Build Time: 2020-03-27 12:32:00
Build Location: /home/test/test/zlib-1.2.11

Module/File property

Build

1. The RTV project can not change the RTV toolchain that was set when the project was created.
2. However, if the RTV toolchain you set originally is deleted, you can change it to another toolchain.
3. In general projects, you can change the toolchain to the RTV toolchain. Changing to the RTV toolchain changes all toolchain settings (modules and source files) under the project and allows you to run the RTV tests.
4. The project with the RTV toolchain can not change the compiler settings of the source file (the module’s linker configuration can be changed).

25.6. Run RTV Test

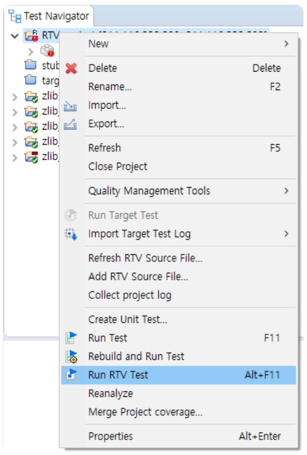
The RTV project allows you to run RTV tests without any additional setup. To test a general project in the RTV environment, you must set the toolchain of the project to the RTV toolchain created from the RTV server to be tested.

Run all RTV tests

It runs the selected tests in the [Unit Test] view and the [Integration Test] view.

RTV tests can be run in the following way.

1. Select the project to be tested, right-click it and click [Run RTV Test].

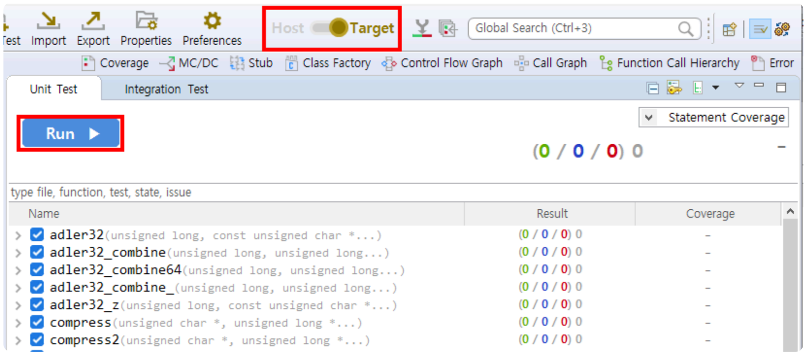


Run RTV unit test

Runs the selected test in the [Unit Test] view.

Run RTV test

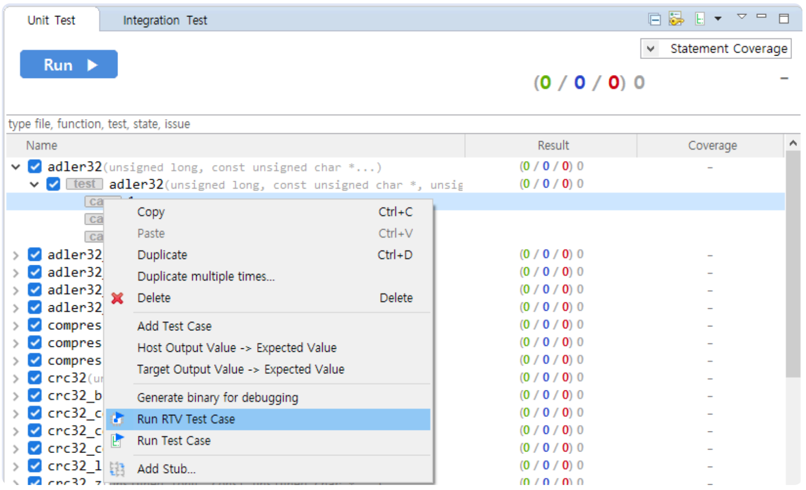
[Run] button In the [Unit Test] view.



Name	Result	Coverage
adler32(unsigned long, const unsigned char *...)	(0 / 0 / 0) 0	-
adler32_combine(unsigned long, unsigned long...)	(0 / 0 / 0) 0	-
adler32_combine64(unsigned long, unsigned long...)	(0 / 0 / 0) 0	-
adler32_combine_(unsigned long, unsigned long...)	(0 / 0 / 0) 0	-
adler32_z(unsigned long, const unsigned char *...)	(0 / 0 / 0) 0	-
compress(unsigned char *, unsigned long *...)	(0 / 0 / 0) 0	-
compress2(unsigned char *, unsigned long *...)	(0 / 0 / 0) 0	-

Run RTV test case

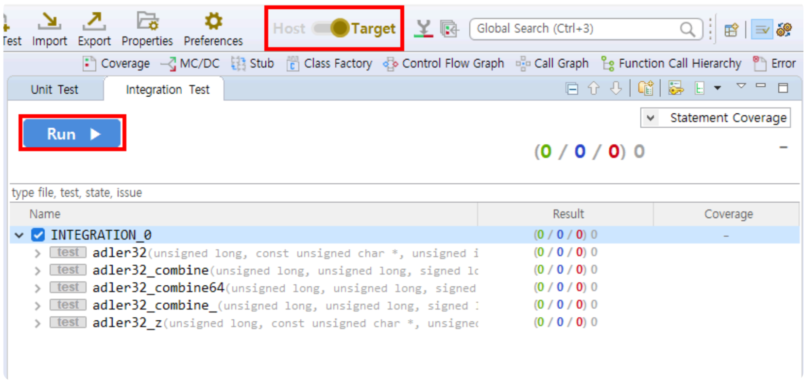
[Run RTV Test Case] context menu (multi-selectable) in the [Unit Test] view.



Run RTV integration test

Runs the selected test in the [Integration Test] view.

[Run] button In the [Integration Test] view.



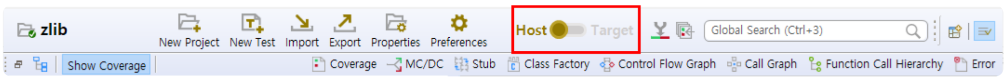
25.7. RTV Test Results

Coverage

You can change the coverage information (host, target, host/target merged) displayed in each view and editor through the coverage view menu in the top toolbar menu.
You can check the detailed information of each view in Test Perspective.

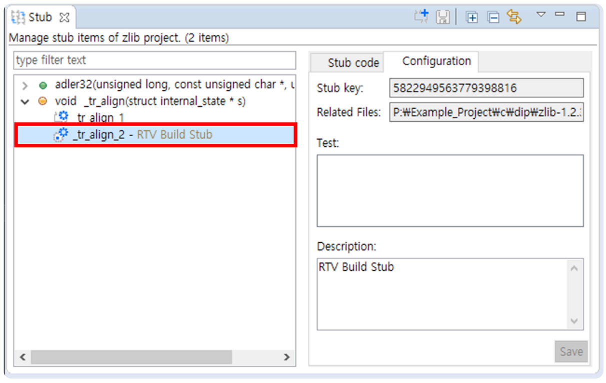
Test results

You can change the test results through the host/target settings menu on the dashboard.



Stub

The RTV build stubs that are created when running the RTV test is distinct from the build stubs which are created when running the host test.



Manage stub items of zlib project. (2 items)

type filter text

- adler32(unsigned long, const unsigned char *, u
- void _tr_align(struct internal_state * s)
  - tr_align_1
  - _tr_align_2 - RTV Build Stub

Stub key: 5822949563779398816

Related Files: P:₩Example_Project₩c₩dip₩zlib-1.2.

Test:

Description:
RTV Build Stub

Type	Description
Target build stub	Auto-created stub during RTV tests

26. CONTROLLER TESTER RTV(Remote Target Verifier) Target Plug-in

Using Controller Tester RTV (Remot Target Verifier) Target Plug-in, software developed in Linux environment can be tested in a real embedded target environment. You can run RTV target after installing Controller Tester RTV server in Linux and setting target environment in Controller Tester. For information on how to install the Controller Tester RTV server in your Linux environment, please contact the Technical support contact on bottom of the Troubleshooting page of this document.

The followings are how to create Controller Tester RTV Target Plug-in project and run a test.

- RTV Server Settings
- RTV Toolchain Settings
- RTV Target Environment Settings
- Create a RTV Target Project
- Refresh/Add RTV Target Source Files
- RTV Target Project Information
- Run RTV Target Test

Supported Operating Systems

Server: Linux (RHEL, Ubuntu, Debian, Fedora based)
Client: Windows 7/10

26.1. RTV Server Settings

For RTV server setting to use Controller Tester RTV Target Plug-in, refer to RTV Server Settings.

26.2. RTV Toolchain Settings

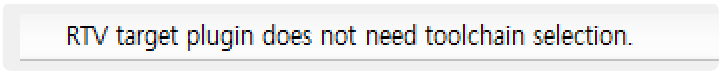
For RTV toolchain setting to use Controller Tester RTV Target Plug-in, refer to RTV Toolchain Settings.

26.3. RTV Target Environment Settings

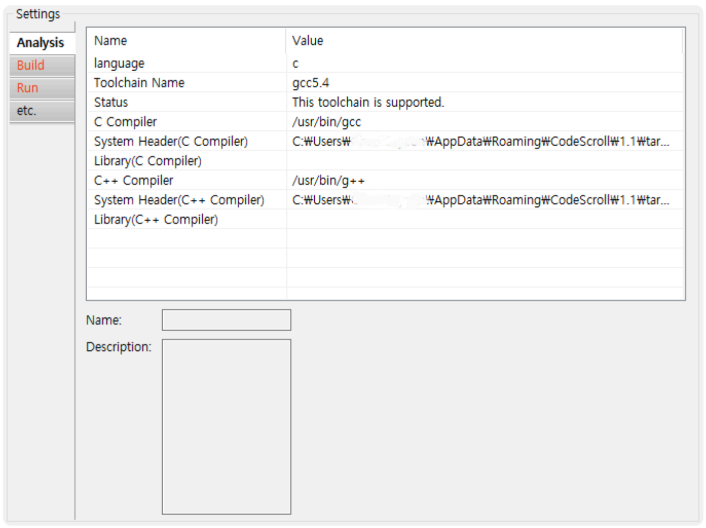
To run tests in a target environment using Controller Tester RTV Target Plug-in, you need to enter information about the target environment as with Controller Tester Target Plug-in. Using information about the target environment entered by the user, Controller Tester builds a test harness in RTV server and run in the target environment. Target log collector can get the test results automatically.
The target environment can be set in the project properties page or in the new RTV target test project wizard.

Target environment settings.

Target environment settings are divided into basic information and detailed settings.
RTV target project don’t need to enter the basic information.


RTV target plugin does not need toolchain selection.

After entering the basic information, detailed settings that require input are displayed.



Name	Value
language	c
Toolchain Name	gcc5.4
Status	This toolchain is supported.
C Compiler	/usr/bin/gcc
System Header(C Compiler)	C:₩Users₩[redacted]₩AppData₩Roaming₩CodeScroll₩1.1₩tar...
Library(C Compiler)	
C++ Compiler	/usr/bin/g++
System Header(C++ Compiler)	C:₩Users₩[redacted]₩AppData₩Roaming₩CodeScroll₩1.1₩tar...
Library(C++ Compiler)	

Name:
Description:

Target environment detailed settings

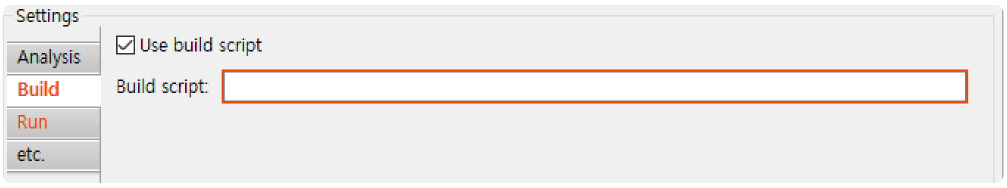
Target environment detailed settings are divided into the analysis, build, run, and etc.

Category	Description
Analysis	The toolchain information is displayed, and in the case of a target test project, the target compiler related settings required for analysis are displayed.
Build	The settings for building the test software are displayed.
Run	Settings for running tests and getting results in the target environment are displayed.
etc.	Other settings are displayed. (Program entry point, etc.)

Required settings for each category are indicated in red. Depending on whether the required settings for each category are entered or not, the behavior when clicking the [Run] button is different as shown below.

Required settings completed category	Description
None	Test run impossible
Analysis	If you click [Run], it overwrites the original source code with the test code. To perform the test, the user must manually build and run the test.
Analysis, Build	If you click [Run], it builds the test code. To perform the test, the user has to manually run the test on the target.
Analysis, Build, Run	Automatically run tests in the target environment.

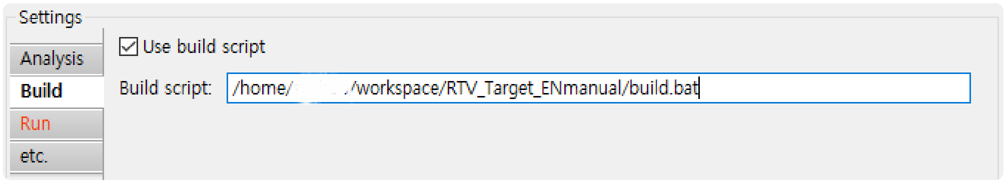
Target environment detailed settings – Build



☑ Use build script

Build script:

Enter a build script path of RTV server into build script area. After entering the build script path, Controller Tester checks validity of the path. If the path is invalid, build script area is displayed in red and if vaild, it is displayed in black.



☑ Use build script

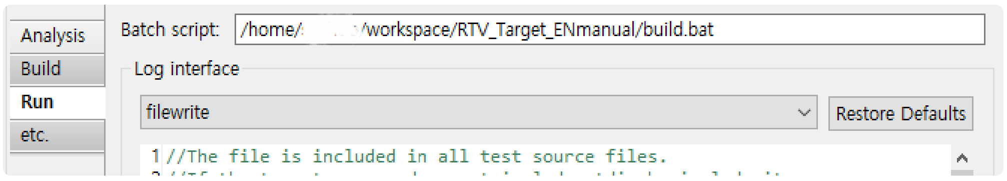
Build script: /home/ ./workspace/RTV_Target_ENmanual/build.bat

Target environment detailed settings – Run

Run setting is divided into batch script area and log interface area. Controller Tester checks validity of batch script area as with build script area. Informations to get results of RTV target test from target environment is entered in log interface area.

Batch script area

Enter a batch script path of RTV server into batch script area as with build script area.



Batch script: /home/ /workspace/RTV_Target_ENmanual/build.bat

Log interface

filewrite

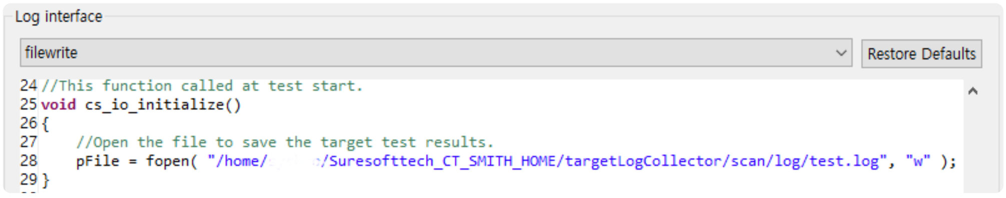
```
//The file is included in all test source files.
```

Log interface area

The log interface area is a setting to record test result from target environment. The followings are how to get target log into Target Log Collector.

- File
- Socket communication (TCP, UDP)
- Serial communication (UART)

To allow target log collector to get test results during recoding the results in file, you modify a path in log interface into `%SMITH_HOME%/targetLogCollector/scan/log/%file_name%`.



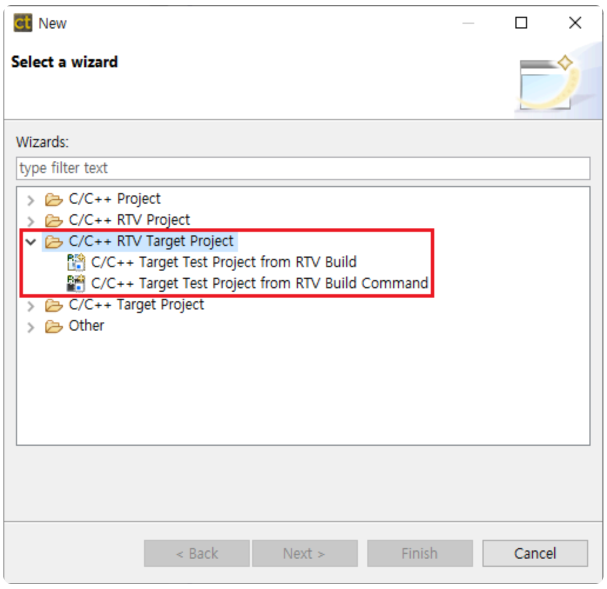
```
//This function called at test start.
void cs_io_initialize()
{
    //Open the file to save the target test results.
    pFile = fopen( "/home/[redacted]/Suresofttech_CT_SMITH_HOME/targetLogCollector/scan/log/test.log", "w" );
}
```

26.4. Create a RTV Target Project

Create an RTV project to test the source files that exist in the RTV environment.

When building source files in the RTV environment, you can extract the information needed to create the RTV project.
This chapter describes how to create an RTV target project by using pre-extracted source file build information(using the Controller Tester RTV Server Utility) in the RTV environment, or extracting information at the same time as building the source file.

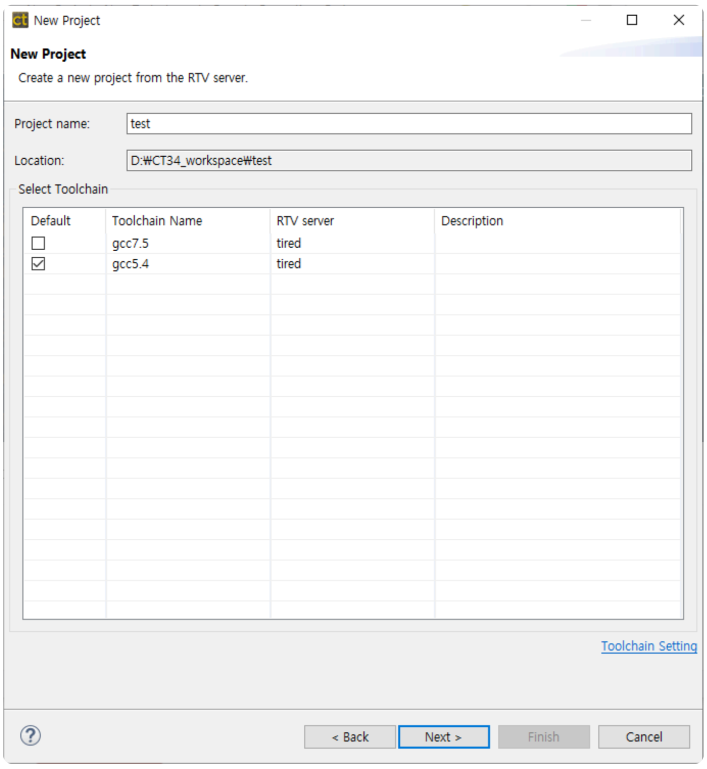
To create an RTV project, run the [Create Project Wizard].
Click [File] -> [New] or Shortcut.



C/C++ Target Test Project from RTV Build

It is selected when creating an RTV target project using pre-extracted source file build information (using the Controller Tester RTV Server Utility) in the RTV environment.

1. Enter the project name in [Project name] and select the RTV toolchain to use in the [Select Toolchain]. After selecting the toolchain, then click the [Next] button.


New Project

New Project

Create a new project from the RTV server.

Project name: test

Location: D:₩CT34_workspace₩test

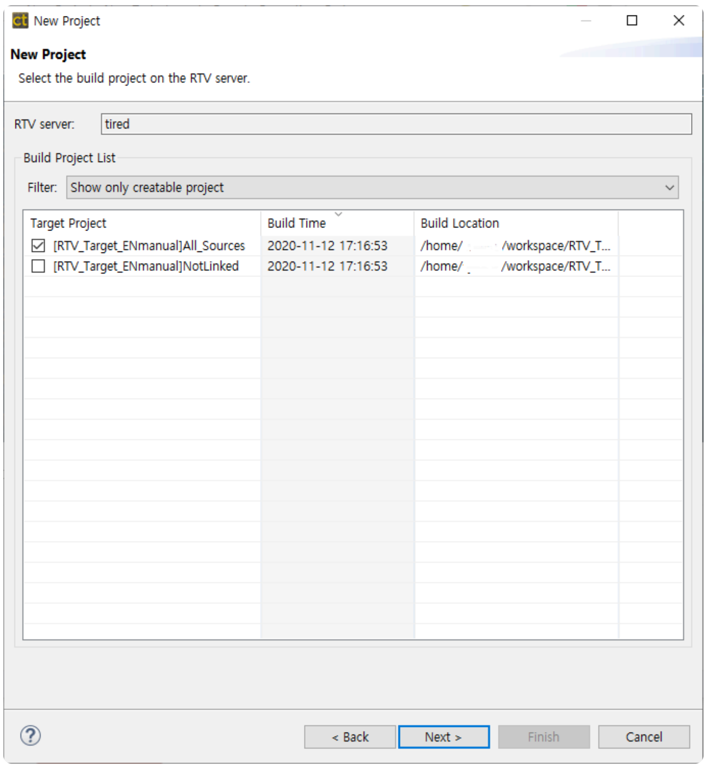
Select Toolchain

Default	Toolchain Name	RTV server	Description
☐	gcc7.5	tired	
☑	gcc5.4	tired	

Toolchain Setting

< Back | Next > | Finish | Cancel

2. You can see the list of source file builds pre-extracted from the RTV server(※ Among the generated projects, 'All_Sources_Project Name' is a project that combines all the source files of the modules captured by csbuild. Since this project is a combined project without considering whether it is built or not, it may not be able to perform the test normally). In the [Build Project List], select the item for which you want to create the RTV project and click the [Next] button.


New Project

New Project

Select the build project on the RTV server.

RTV server: tired

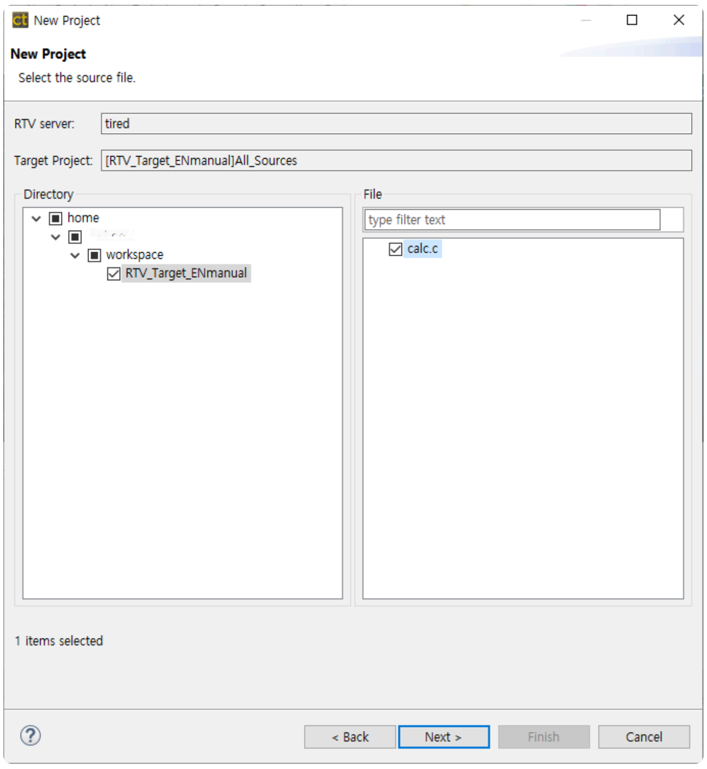
Build Project List

Filter: Show only creatable project

Target Project	Build Time	Build Location
☑ [RTV_Target_ENmanual]All_Sources	2020-11-12 17:16:53	/home/ /workspace/RTV_T...
☐ [RTV_Target_ENmanual]NotLinked	2020-11-12 17:16:53	/home/ /workspace/RTV_T...

< Back | Next > | Finish | Cancel

3. After selecting source files to be tested, click the [Next] button.



New Project

Select the source file.

RTV server: tired

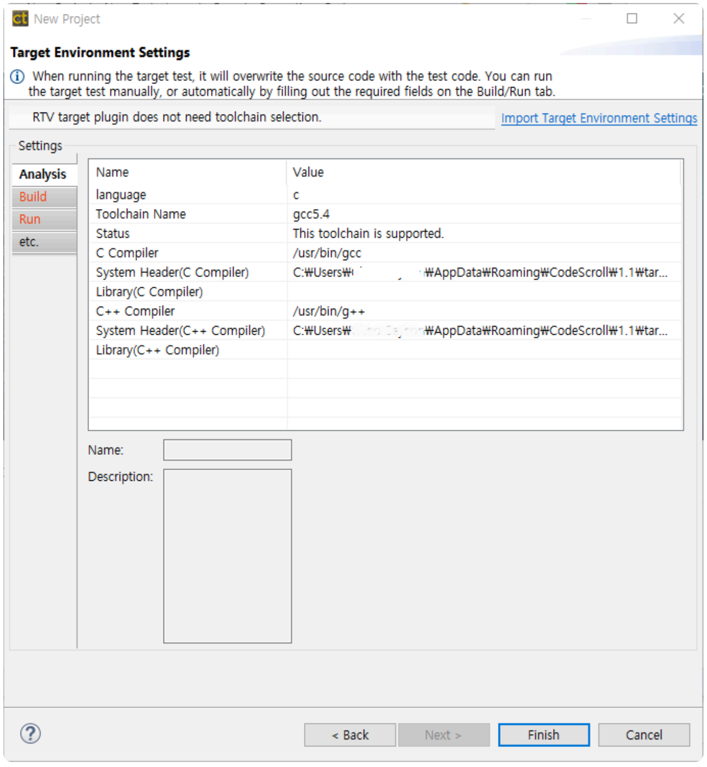
Target Project: [RTV_Target_ENmanual]All_Sources

Directory
- home
  - [redacted]
    - workspace
      - ☑ RTV_Target_ENmanual

File
- type filter text
- ☑ calc.c

1 items selected

4. After entering the detailed settings for each category and click the [Next] button



Target Environment Settings

When running the target test, it will overwrite the source code with the test code. You can run the target test manually, or automatically by filling out the required fields on the Build/Run tab.

RTV target plugin does not need toolchain selection. Import Target Environment Settings

Settings

Name	Value
language	c
Toolchain Name	gcc5.4
Status	This toolchain is supported.
C Compiler	/usr/bin/gcc
System Header(C Compiler)	C:₩Users₩[redacted]₩AppData₩Roaming₩CodeScroll₩1.1₩tar...
Library(C Compiler)	
C++ Compiler	/usr/bin/g++
System Header(C++ Compiler)	C:₩Users₩[redacted]₩AppData₩Roaming₩CodeScroll₩1.1₩tar...
Library(C++ Compiler)	

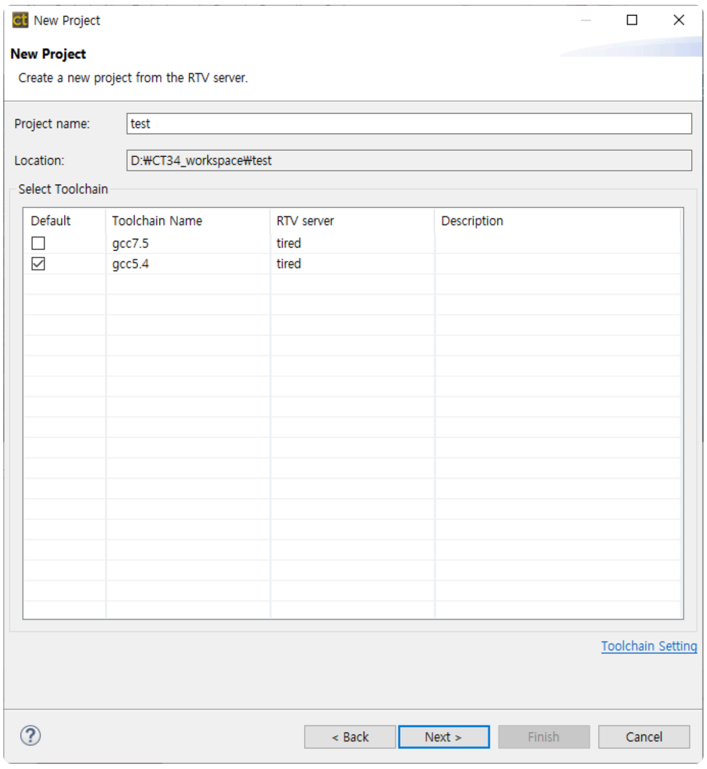
Name:

Description:

C/C++ Target Test Project from RTV Build Command

It is selected when creating an RTV target project by extracting information at the same time as building the source file. The user builds the source file on the RTV server using the build command and then creates the RTV target project.

1. Enter the project name in [Project name] and select the RTV toolchain to use in the [Select Toolchain]. After selecting the toolchain, then click the [Next] button.


New Project

New Project

Create a new project from the RTV server.

Project name: test

Location: D:₩CT34_workspace₩test

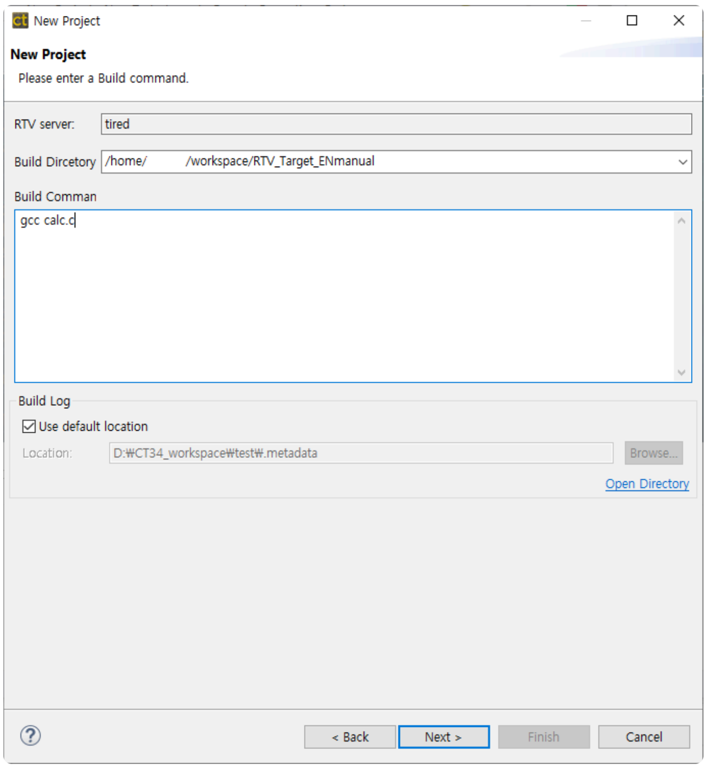
Select Toolchain

Default	Toolchain Name	RTV server	Description
☐	gcc7.5	tired	
☑	gcc5.4	tired	

Toolchain Setting

< Back | Next > | Finish | Cancel

2. Enter the path to build from the target server (for example, the directory where the make file is located), and enter the build command. In [Build Log], specify the path to the build results file. After entering the required information for the build, click the [Next] button. It builds the source file on the target server with the entered build command (depending on the build target, it can take a lot of time).


New Project

New Project

Please enter a Build command.

RTV server: tired

Build Dircetory /home/ /workspace/RTV_Target_ENmanual

Build Comman

gcc calc.c

Build Log

☑ Use default location

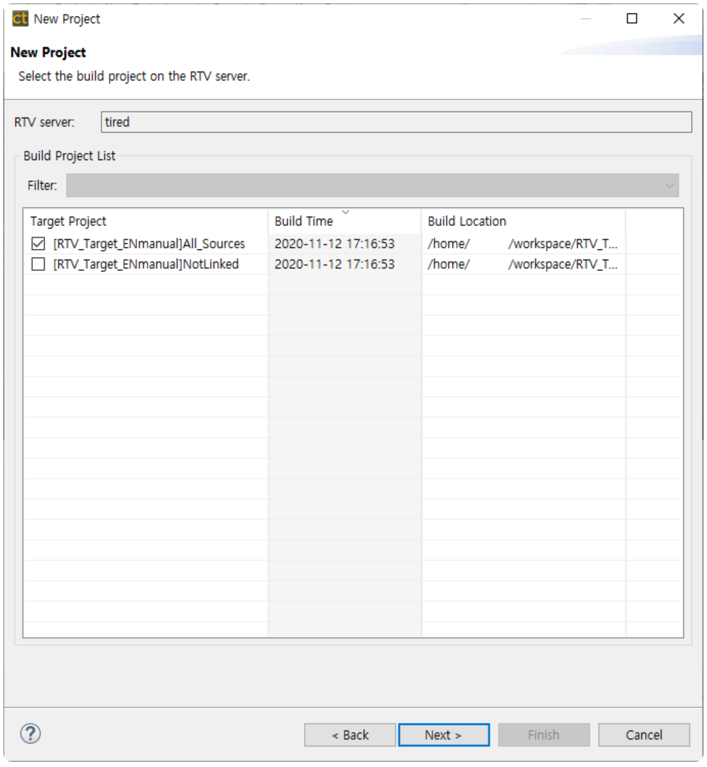
Location: D:₩CT34_workspace₩test₩.metadata Browse...

Open Directory

< Back | Next > | Finish | Cancel

3. When the build is complete, a list of built projects appears(※ Among the generated projects, ‘All_Sources_Project Name’ is a project that combines all the source files of the modules captured by csbuild. Since this project is a combined project without considering whether it is built or not, it may not be able to perform the test normally). In the [Build Project List], select the item for which

you want to create the RTV target project and click the [Next] button.



New Project

Select the build project on the RTV server.

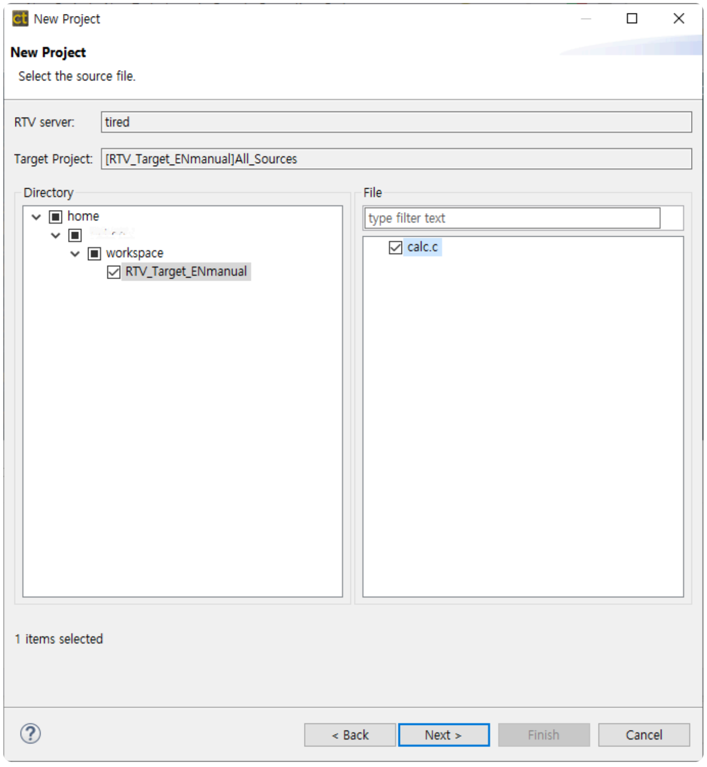
RTV server: tired

Build Project List

Filter:

Target Project	Build Time	Build Location
☑ [RTV_Target_ENmanual]All_Sources	2020-11-12 17:16:53	/home/ /workspace/RTV_T...
☐ [RTV_Target_ENmanual]NotLinked	2020-11-12 17:16:53	/home/ /workspace/RTV_T...

4. After selecting source files to be tested, click the [Next] button.



New Project

Select the source file.

RTV server: tired

Target Project: [RTV_Target_ENmanual]All_Sources

Directory
- home
  - workspace
    - ☑ RTV_Target_ENmanual

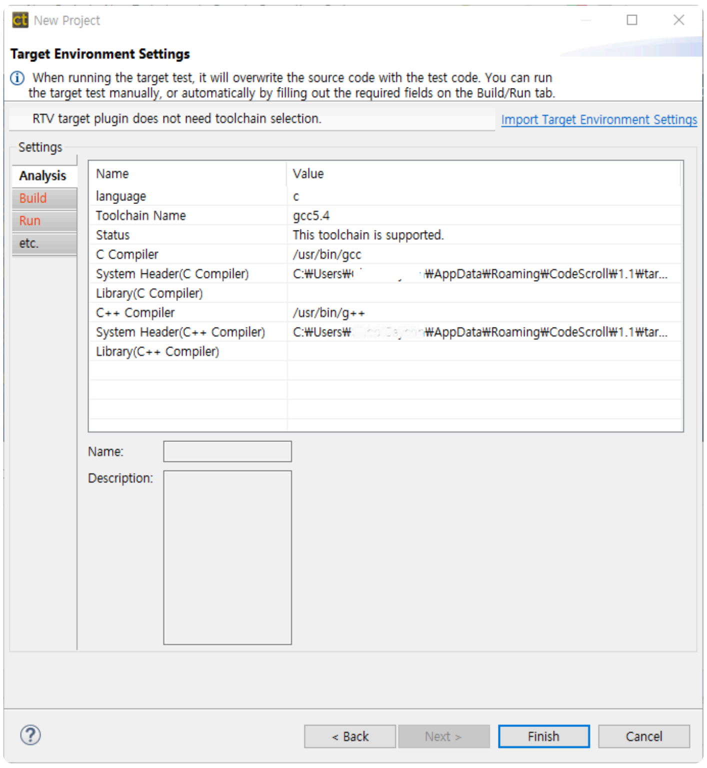
File

type filter text

☑ calc.c

1 items selected

5. After entering the detailed settings for each category and click the [Next] button


New Project

Target Environment Settings

When running the target test, it will overwrite the source code with the test code. You can run the target test manually, or automatically by filling out the required fields on the Build/Run tab.

RTV target plugin does not need toolchain selection.

Import Target Environment Settings

Settings

Analysis / Build / Run / etc.

Name	Value
language	c
Toolchain Name	gcc5.4
Status	This toolchain is supported.
C Compiler	/usr/bin/gcc
System Header(C Compiler)	C:₩Users₩[redacted]₩AppData₩Roaming₩CodeScroll₩1.1₩tar...
Library(C Compiler)	
C++ Compiler	/usr/bin/g++
System Header(C++ Compiler)	C:₩Users₩[redacted]₩AppData₩Roaming₩CodeScroll₩1.1₩tar...
Library(C++ Compiler)	

Name:

Description:

RTV build command

To create a project from build information, you must use the csbuild command on the build command. For RTV build command, refer to [RTV build command] in Create a RTV Project

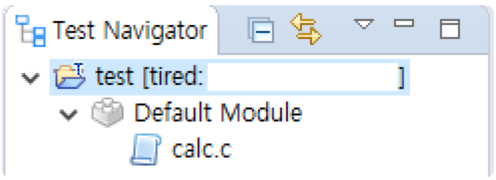
26.5. Refresh/Add RTV Target Source Files

If the source file is modified or added on the RTV server, the [Refresh RTV Source File] and [Add RTV Source File] allow the revised content to be reflected in the project. For Refresh/Add RTV Target Source Files, refer to Refresh/Add RTV Source Files.

26.6. RTV Target Project Information

Test navigator

- The icon for the RTV project is displayed as .
- The RTV server's information ([server name: IP]) is displayed after the name of the RTV target project.

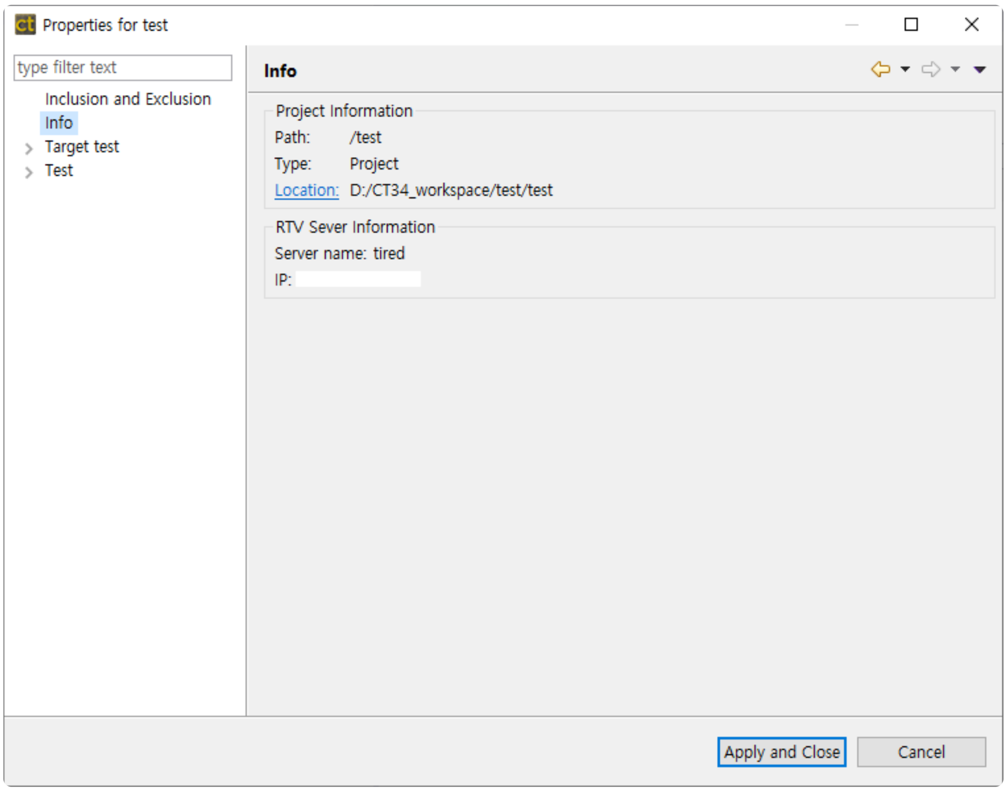


- Source files in the RTV project can not be modified(the source file editor of the RTV project is read-only).

Project properties

Info

The RTV target project displays the RTV server and project information.



Project Information
Path: /test
Type: Project
Location: D:/CT34_workspace/test/test

RTV Sever Information
Server name: tired
IP:

Target test

The RTV target project can set about target test run and RTV environment. For target test run settings, refer to Target Test Run Settings and for RTV environment settings, refer to Target Environment Settings.

Module/file properties

For properties about module or file, refer to RTV Project Information.

26.7. Run RTV Target Test

Test run

The binary file built in Linux environment can be tested in target environment using RTV Target Plug-in. For running the RTV target test, refer to Run RTV Test.

27. DISCOVERY Plug-in

DISCOVERY automatically generates test cases to increase coverage.

The process of executing DISCOVERY is as follows.

- DISCOVERY Install
- DISCOVERY Execution

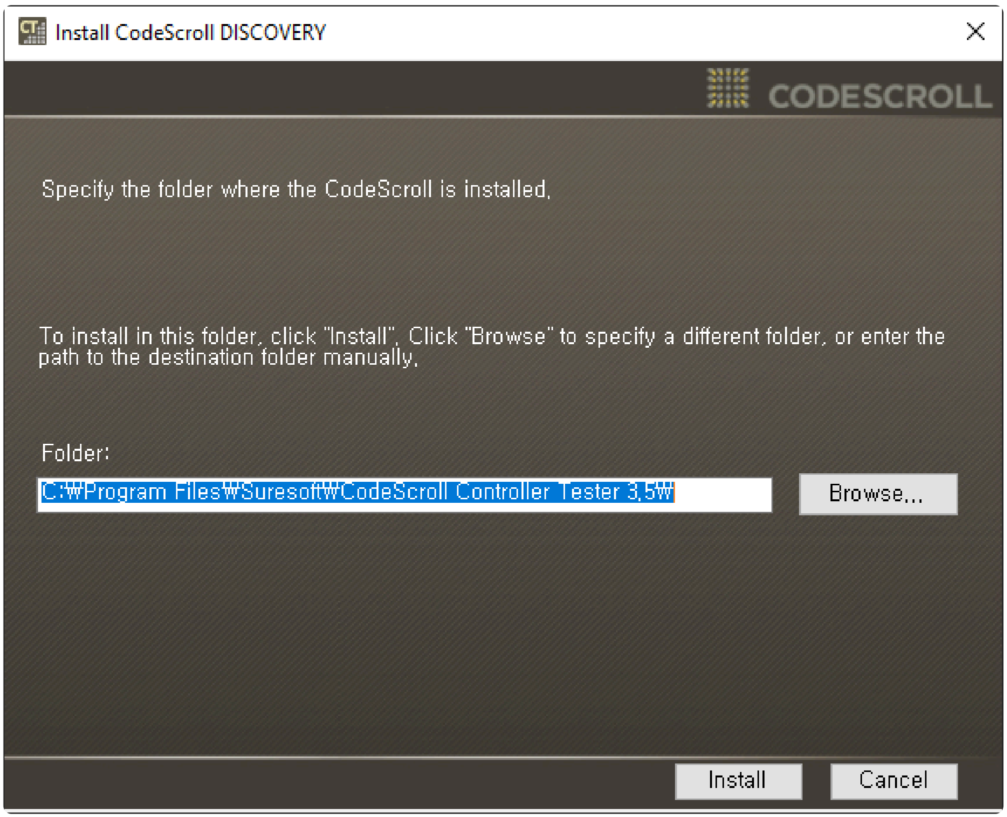
27.1. DISCOVERY Install

DISCOVERY Install

By using the install package, you can install DISCOVERY as follows:

1. Execute DISCOVERY_Installer.exe file.
   DISCOVERY_Installer.exe

2. Set the path where Controller Tester is installed and click [Install].



Install CodeScroll DISCOVERY

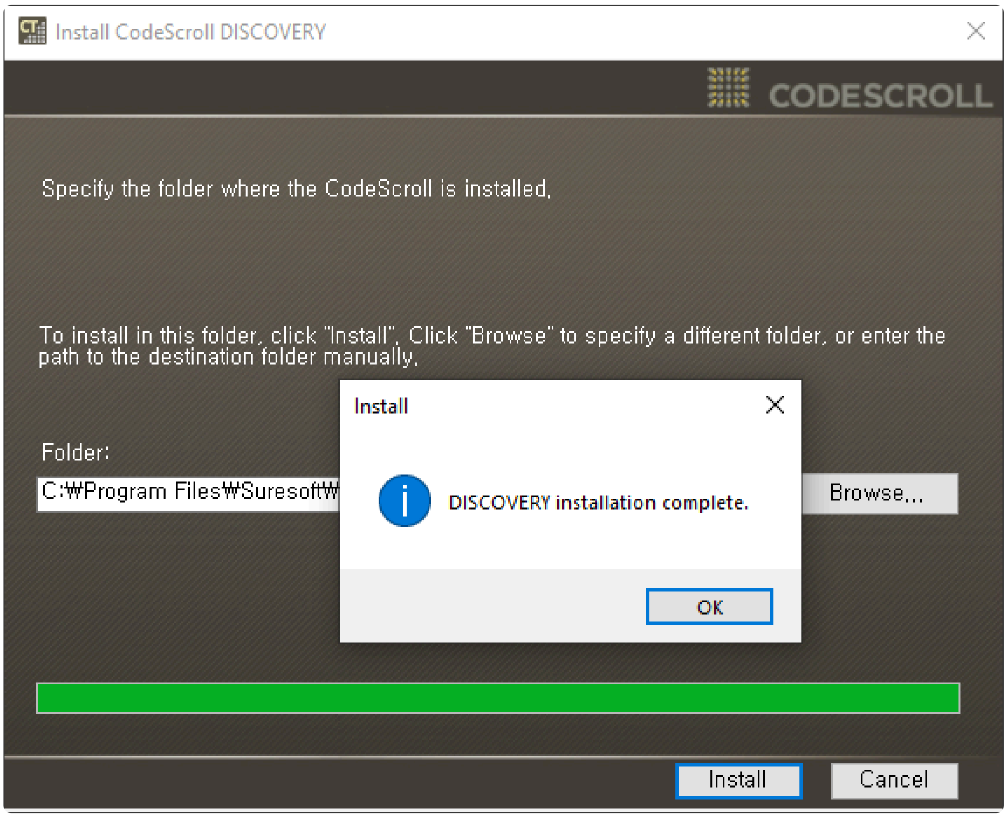
Specify the folder where the CodeScroll is installed.

To install in this folder, click "Install". Click "Browse" to specify a different folder, or enter the path to the destination folder manually.

Folder: C:\Program Files\Suresoft\CodeScroll Controller Tester 3.5\

! If the installation path of Controller Tester is wrong, it will not be installed. If the version of Controller Tester installed is lower than the version of Controller Tester required to install DISCOVERY, it will not be installed.

3. After installation is complete, click [OK] to automatically run Controller Tester.



Install CodeScroll DISCOVERY

Specify the folder where the CodeScroll is installed.

To install in this folder, click "Install". Click "Browse" to specify a different folder, or enter the path to the destination folder manually.

Folder:
C:₩Program Files₩Suresoft₩

Install

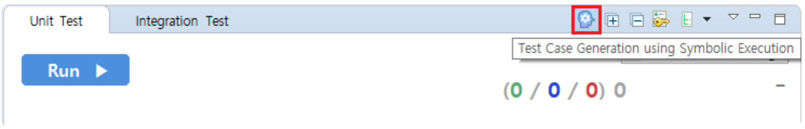
DISCOVERY installation complete.

27.2. DISCOVERY Execution

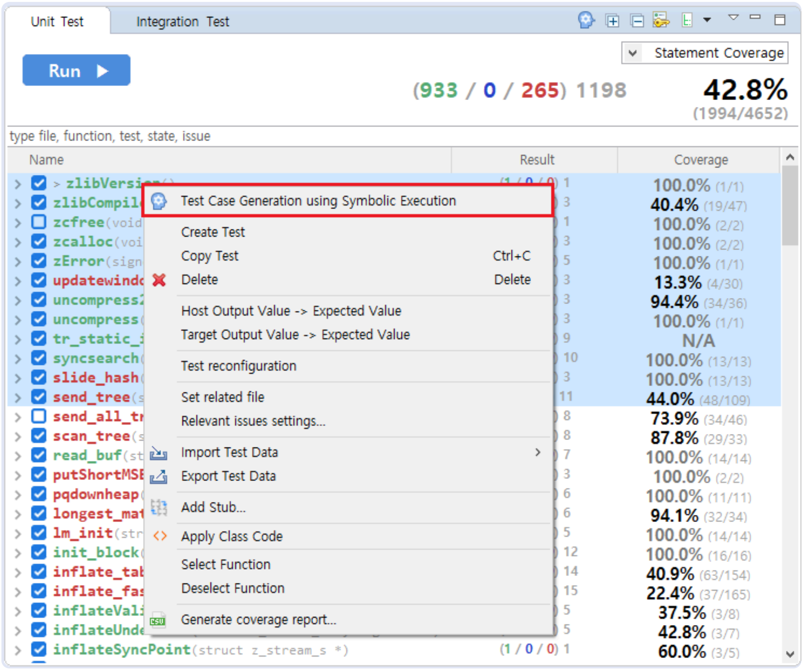
If you use the [Test Case Generation using Symbolic Execution] feature, test cases that can increase coverage are automatically generated.

Test Case Generation using Symbolic Execution

1. Generate test cases based on symbolic execution for the selected tests.
   - Toolbar in Unit Test View
     If you click [Test Case Generation using Symbolic Execution] on the toolbar of Unit Test View, test cases are generated and executed based on symbol execution for the function/test checked in Unit Test View.

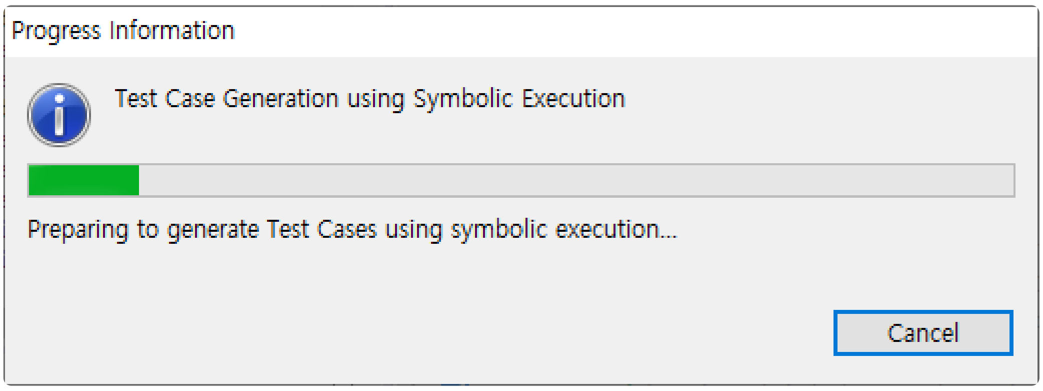


   - Context menu in Unit Test View
     Right-clicking a function/test and selecting the [Test Case Generation using Symbolic Execution] menu generates and executes a test case based on the symbolic execution.



Name	Result	Coverage
✓ > zlibVersion()	(1 / 0 / 0) 1	100.0% (1/1)
✓ zlibCompil	3	40.4% (19/47)
zcfree(void	1	100.0% (2/2)
✓ zcalloc(voi	3	100.0% (2/2)
✓ zError(sign	5	100.0% (1/1)
✓ updatewindo	3	13.3% (4/30)
✓ uncompress2	3	94.4% (34/36)
✓ uncompress(	3	100.0% (1/1)
✓ tr_static_i	9	N/A
✓ syncsearch(	10	100.0% (13/13)
✓ slide_hash(	3	100.0% (13/13)
✓ send_tree(s	11	44.0% (48/109)
send_all_tr	8	73.9% (34/46)
✓ scan_tree(s	8	87.8% (29/33)
✓ read_buf(st	7	100.0% (14/14)
✓ putShortMSB	3	100.0% (2/2)
✓ pqdownheap(	6	100.0% (11/11)
✓ longest_mat	6	94.1% (32/34)
✓ lm_init(str	5	100.0% (14/14)
✓ init_block(	12	100.0% (16/16)
✓ inflate_tab	14	40.9% (63/154)
✓ inflate_fas	15	22.4% (37/165)
✓ inflateVali	5	37.5% (3/8)
✓ inflateUnde	5	42.8% (3/7)
✓ inflateSyncPoint(struct z_stream_s *)	(1 / 0 / 0) 1	60.0% (3/5)

2. You can check the progress information after clicking [Test Case Generation using Symbolic Execution].

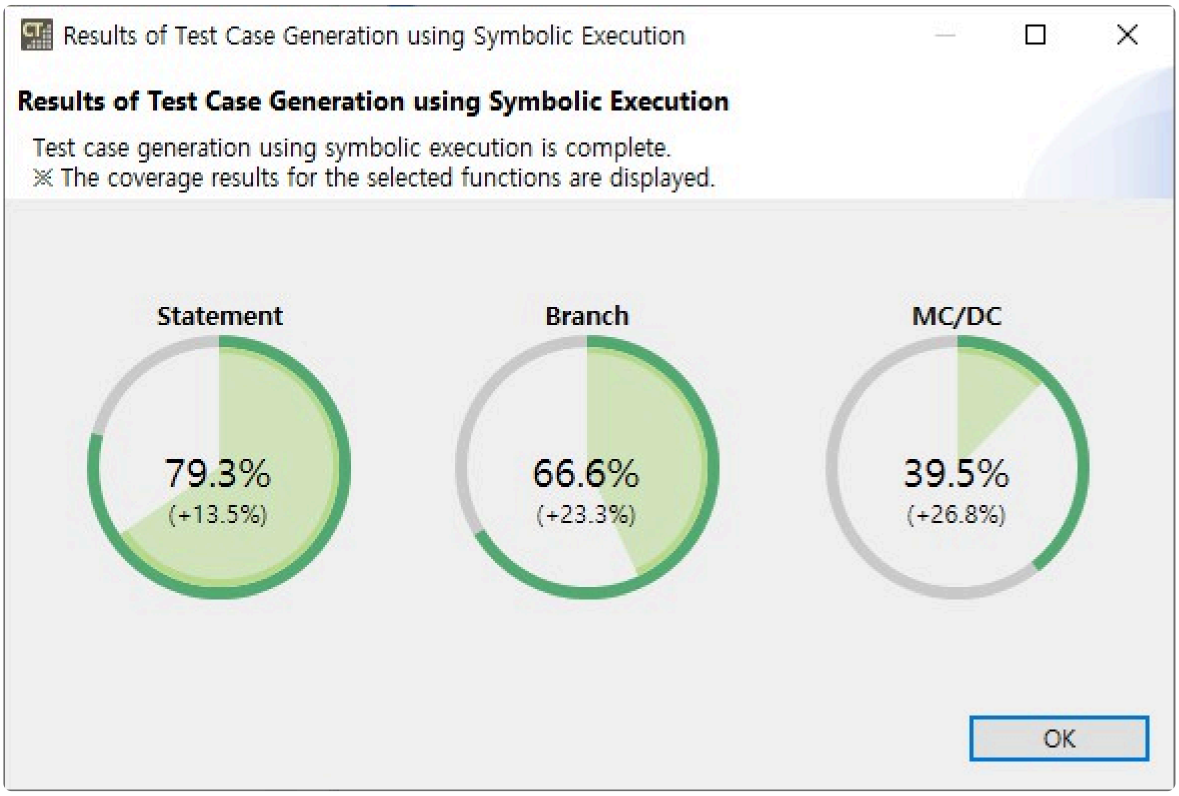

Progress Information

Test Case Generation using Symbolic Execution

Preparing to generate Test Cases using symbolic execution...

! When generating a test case based on symbolic execution, it may take a long time to generate test cases.

3. When the test case generation is completed, you can check the coverage through the [Test Case Generation using Symbolic Execution] dialog.


Results of Test Case Generation using Symbolic Execution

Results of Test Case Generation using Symbolic Execution

Test case generation using symbolic execution is complete.
※ The coverage results for the selected functions are displayed.

28. CONTROLLER TESTER CLI(Command Line Interface)

You can run Controller Tester in CLI environment.

The process of executing Controller Tester in CLI environment is as follows.

- Install CLI
- Project Import/Export
- CLI Settings
- CLI Execution

28.1. CLI Install

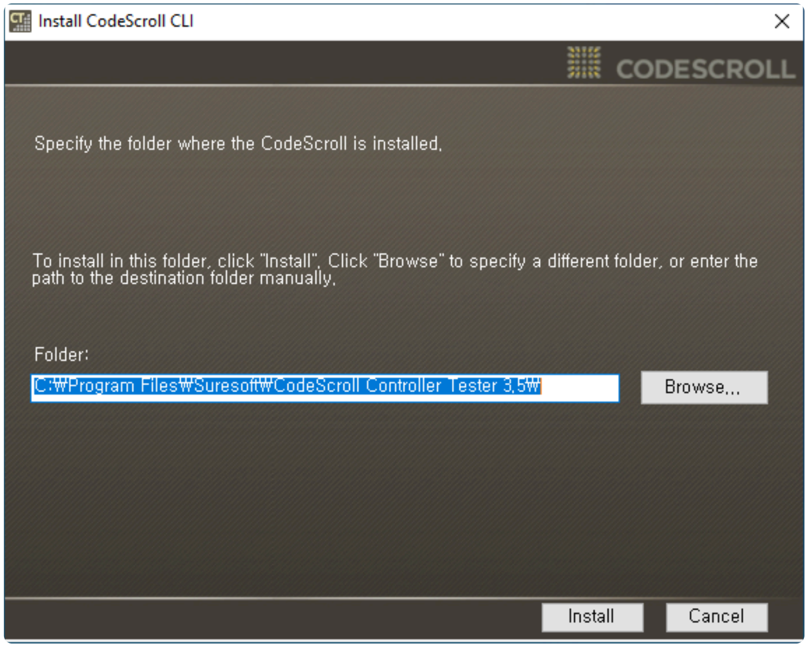
Install CLI

By using the install package, you can install CLI as follows:

1. Run the `CodeScroll CLI.exe` file.

   CodeScroll CLI.exe

2. Enter the path where Controller Tester is installed and click [Install].

   Install CodeScroll CLI

   CODESCROLL

   Specify the folder where the CodeScroll is installed.

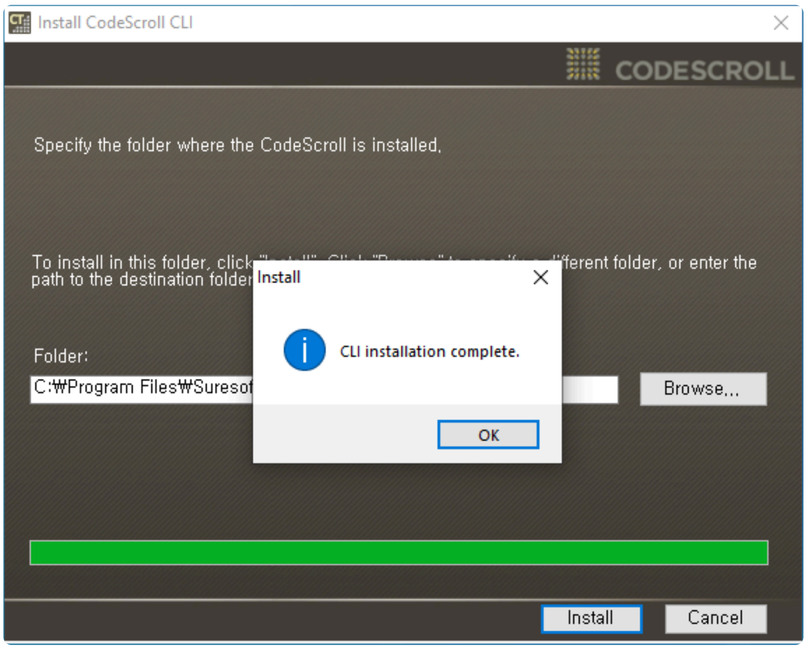
   To install in this folder, click "Install". Click "Browse" to specify a different folder, or enter the path to the destination folder manually.

   Folder:

   C:₩Program Files₩Suresoft₩CodeScroll Controller Tester 3.5₩

! If the installation path of Controller Tester is incorrect, it will not be installed.

3. CLI is installed.


Install CodeScroll CLI

CODESCROLL

Specify the folder where the CodeScroll is installed.

To install in this folder, click "Install". Click "Browse" to specify a different folder, or enter the path to the destination folder

Folder:

C:₩Program Files₩Suresof

Install

CLI installation complete.

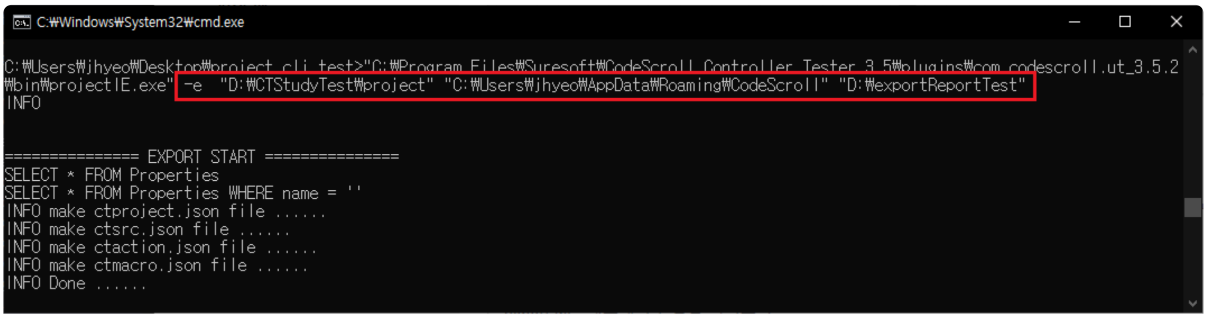
28.2. Project Import/Export

You can import and export projects in the CLI environment.

Export command

You can export a project using the `-e, --export <project top dir> <global top dir> <export dir>` command.

- projectIE.exe path: Controller Tester installation path\plugins\com.codescroll.ut_ut_3.x.x\bin.
- project top dir: export target project directory.
- global top dir: tool global directory.
- export dir: Export output directory.



```
C:₩Windows₩System32₩cmd.exe

C:₩Users₩jhyeo₩Desktop₩project_cli_test>"C:₩Program Files₩Suresoft₩CodeScroll Controller Tester 3.5₩plugins₩com.codescroll.ut_3.5.2
₩bin₩projectIE.exe" -e  "D:₩CTStudyTest₩project" "C:₩Users₩jhyeo₩AppData₩Roaming₩CodeScroll" "D:₩exportReportTest"
INFO


=============== EXPORT START ===============
SELECT * FROM Properties
SELECT * FROM Properties WHERE name = ''
INFO make ctproject.json file ......
INFO make ctsrc.json file ......
INFO make ctaction.json file ......
INFO make ctmacro.json file ......
INFO Done ......
```

Export output

- **io**: Folder containing the interface implementation file used for target export. Appears on the global path and does not create it if it does not exist.
- **target_server**: Folder containing RTV target server information. Appears on the global path and does not create if it does not exist.
- **factory**: Folder used for class factory function. Appears in the project path and does not create if it does not exist.
- **pa.ini, ut.ini**: Project analysis and test configuration files.
- **build.mk**: RTV project compilation flag file.
- **link.mk**: RTV project link flag file.
- **ctproject.json**: Project setting information and exclusion information.
    - infromation: Project information.
    - exclusions: [Project] – [Properties] – [Inclusion and Exclusion] – [Excluded].
    - Inclusions: [Project] – [Properties] – [Inclusion and Exclusion] – [Included].
    - globalExclusions: [Window] – [Preferences] – [Exclusion].
    - utCoverageExclusions: [Project] – [Properties] – [Test] – [Exclusion of coverage].
    - utUserCodeInsertNodes: Fault Injection view.
    - utClassFactories: Class Factory view.
    - properties: Project setting information.
    - globalProperties: Controller Tester global setting information.
- **ctsrc.json**: Test target source file information.
    - name: Module name.

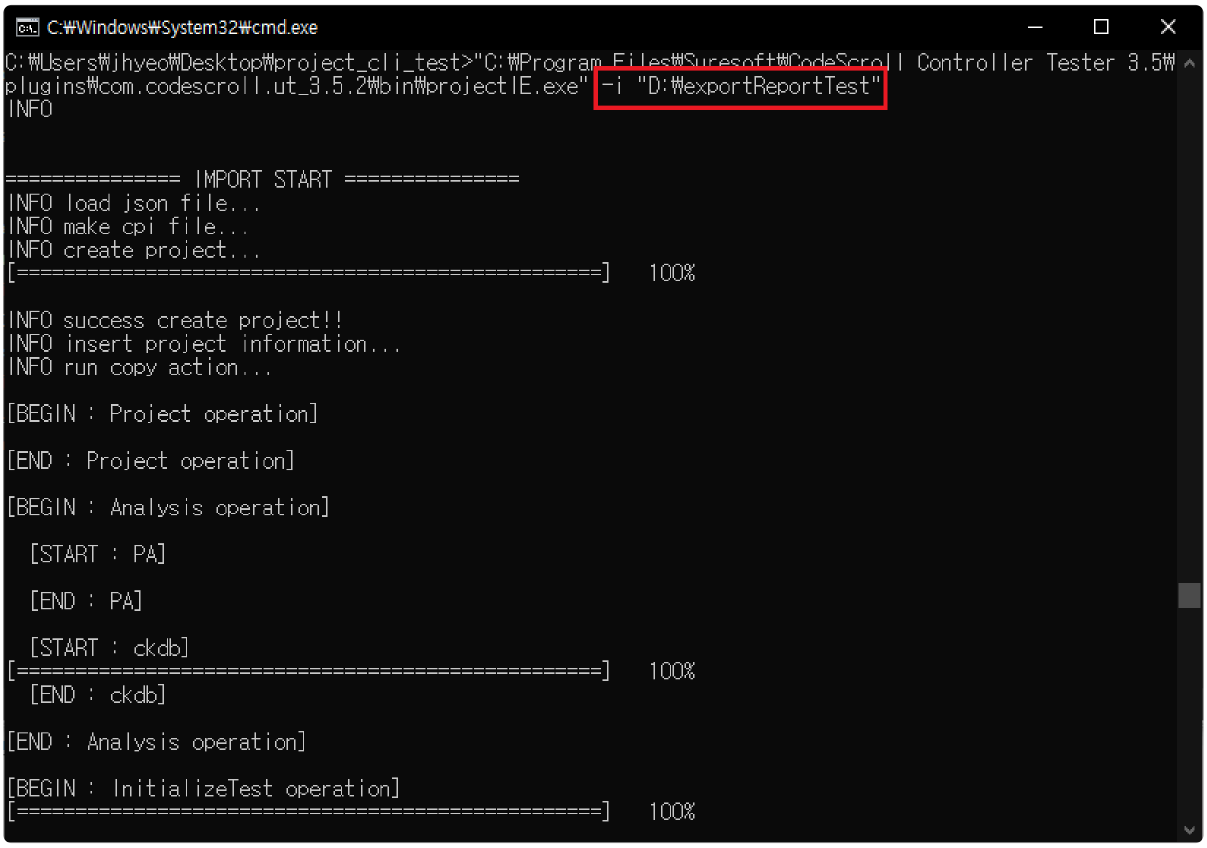
    - language: Target source language.
    - linkFlag: Link flag.
    - cmpileFlag: Compilation flag.
    - toolchainName: Toolchain name.
    - sourceTopDir: Source common parent path.
    - src.path: Source file path.
    - src.compileFlag: Compilation flag.
- **ctaction.json**: A file that defines actions to be executed for each step.
    - copy: Fields left by the existing copy action migration.
    - beforeCreateProject: Actions executed before project creation.
    - afterCreateProject: Action to be executed after project creation.
    - afterImport: Action to be executed after import is complete.
    - copy action: Description.
        - actionName: Action name.
        - from: Copy destination.
        - to: Path to be copied.
        - isDir: Whether a directory.
- **ctmacro.json**: The macro information inserted in each json file is replaced with the characters in the ctmacro.json file.
    - If you put it in the json file in the form of ${macro name}, it is replaced with the corresponding string when imported.
    - When exporting, the WORKSPACE and GLOBAL paths are created as blanks in the ctmacro.json file.
        - WORKSPACE: The workspace path of the project to be created when exporting.
        - GLOBAL: Global path of PC to be imported.

✻ The WORKSPACE path and GLOBAL path are required.

Import command

1. You can import the project using the # `-i, --i <import resource dir>` command.
    - import resource dir: Import destination directory.
2. Import will create a .import_product folder in the destination directory. In that folder, setup files (.cpi, .ini) and .bat files used for project creation and test export import are created.

✻ Create an exportTest folder in the import destination directory and copy the result of [Project] – [Export] – [Test] – [Export Test] to import the test when importing.



C:₩Windows₩System32₩cmd.exe

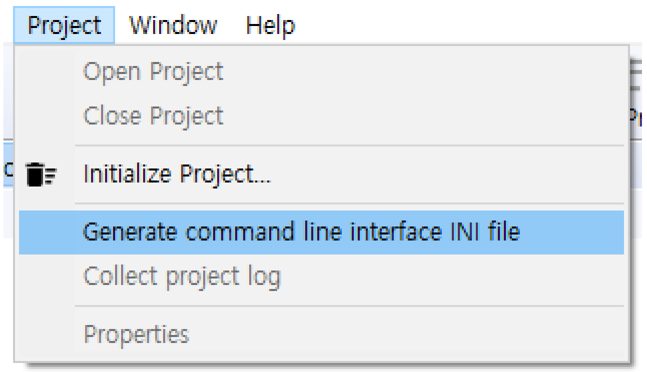
```
C:₩Users₩jhyeo₩Desktop₩project_cli_test>"C:₩Program Files₩Suresoft₩CodeScroll Controller Tester 3.5₩
plugins₩com.codescroll.ut_3.5.2₩bin₩projectIE.exe" -i "D:₩exportReportTest"
INFO


=============== IMPORT START ===============
INFO load json file...
INFO make cpi file...
INFO create project...
[==================================================]   100%

INFO success create project!!
INFO insert project information...
INFO run copy action...

[BEGIN : Project operation]

[END : Project operation]

[BEGIN : Analysis operation]

  [START : PA]

  [END : PA]

  [START : ckdb]
[==================================================]   100%
  [END : ckdb]

[END : Analysis operation]

[BEGIN : InitializeTest operation]
[==================================================]   100%
```

28.3. CLI Settings

Creates a configuration file to run Controller Tester in CLI environment.

Creating CLI configuration file

- If you select [Project] – [Generate command line interface INI file], the projectName_CLI.ini file and path.bat file are created in the path selected by the user.



✻ If there is no selected project, CLI.ini file and path.bat file that does not contain project information are created.

[Information]

Item	Description
workspace	Workspace path.
ct_version	Controller Tester version.

✻ [Information] automatically fills in the values when creating the CLI configuration file.

[Project]

Item	Description
create	Whether to create a project.
cpi_file	If `create=true`, the path to the `.cpi` file for project creation.
name	Project name.
toolchain	Toolchain name (create in case of RTV project).
target_project	Target project name (create in case of RTV project).

! The target_project option must be entered in the same way as the target project name in [Project]-[Properties]-[Information]-[RTV Server Information].

[Analysis]

Item	Description
run	Whether to perform analysis.

[InitializeTest]

Item	Description
run	If true, delete all existing tests.

[CreateTest]

Item	Description
run	Whether to generate unit tests.
target_function	It is a function name for generating unit tests. Unit tests can be created for one or more functions. When entering multiple functions, they can be separated with a semicolon (;) or Enter. If there is no target_function list, create unit tests for all functions.

[ImportTestInfo]

Item	Description
run	Whether to fetch test information.
testinfo_file	Path to the testinfo.export file.

[CreateTestCase]

Item	Description
run	Whether to create a test case.
mode	Test case generation mode. (flat, pairwise, random)
random_testcase_count	In case of random, input the number of test cases generated.

[ExecuteTest]

Item	Description
run	Whether to run unit test.

remote_target	RTV run or not.
run_robust	If an error occurs while running a test, whether to exclude non-executable tests.

[Report]

Item	Description
run	Whether to generate a report.
output_dir	Report output path. The default output path is project path.
each_test	Whether to generate a report by test.
HTML, XLSX, PDF, DOCX, PPTX, XLS, DOC, PPT	Specify Report Format
URL	URL of the results report accessible from ITS

Individual import of test information

By setting `run=false` in [ImportTestInfo], [ImportStub], [ImportTest], and [ImportIntegrationTest] can be executed individually.

[ImportStub]

Item	Description
run	Whether to perform stub import.
stub_file	Path to the stub file.
stub_dir	Path to the stub directory.

[ImportTest]

Item	Description
run	Whether to perform test import.
test_source_file	.utest file path. When entering multiple source file paths, they can be separated with a semicolon (;) or Enter.
test_source_dir	Path to the test source directory. If you enter the test source directory path, perform a full test import included in the directory path.

[ImportTestCase]

Item	Description
run	Whether to perform test import.
testcase_dir	Test case directory path. If you enter the test case directory path, import all test cases included in the directory path.

[ImportIntegrationTest]

Item	Description
run	Whether to perform integration tests and import of test cases.
test_file	.itest file path.
test_dir	Common parent path for .itest file. If the test and test case are in the same directory, perform an import.

Create CPI file

CPI file is a configuration file for creating a project in CLI environment. The project is created only when the [Project] – `create` option in the CLI.ini file is set to true.

You can set the option to create a project from the CPI template file in the path of `Controller Tester installation path\plugins\com.codescroll.gp.cli_version\cpi`.

! You cannot create a project in the CLI environment while using the workspace.

Item	Description
KIND	Project creation type setting. General project =1 Get Build Script = 2 Visual Studio Import =3 Import Embedded Project = 4
NAME	Project name.
LOCATION	Location of project creation.
DESCRIPTION	Project description.
LANGUAGE	Project type. Java = 0, C/C++ = 1

SourceFileProject

Item	Description

IUT_LANGUAGE	Target language type. C=0, C++=1, Java=2
DBSCHEMA	Global database schema version.
LINKFLAG	Link flag.
COMMON_COMPILEFLAG	Compilation flag to apply to all TUs.
TOOLCHAIN_NAME	Toolchain name.
BINARY_KIND	Binary type.
SOURCE_TOP_DIR	Source file top level directory.
SOURCE	Absolute path to source file.
COMPILEFLAG	Compilation flag to apply only to source files.
COMPILER_PATH	Path to the compiler to apply only to source files.

VisualStudioPorject

Item	Description
PROJECT_PATH	Visual Studio project file to import.
ENVFILE	Environment variable required for import.

BuildScriptProject

Item	Description
BUILD_COMMAND	Build script to perform the import.
WORKING_DIRECTORY	Working directory to perform import.
ENVFILE	Environment variable required for import.

EmbeddedProject

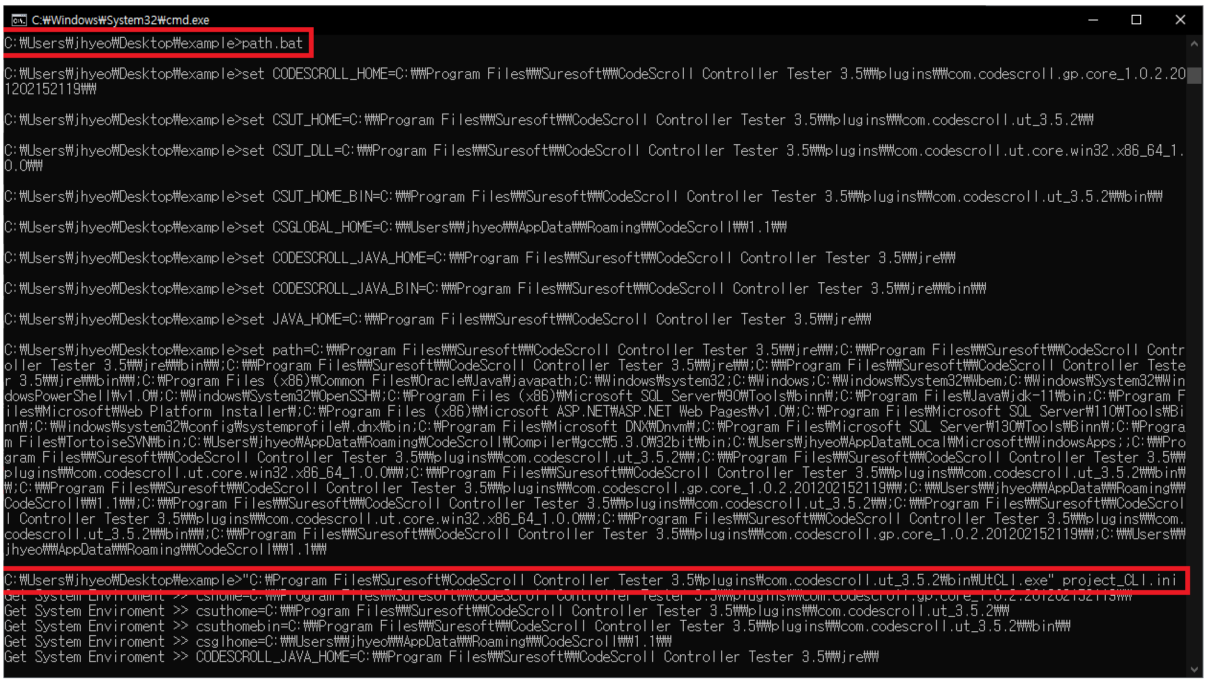
Item	Description
COMMON_COMPILEFLAG	Compilation flag to apply to all Source Files.
TOOLCHAIN_NAME	Toolchain name.
PROJECT_PATH	Visual Studio project file to import.

28.4. CLI Execution

Controller Tester can be done in CLI environment.

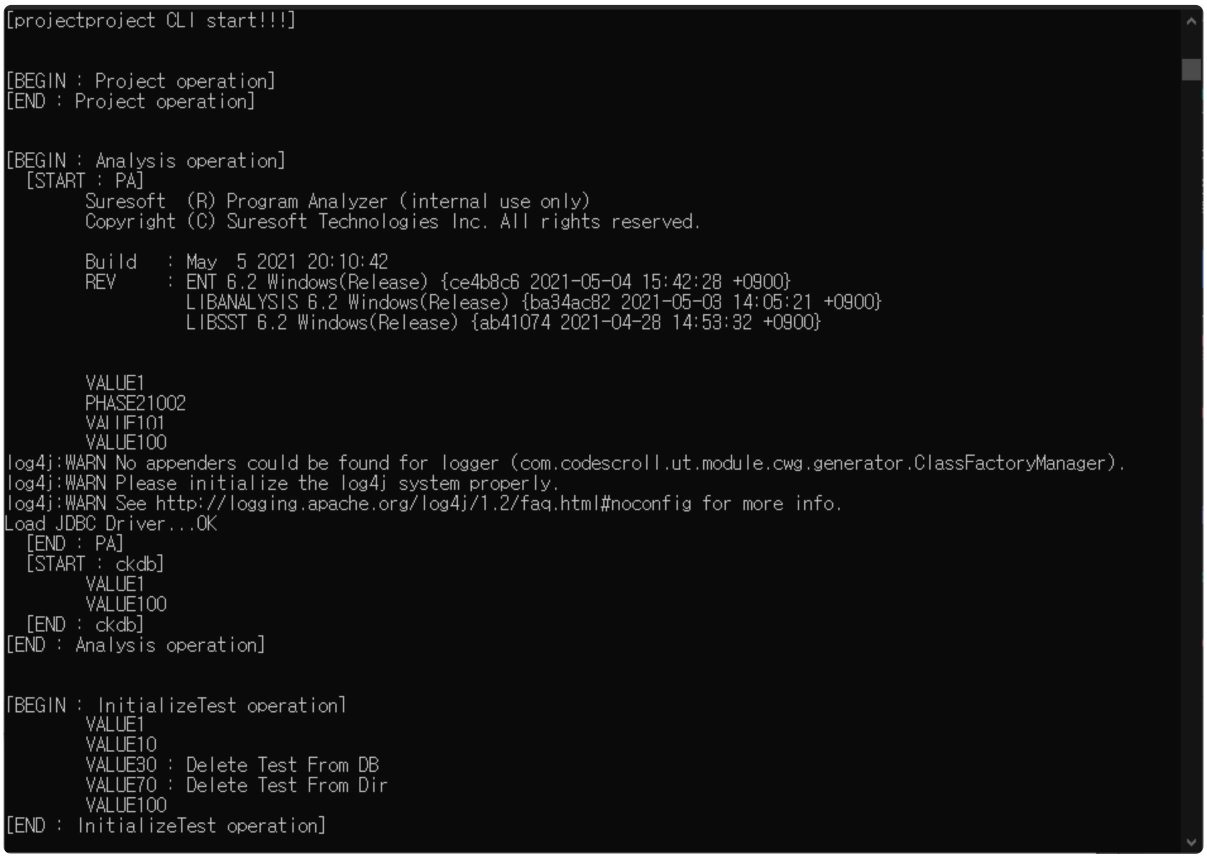
Performing Controller Tester with CLI

1. Execute the path.bat file created with [Generate command line interface INI file] to get the path information necessary for CLI execution.
2. Execute UtCLI.exe by passing the CLI.ini file edited by the user as an argument.
    - UtCLI.exe path: `Controller Tester installation path\plugins\com.codescroll.ut_ut_3.x.x\bin`



```
C:₩Users₩jhyeo₩Desktop₩example>path.bat

C:₩Users₩jhyeo₩Desktop₩example>set CODESCROLL_HOME=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.gp.core_1.0.2.20
1202152119₩₩

C:₩Users₩jhyeo₩Desktop₩example>set CSUT_HOME=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.ut_3.5.2₩₩

C:₩Users₩jhyeo₩Desktop₩example>set CSUT_DLL=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.ut.core.win32.x86_64_1.
0.0₩₩

C:₩Users₩jhyeo₩Desktop₩example>set CSUT_HOME_BIN=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.ut_3.5.2₩₩bin₩₩

C:₩Users₩jhyeo₩Desktop₩example>set CSGLOBAL_HOME=C:₩₩Users₩₩jhyeo₩₩AppData₩₩Roaming₩₩CodeScroll₩₩1.1₩₩

C:₩Users₩jhyeo₩Desktop₩example>set CODESCROLL_JAVA_HOME=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩jre₩₩

C:₩Users₩jhyeo₩Desktop₩example>set CODESCROLL_JAVA_BIN=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩jre₩₩bin₩₩

C:₩Users₩jhyeo₩Desktop₩example>set JAVA_HOME=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩jre₩₩

C:₩Users₩jhyeo₩Desktop₩example>set path=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩jre₩₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Contr
oller Tester 3.5₩₩jre₩₩bin₩₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩jre₩₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Teste
r 3.5₩₩jre₩₩bin₩₩;C:₩Program Files (x86)₩Common Files₩Oracle₩Java₩javapath;C:₩₩indows₩system32;C:₩₩indows;C:₩₩indows₩System32₩₩bem;C:₩₩indows₩System32₩₩in
dowsPowerShell₩v1.0₩;C:₩₩indows₩System32₩OpenSSH₩;C:₩Program Files (x86)₩Microsoft SQL Server₩90₩Tools₩binn₩;C:₩Program Files₩Java₩jdk-11₩bin;C:₩Program F
iles₩Microsoft₩Web Platform Installer₩;C:₩Program Files (x86)₩Microsoft ASP.NET₩ASP.NET Web Pages₩v1.0₩;C:₩Program Files₩Microsoft SQL Server₩110₩Tools₩Bi
nn₩;C:₩₩indows₩system32₩config₩systemprofile₩.dnx₩bin;C:₩Program Files₩Microsoft DNX₩Dnvm₩;C:₩Program Files₩Microsoft SQL Server₩130₩Tools₩Binn₩;C:₩Progra
m Files₩TortoiseSVN₩bin;C:₩Users₩jhyeo₩AppData₩Roaming₩CodeScroll₩Compiler₩gcc₩5.3.0₩32bit₩bin;C:₩Users₩jhyeo₩AppData₩Local₩Microsoft₩₩indowsApps;;C:₩₩Pro
gram Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.ut_3.5.2₩₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩
plugins₩₩com.codescroll.ut.core.win32.x86_64_1.0.0₩₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.ut_3.5.2₩₩bin₩
₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.gp.core_1.0.2.201202152119₩₩;C:₩₩Users₩₩jhyeo₩₩AppData₩₩Roaming₩₩
CodeScroll₩₩1.1₩₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.ut_3.5.2₩₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScrol
l Controller Tester 3.5₩₩plugins₩₩com.codescroll.ut.core.win32.x86_64_1.0.0₩₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.
codescroll.ut_3.5.2₩₩bin₩₩;C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.gp.core_1.0.2.201202152119₩₩;C:₩₩Users₩₩
jhyeo₩₩AppData₩₩Roaming₩₩CodeScroll₩₩1.1₩₩

C:₩Users₩jhyeo₩Desktop₩example>"C:₩Program Files₩Suresoft₩CodeScroll Controller Tester 3.5₩plugins₩com.codescroll.ut_3.5.2₩bin₩UtCLI.exe" project_CLI.ini
Get System Enviroment >> cshome=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.gp.core_1.0.2.201202152119₩₩
Get System Enviroment >> csuthome=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.ut_3.5.2₩₩
Get System Enviroment >> csuthomebin=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩plugins₩₩com.codescroll.ut_3.5.2₩₩bin₩₩
Get System Enviroment >> csglhome=C:₩₩Users₩₩jhyeo₩₩AppData₩₩Roaming₩₩CodeScroll₩₩1.1₩₩
Get System Enviroment >> CODESCROLL_JAVA_HOME=C:₩₩Program Files₩₩Suresoft₩₩CodeScroll Controller Tester 3.5₩₩jre₩₩
```

3. The Controller Tester function set by the user is performed.



```
[projectproject CLI start!!!]


[BEGIN : Project operation]
[END : Project operation]


[BEGIN : Analysis operation]
  [START : PA]
        Suresoft  (R) Program Analyzer (internal use only)
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        Build   : May  5 2021 20:10:42
        REV     : ENT 6.2 Windows(Release) {ce4b8c6 2021-05-04 15:42:28 +0900}
                  LIBANALYSIS 6.2 Windows(Release) {ba34ac82 2021-05-03 14:05:21 +0900}
                  LIBSST 6.2 Windows(Release) {ab41074 2021-04-28 14:53:32 +0900}


        VALUE1
        PHASE21002
        VALUE101
        VALUE100
log4j:WARN No appenders could be found for logger (com.codescroll.ut.module.cwg.generator.ClassFactoryManager).
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
Load JDBC Driver...OK
  [END : PA]
  [START : ckdb]
        VALUE1
        VALUE100
  [END : ckdb]
[END : Analysis operation]


[BEGIN : InitializeTest operation]
        VALUE1
        VALUE10
        VALUE30 : Delete Test From DB
        VALUE70 : Delete Test From Dir
        VALUE100
[END : InitializeTest operation]
```

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