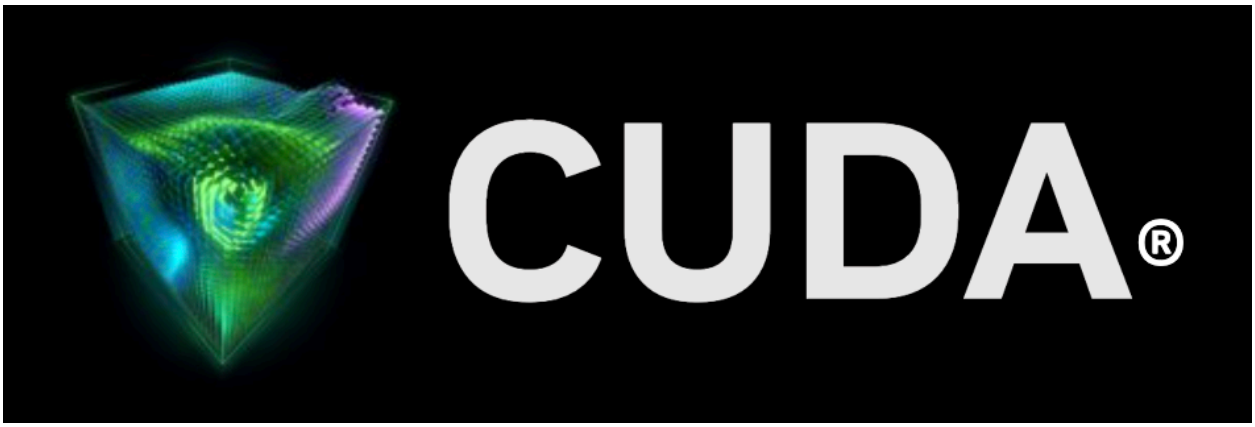


Nsight Eclipse Plugins Guide

Release 13.2

NVIDIA Corporation

Mar 05, 2026

Contents

Nsight Eclipse Plugins Edition Getting Started Guide

The user guide for using Nsight Eclipse Plugins Edition.

This guide introduces Nsight Eclipse Plugins Edition and provides instructions necessary to start using this tool. Nsight Eclipse is based on Eclipse CDT project. For a detailed description of Eclipse CDT features consult the integrated help “C/C++ Development User Guide” available from inside Nsight (through Help->Help Contents menu).

Chapter 1. About Nsight Eclipse Plugins Edition

NVIDIA® Nsight™ Eclipse Edition is a unified CPU plus GPU integrated development environment (IDE) for developing CUDA® applications on Linux for the x86 and ARM platforms. It is designed to help developers on all stages of the software development process. Nsight Eclipse Plugins can be installed on vanilla Eclipse using the standard Help->Install New Software.. Menu. The principal features are as follows:

- Edit, build and debug CUDA-C applications
- CUDA aware source code editor – syntax highlighting, code completion and inline help
- Graphical user interface for debugging heterogeneous applications

For more information about Eclipse Platform, visit http://eclipse.org

Chapter 2. Using Nsight Eclipse Edition

2.1. Installing Nsight Eclipse Edition

Nsight Eclipse Plugins archive is part of the CUDA Toolkit. Nsight Eclipse Plugins archive can be installed using the Help -> Install New Software... Menu on Eclipse

2.1.1. Installing CUDA Toolkit

To install CUDA Toolkit:

1. Visit the NVIDIA CUDA Toolkit download page: https://developer.nvidia.com/cuda-downloads
2. Select appropriate operating system. Nsight Eclipse Edition is available in Linux toolkit packages.
3. Download and install the CUDA Driver.
4. Download and install the CUDA Toolkit.
5. Follow instructions to configure CUDA Driver and Toolkit on your system.

2.1.2. Configure CUDA Toolkit Path

When Eclipse is first launched with Nsight Eclipse plugins in the new workspace, NVIDIA usage data collection dialog will be displayed as below. Click Yes to enable usage collection. This can be disabled later from the CUDA preference page.

To get started, CUDA Toolkit path must be configured in Eclipse with Nsight Plugins:

1. Open the Preferences page, Window > Preferences.
2. Go to CUDA toolkit section.
3. Select the CUDA toolkit path to be used by Nsight. CUDA tookits that are installed in the default location will automatically appear.
4. CUDA toolkit path can be also specified in the project properties page in order to use different toolkit for a project.
5. Enable usage data collection if you wish to send usage data to NVIDIA.
6. Click on the button to set cuda-gdb as the default launcher.

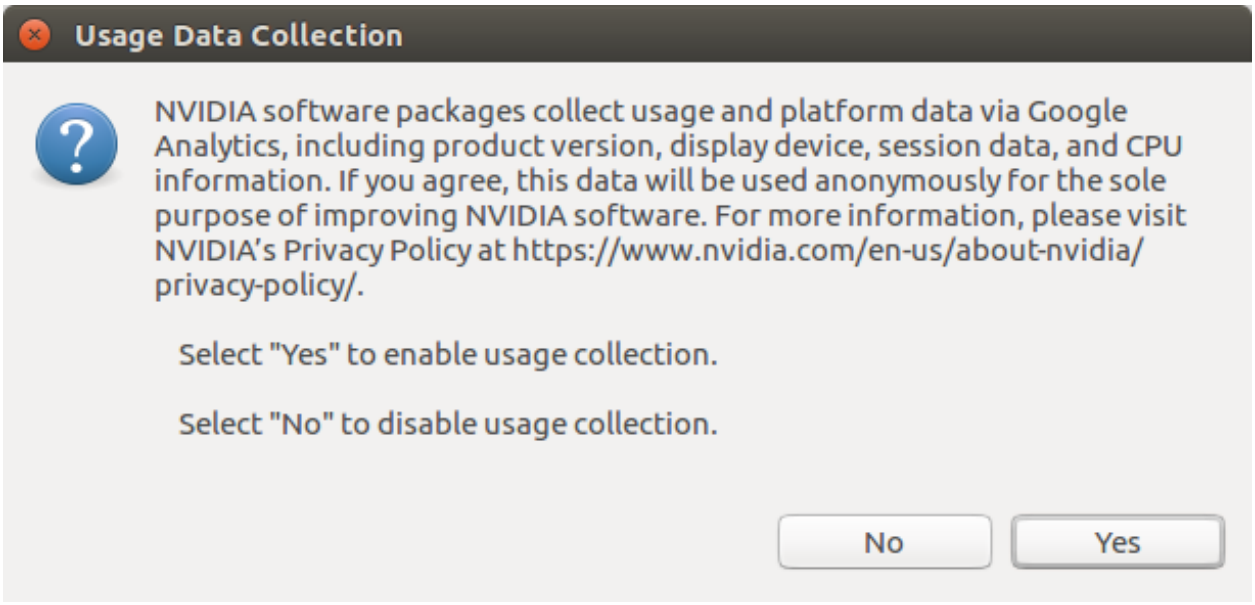
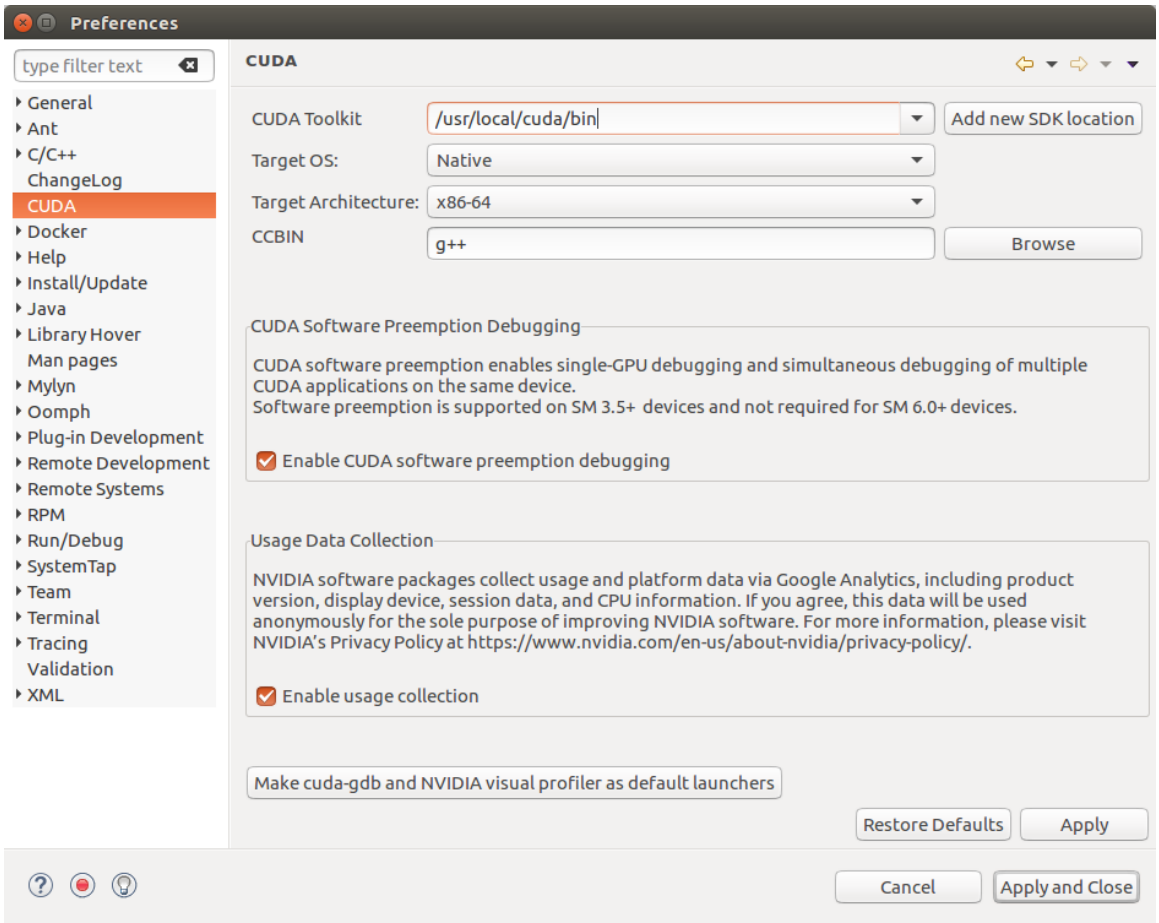
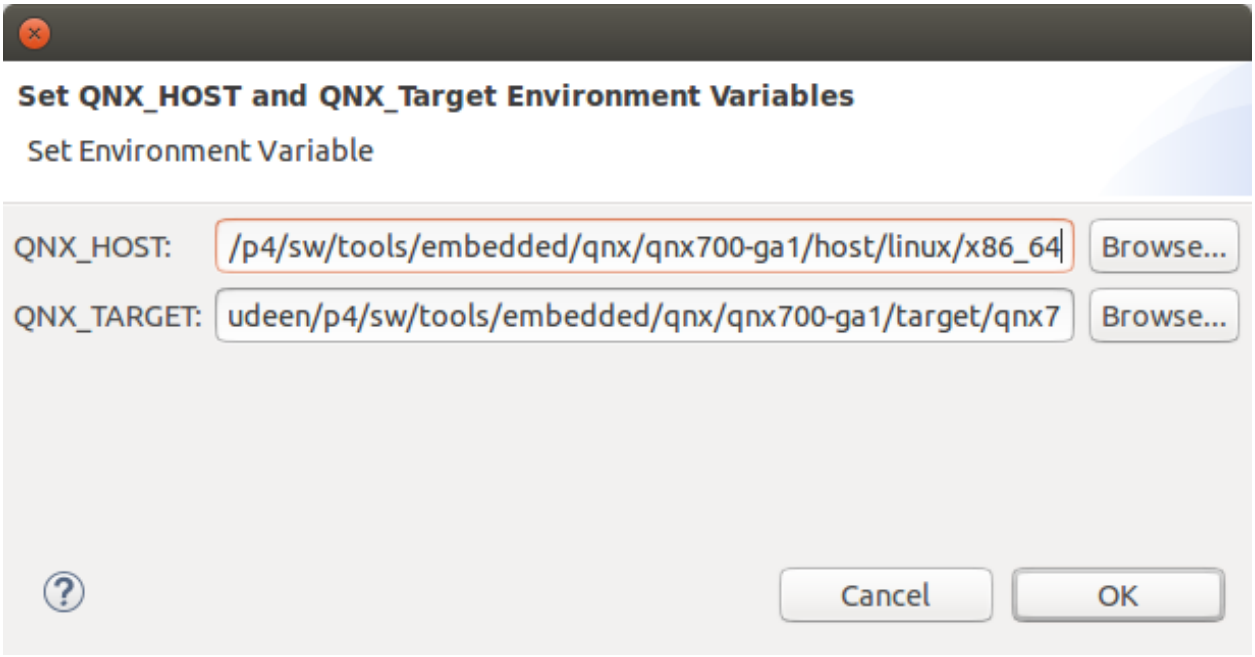


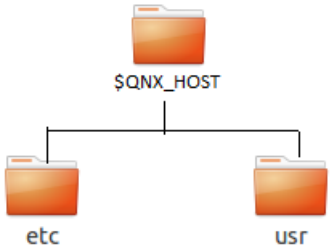
Fig. 1: Usage data collection page



7. **For QNX:** When QNX is selected as Target OS, a dialog will be displayed to set the QNX_HOST and QNX_TARGET environment variables if they were not already set.



QNX_HOST environment variable identifies the directory that holds the host-related components:



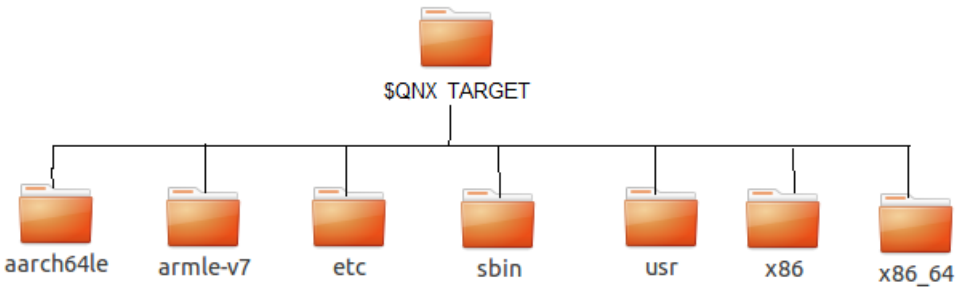
QNX_TARGET environment variable identifies the directory that holds the target-related components:

2.2. Nsight Eclipse Main Window

On the first run Eclipse will ask to pick a workspace location. The workspace is a folder where Nsight will store its settings, local files history and caches. An empty folder should be selected to avoid overwriting existing files.

The main Nsight window will open after the workspace location is selected. The main window is divided into the following areas:

- Editor - displays source files that are opened for editing.
- Project Explorer - displays project files



- Outline - displays structure of the source file in the current editor.
- Problems - displays errors and warnings detected by static code analysis in IDE or by a compiler during the build.
- Console - displays make output during the build or output from the running application.

2.3. Creating a New Project

1. From the main menu, open the new project wizard - File > New... > CUDA C/C++ Project
2. Specify the project name and project files location.
3. Specify the project type like executable project.
4. Specify the CUDA toolchain from the list of toolchains.
5. Specify the project configurations on the next wizard page.
6. Complete the wizard. The project will be shown in the Project Explorer view and source editor will be opened.
7. Build the project by clicking on the hammer button on the main toolbar.

2.4. Importing CUDA Samples

The CUDA samples are an optional component of the CUDA Toolkit installation. Nsight provides a mechanism to import these samples and work with them easily:

Note: Samples that use the CUDA driver API (suffixed with “Drv”) are not supported by Nsight.

1. From the main menu, open the new project wizard - File > New... > CUDA C/C++ Project
2. Specify the project name and project files location.
3. Select Import CUDA Sample under Executable in the Project type tree.
4. Select CUDA toolchain from the Toolchains option. location.

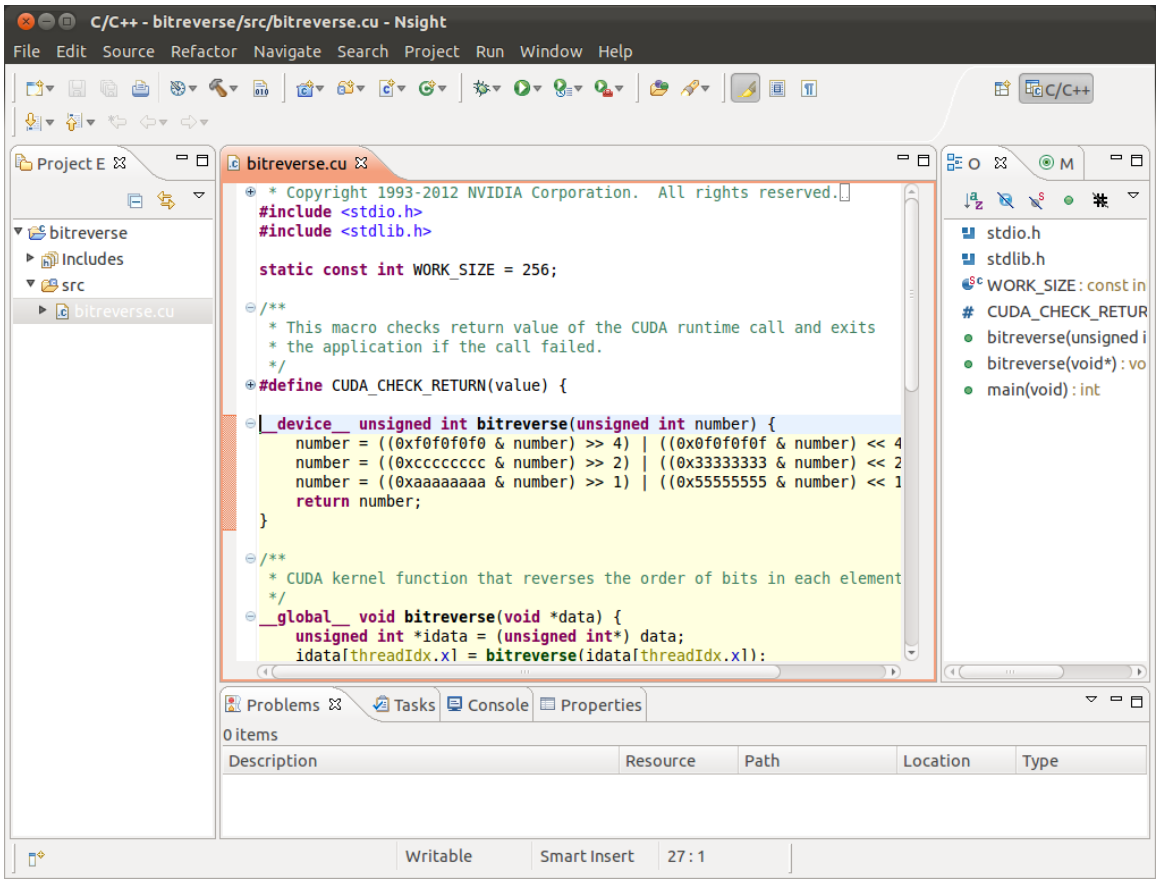


Fig. 2: Nsight main window after creating a new project

5. On the next wizard page select project sample you want to import. Also select the target CPU architecture. Press Next...
6. Specify the project parameters on the next wizard page.
7. Complete the wizard. The project will be shown in the Project Explorer view and source editor will be opened.
8. Build the project by clicking on the hammer button on the main toolbar.

2.5. CMake CUDA Samples

2.5.1. Making of CUDA Samples using CMake

Prerequisites

- Eclipse IDE (with C/C++ support)
- CMake installed and available in your system path
- CUDA Toolkit installed (e.g */usr/local/cuda-13.0*)
- NVIDIA CUDA Samples downloaded and extracted

1. Open a terminal and navigate to the sample directory:

```
$ cd NVIDIA_CUDA-13.0_Samples/Samples/0_Introduction/matrixMul
```

2. Create a new build directory:

```
$ mkdir -p build && cd build
```

3. Run CMake with the Eclipse CDT generator:

```
$ cmake -G "Eclipse CDT4 - Unix Makefiles" \
  -DCMAKE_BUILD_TYPE=Debug \
  -DENABLE_CUDA_DEBUG=True ..
```

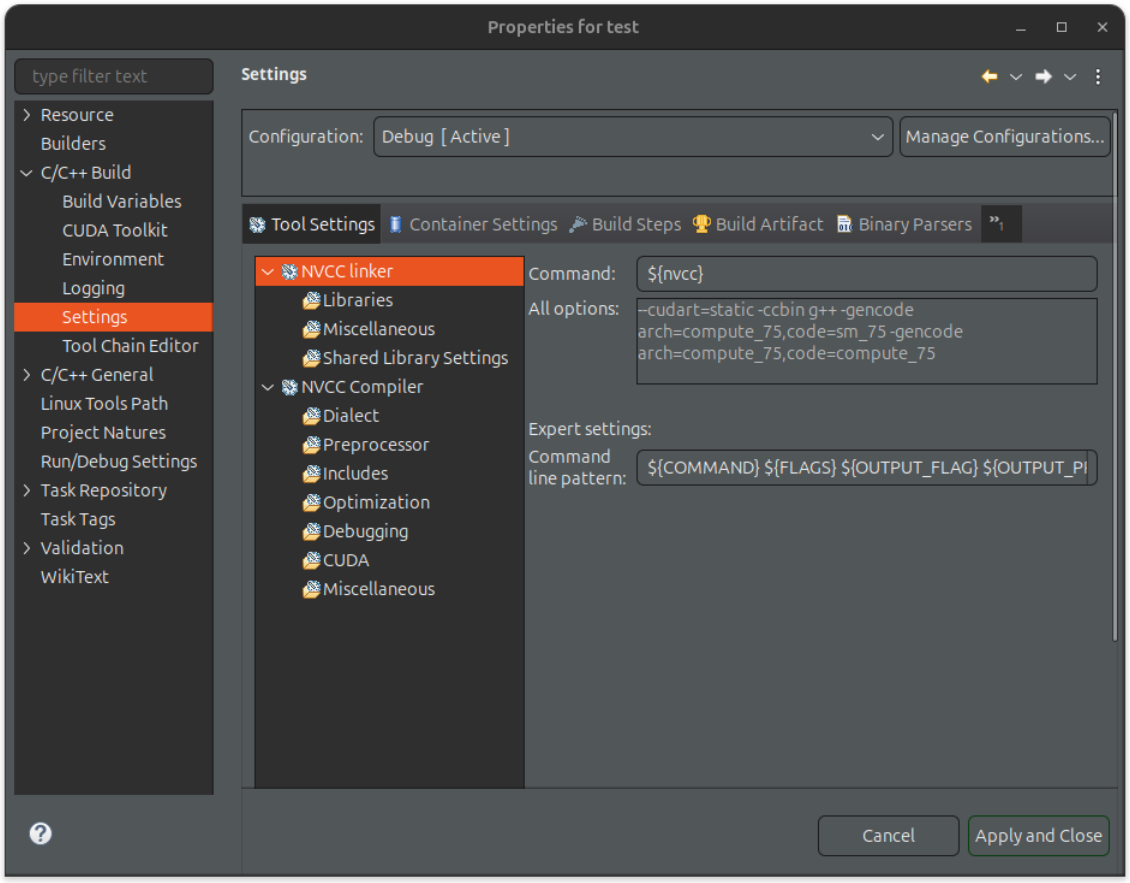
Upon configuration, CMake generates the project's Makefile within the designated build directory.

2.5.2. Creating a New Project

1. From the main menu, Go to File -> Import -> General -> Existing Projects into Workspace
2. In the Import Projects wizard, Set the Root Directory to the project build path
3. Eclipse will automatically detect the generated project
4. Click Finish to import.
5. project will be shown in the Project Explorer view and source editor will be opened.
6. Build the project by clicking on the hammer button on the main toolbar.

2.6. Configure Build Settings

To define build settings: In the C/C++ Projects view, right-click your project, and select Properties. Select C/C++ Build, Settings from the list.



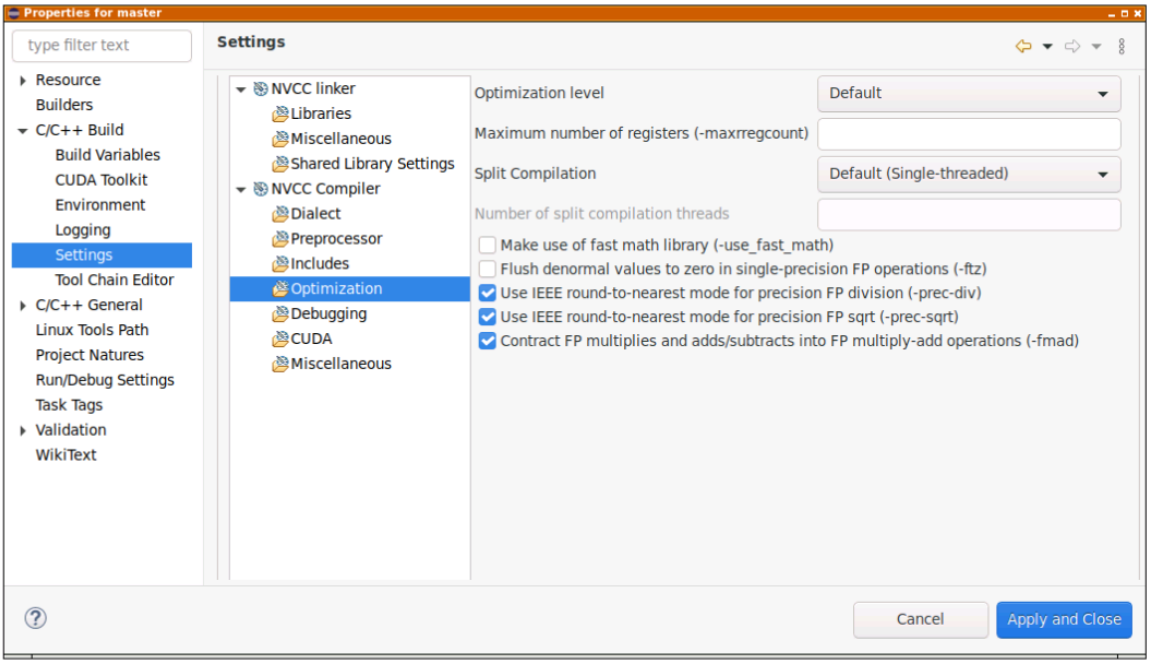
The following are the categories of Nvcc linker settings that can be configured for the selected project.

Note: All options field in the main page is not editable and it's the collection of options set in the child categories.

- Libraries - Configure library search path(-L) and to include linker libraries(-l). When you are cross compiling for different target os, the library search path should point to the appropriate location where the target os libraries are present.
- Miscellaneous - Set additional linker options and option to link with OpenGL libraries.
- Shared Library Settings - Set option to build a shared library.

The following are the categories of Nvcc Compiler settings that can be configured for the selected project.

Note: All options field in the main page is not editable and it's the collection of options set in the child



categories.

- Dialect - Select the language standard and dialect options.
- Preprocessor - Add the defined and undefined symbols for the preprocessor.
- Includes - Set include paths and include files for the compiler.
- Optimization - Set the optimization level used by the compiler for code generation. Additionally, set the number of threads that the compiler will use during the compiliation process ("split compilation"). Split compilation is either basic or extended, both cannot be used at the same time.
- Debugging - Set the options to generate debug information.
- CUDA - Generate code for different real architectures with the PTX for the same vitrual architectures.

Note: As of CUDA Toolkit 12.8, Nsight Eclipse plugins will no longer be included in Tegra (SOC) packages, such as DriveOS or Jetson. Users of these packages are encouraged to use Nsight Visual Studio Code, available in the VSCode Extension Gallery or from the Microsoft VSCode Marketplace.

2.7. Debugging CUDA Applications

Nsight must be running and at least one project must exist.

1. In the Project Explorer view, select project you want to debug. Make sure the project executable is compiled and no error markers are shown on the project.
2. Right click on the project and go to Debug As > NVIDIA CUDA GDB Debugger menu.
3. You will be offered to switch perspective when you run debugger for the first time. Click “Yes”. Perspective is a window layout preset specifically designed for a particular task.
4. Application will suspend in the main function. At this point there is no GPU code running.
5. Add a breakpoint in the device code. Resume the application.

Debugger will break when application reaches the breakpoint. You can now explore your CUDA device state, step through your GPU code or resume the application.

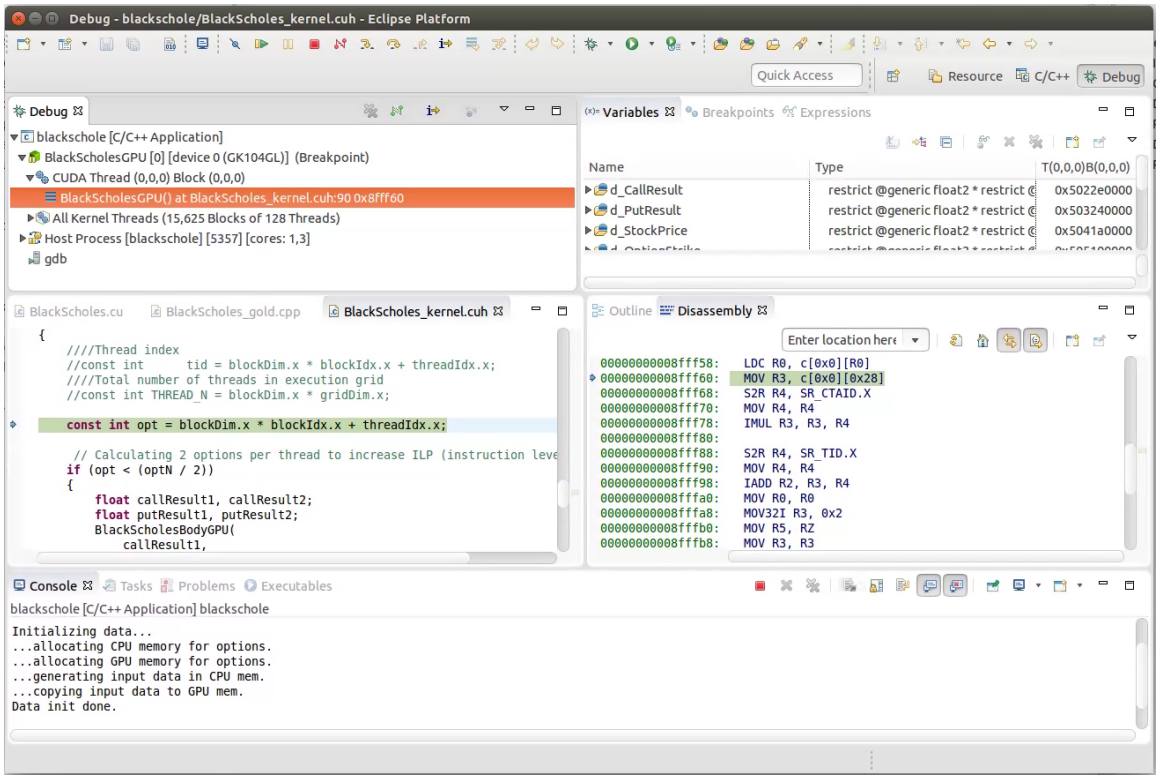


Fig. 3: Debugging CUDA application

Additional debugger options can be set in the debug configuration dialog through Run > Debug Configurations .. menu..

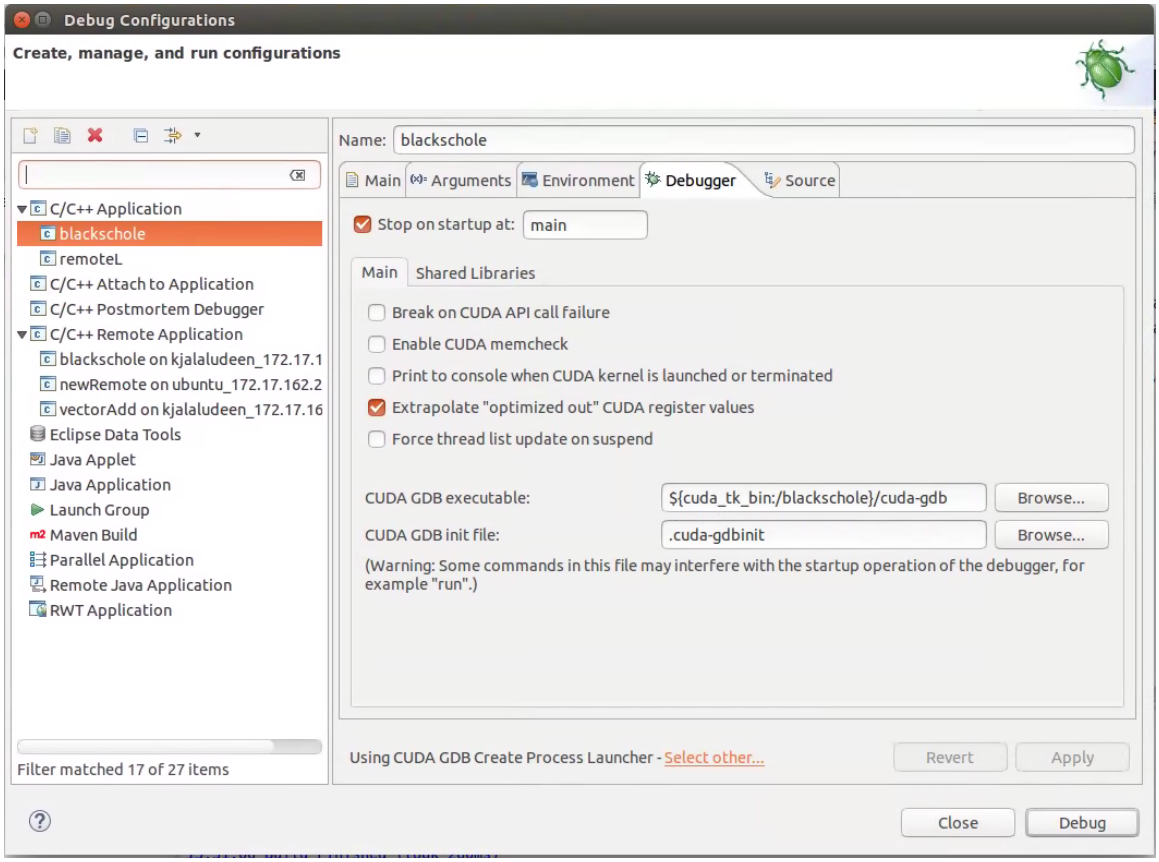
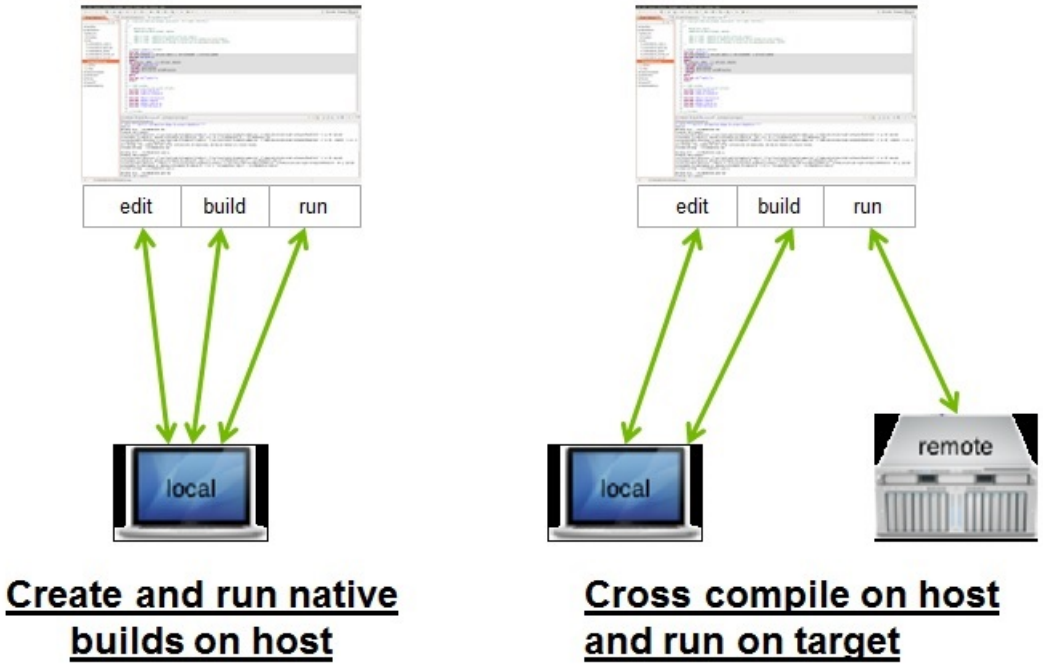


Fig. 4: Debugging CUDA application

2.8. Remote development of CUDA Applications

Nsight Eclipse Edition also supports remote development of CUDA application starting with CUDA Toolkit 6.0. The picture below shows how Nsight Eclipse Edition can be used for local as well as remote development:

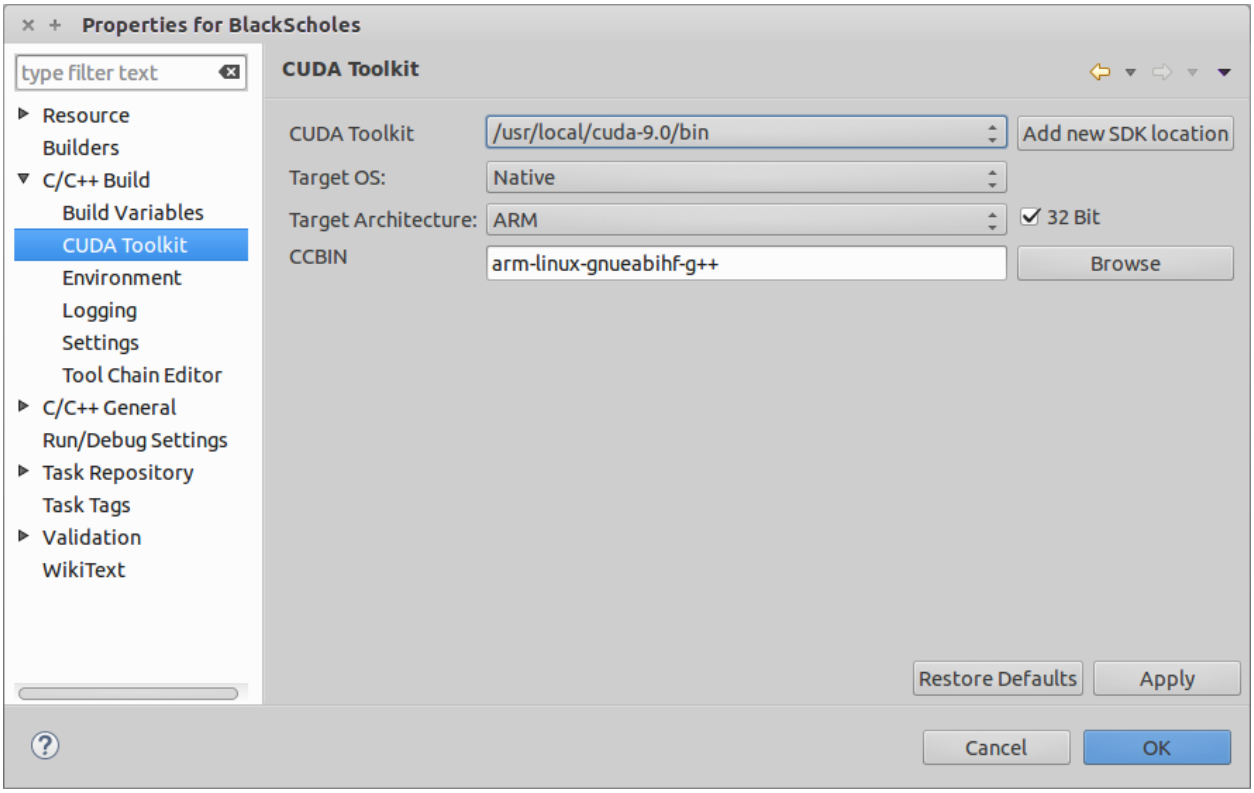


For remote development you do not need any NVIDIA GPU on your host system. The remote target system can be a Linux x86 system with an NVIDIA GPU or an Tegra-based ARM system. Nsight IDE and UI tools can only be hosted on x86 systems.

Nsight Eclipse Plugins supports the cross compilation mode for remote devices.

In the **cross compilation mode** the project resides on the host system and the cross compilation is also done on the host system. The cross compilation mode is only supported on an Ubuntu x86 host system.

To cross compile select the target cross compile architecture in CPU architecture drop down in the project properties page:



2.9. Postmortem Debugging Using Nsight Eclipse Edition

1. Introduction
   - Postmortem debugging allows developers to analyze the state of an application after it crashes by loading a core dump file into Nsight Eclipse Edition (Nsight EE).
2. Requirements for Postmortem Debugging
   - Before beginning a postmortem debugging session, ensure you have:
   - The executable binary produced by the build
   - A CUDA core dump file generated from a crash
   - The correct `cuda-gdb` binary matching your CUDA version
   - Nsight Eclipse Edition installed and configured
3. Creating a Postmortem Debug Configuration
   - Open Debug Configurations:
   - Navigate to **Run Debug Configurations**
   - Select **C/C++ Postmortem Debugger**
   - Click **New** to create a new configuration
   - Provide Basic Configuration Details:

- Enter a configuration name
- Specify the path to the executable built in the earlier steps

4. Selecting the Debug Launcher
   - Configure the CUDA Debug Core Launcher:
   - Click **Select Other...**
   - Choose **CUDA GDB Debug Core Launcher**
   - Confirm and apply the selection
5. Selecting Required Files
   - Choose the CUDA Core Dump:
   - Browse and select the CUDA core dump file you want to debug
   - Specify the `cuda-gdb` Executable:
   - Browse and select the correct `cuda-gdb` binary associated with your CUDA Toolkit (for example, `cuda-gdb` under CUDA 13.x)
6. Launching the Postmortem Debugger
   - Click **Debug** to start the session
   - Nsight will load the core file and display the program state at the time of the crash
7. Analyzing the Loaded Core File
   - Once the core file is loaded, you may:
   - Examine the call stack
   - Inspect local and global variables
   - View GPU kernel execution context
   - Analyze memory and device state
   - Step through source code to determine the cause of failure

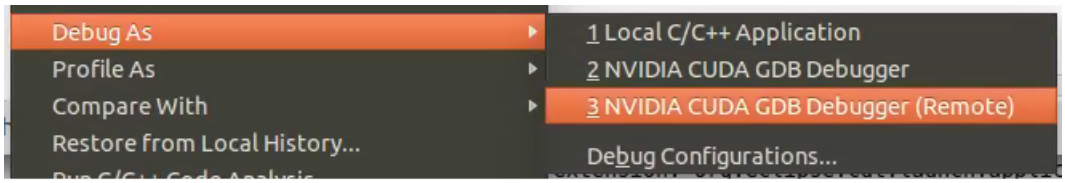
2.10. Debugging Remote CUDA Applications

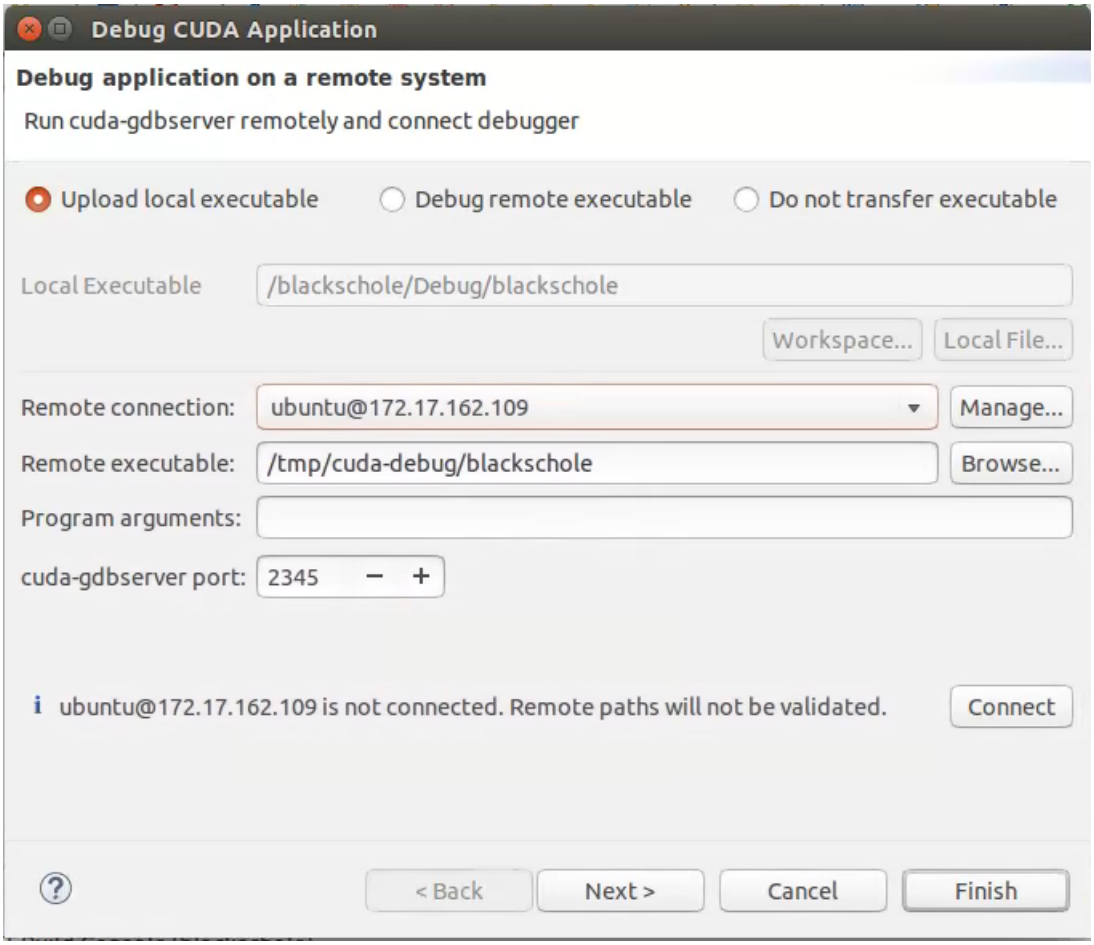
Remote debugging is available starting with CUDA Toolkit 5.5. A dedicated GPU is not required to use Nsight remote debugging UI. A dedicated GPU is still required on the debug target. Only Linux targets are supported. Debug host and target may run different operating systems or have different CPU architectures. The remote machine must be accessible via SSH and CUDA Toolkit must be installed on both machines.

Note: If there is a firewall between the host and the target, it must be set up to let RSP messages through, or SSH port-forwarding must be used.

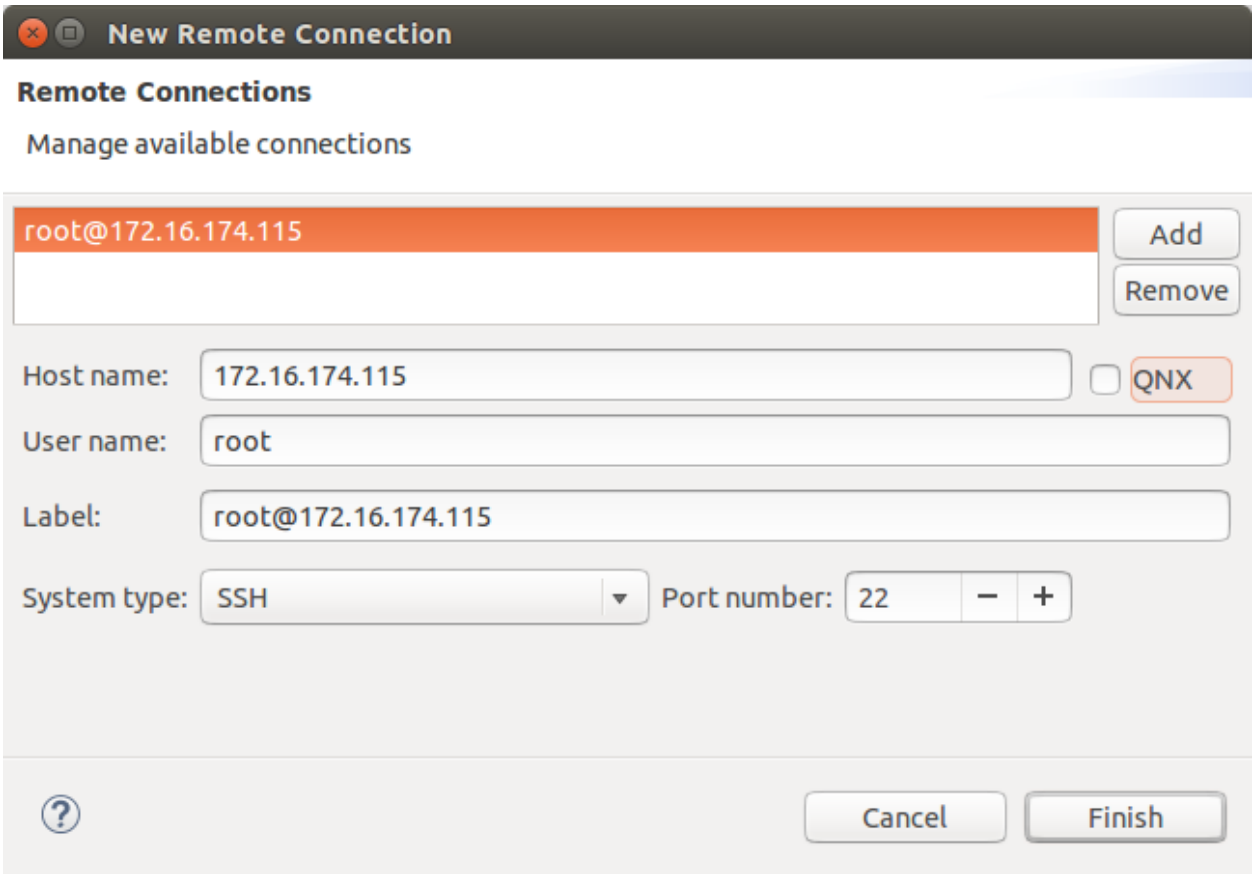
---

1. Select the project and right click then go to Debug As...>NVIDIA CUDA GDB Debugger(Remote) menu item.
2. Type the full path to a local executable or select one using the Local file... button.


Debug As
Profile As
Compare With
Restore from Local History...
1 Local C/C++ Application
2 NVIDIA CUDA GDB Debugger
3 NVIDIA CUDA GDB Debugger (Remote)
Debug Configurations...

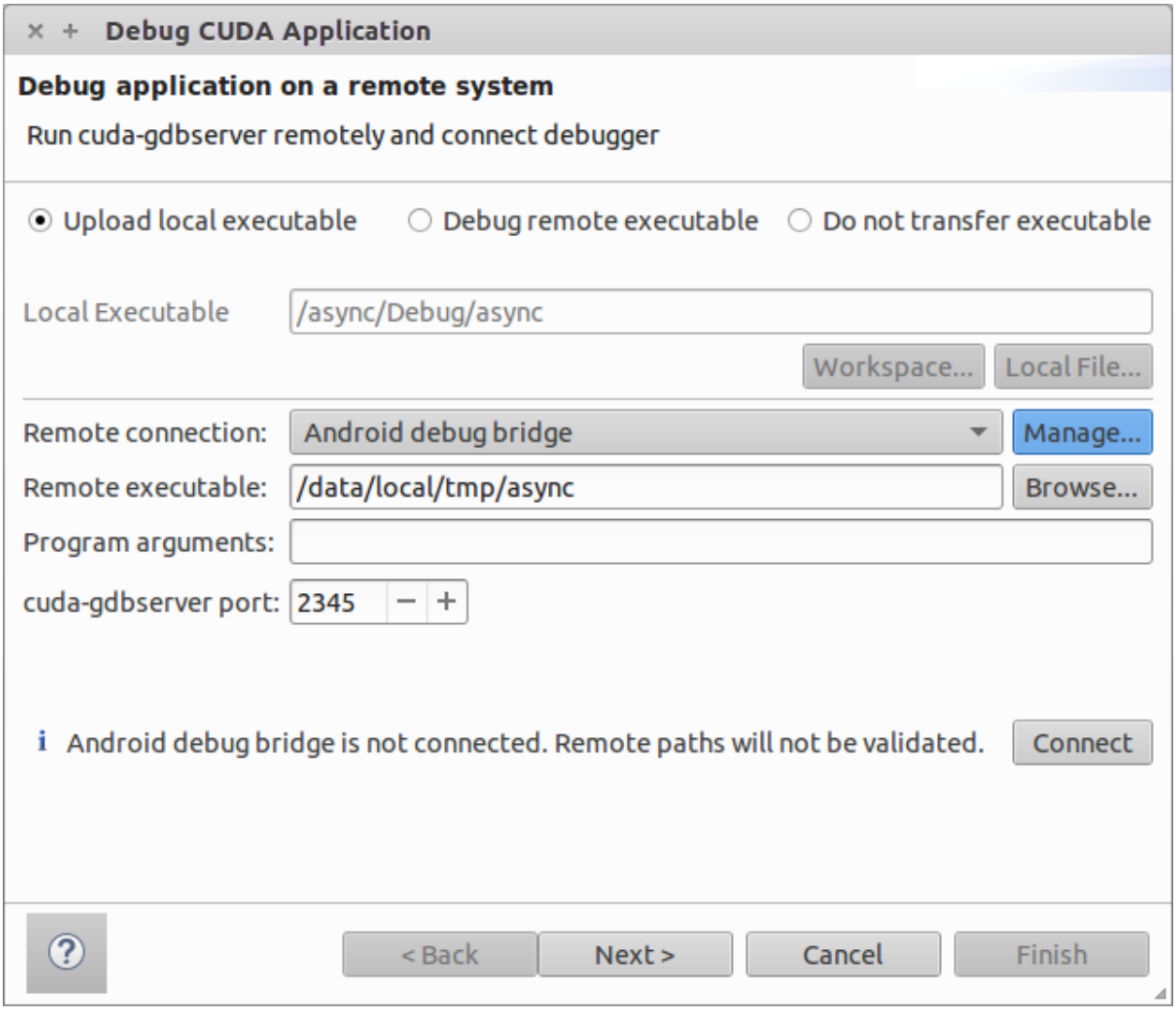

Debug CUDA Application
Debug application on a remote system
Run cuda-gdbserver remotely and connect debugger
Upload local executable
Debug remote executable
Do not transfer executable
Local Executable
/blackschole/Debug/blackschole
Workspace...
Local File...
Remote connection:
ubuntu@172.17.162.109
Manage...
Remote executable:
/tmp/cuda-debug/blackschole
Browse...
Program arguments:
cuda-gdbserver port:
2345
ubuntu@172.17.162.109 is not connected. Remote paths will not be validated.
Connect
< Back
Next >
Cancel
Finish

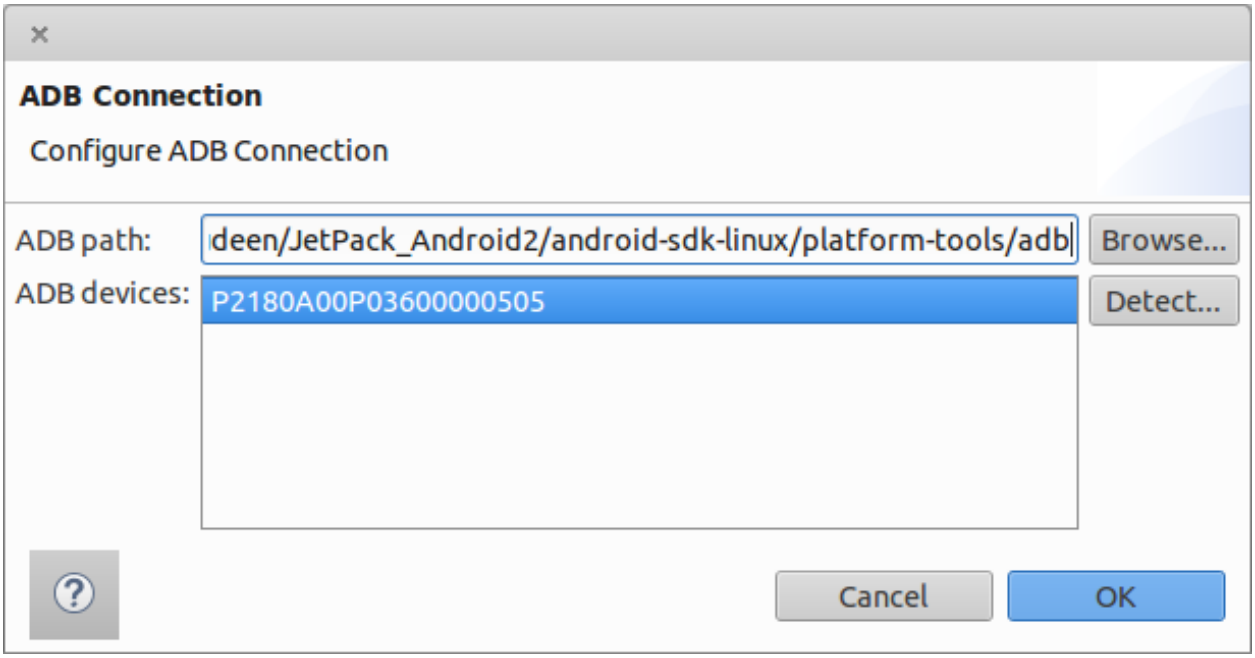
3. Select a remote connection from a drop-down list or press the Add connection... button to create a new one.
4. If you are creating a new remote connection, enter the host name(or IP address) as well as the user name. Select the SSH as system type. Also select the QNX check box for QNX targets and then press Finish.

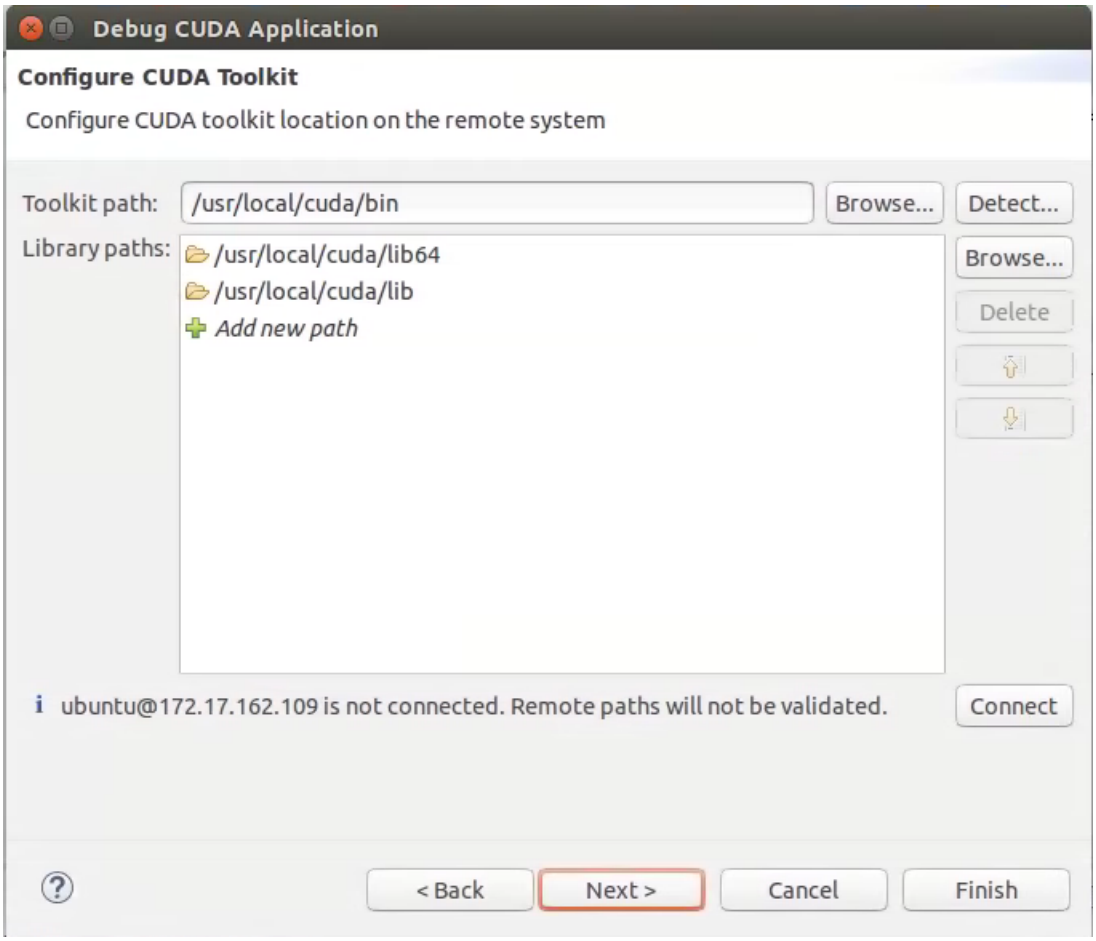


5. **For Android devices:** To configure the remote connection using Android debug bridge, select the Android debug bridge from the Remote Connection drop-down list, Android device must be connected to the host system using USB port.

   Press Manage button, and enter or select the path to adb utility. You need to install Android SDK platform tools to use Android debug bridge. press Detect button to find the android device available through ADB.
6. **Optional:** Press Connect to verify the selected remote connection.
7. Press the Next button.
8. Type the full path to cuda-gdbserver on the remote system or select one using the Browse... button.
9. Click on “Add new path” or on the Browse... button to specify the path to the shared libraries the remote application depends on.
10. Click on the Finish button to finish the new debug configuration wizard and start debugging the application.
11. You will be offered to switch perspective when you run the debugger for the first time. Click Yes. Perspective is a window layout preset specifically designed for a particular task.


Debug CUDA Application
Debug application on a remote system
Run cuda-gdbserver remotely and connect debugger
Upload local executable
Debug remote executable
Do not transfer executable
Local Executable
/async/Debug/async
Workspace...
Local File...
Remote connection:
Android debug bridge
Manage...
Remote executable:
/data/local/tmp/async
Browse...
Program arguments:
cuda-gdbserver port:
2345
Android debug bridge is not connected. Remote paths will not be validated.
Connect
< Back
Next >
Cancel
Finish


ADB Connection
Configure ADB Connection
ADB path:
deen/JetPack_Android2/android-sdk-linux/platform-tools/adb
Browse...
ADB devices:
P2180A00P03600000505
Detect...
Cancel
OK


Debug CUDA Application
Configure CUDA Toolkit
Configure CUDA toolkit location on the remote system
Toolkit path:
/usr/local/cuda/bin
Browse...
Detect...
Library paths:
/usr/local/cuda/lib64
/usr/local/cuda/lib
Add new path
Browse...
Delete
ubuntu@172.17.162.109 is not connected. Remote paths will not be validated.
Connect
< Back
Next >
Cancel
Finish

The debugger will stop at the application main routine. You can now set breakpoints, or resume the application.

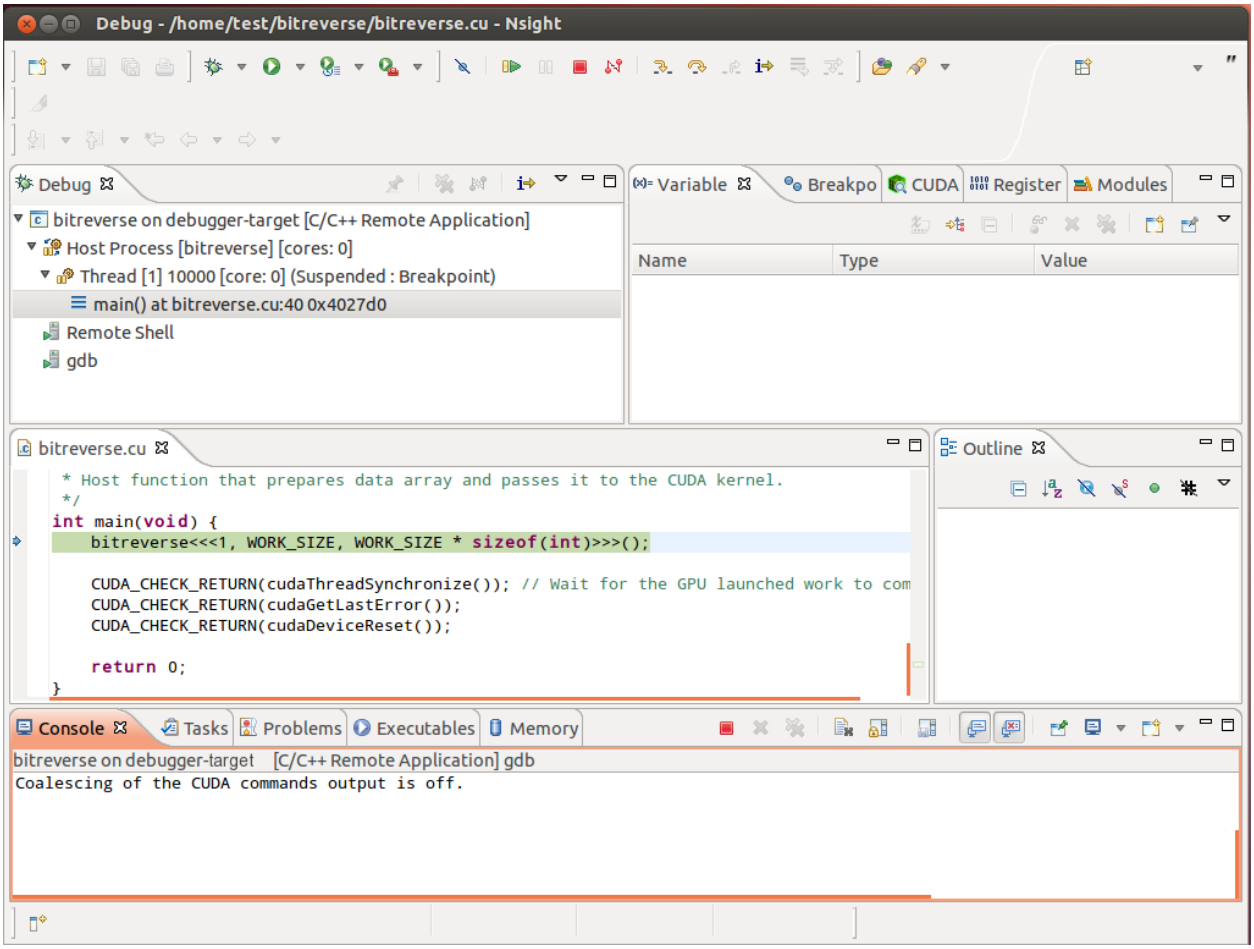
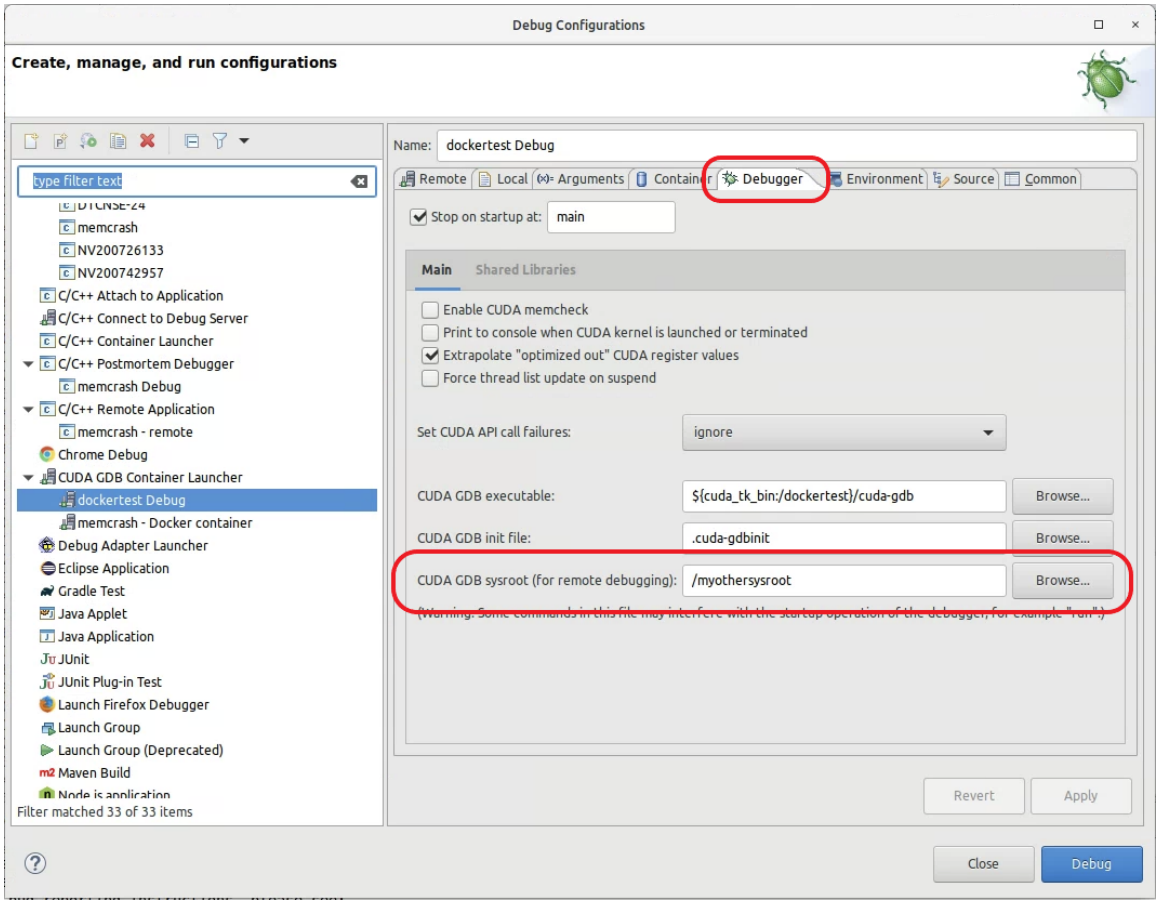


Fig. 5: Debugging remote CUDA application

2.10.1. Improving Remote Debugging Performance

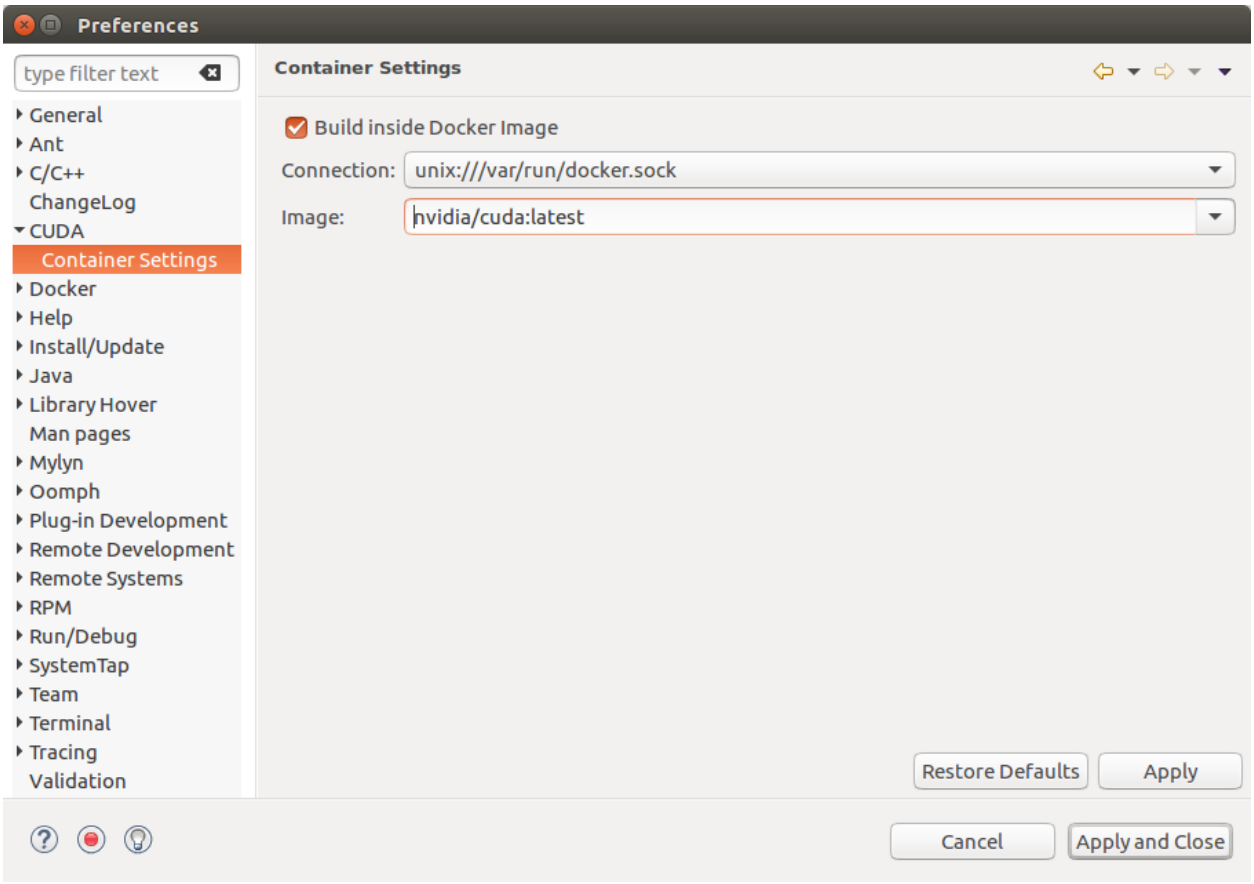
When doing remote debugging, it can be useful to host copies of the target libraries in a local sysroot. Starting with CUDA 11.5, this feature is available on the **Debugger Configurations -> Debugger** tab. You can modify 'CUDA GDB sysroot (for remote debugging)' to point to a local sysroot directory to improve debugging performance.


Debug Configurations
Create, manage, and run configurations
type filter text
memcrash
NV200726133
NV200742957
C/C++ Attach to Application
C/C++ Connect to Debug Server
C/C++ Container Launcher
C/C++ Postmortem Debugger
memcrash Debug
C/C++ Remote Application
memcrash - remote
Chrome Debug
CUDA GDB Container Launcher
dockertest Debug
memcrash - Docker container
Debug Adapter Launcher
Eclipse Application
Gradle Test
Java Applet
Java Application
JUnit
JUnit Plug-in Test
Launch Firefox Debugger
Launch Group
Launch Group (Deprecated)
Maven Build
Filter matched 33 of 33 items
Name: dockertest Debug
Remote
Local
Arguments
Container
Debugger
Environment
Source
Common
Stop on startup at: main
Main
Shared Libraries
Enable CUDA memcheck
Print to console when CUDA kernel is launched or terminated
Extrapolate "optimized out" CUDA register values
Force thread list update on suspend
Set CUDA API call failures: ignore
CUDA GDB executable: ${cuda_tk_bin:/dockertest}/cuda-gdb
Browse...
CUDA GDB init file: .cuda-gdbinit
Browse...
CUDA GDB sysroot (for remote debugging): /myothersysroot
Browse...
Revert
Apply
Close
Debug

2.11. Build CUDA Projects inside a Docker Container

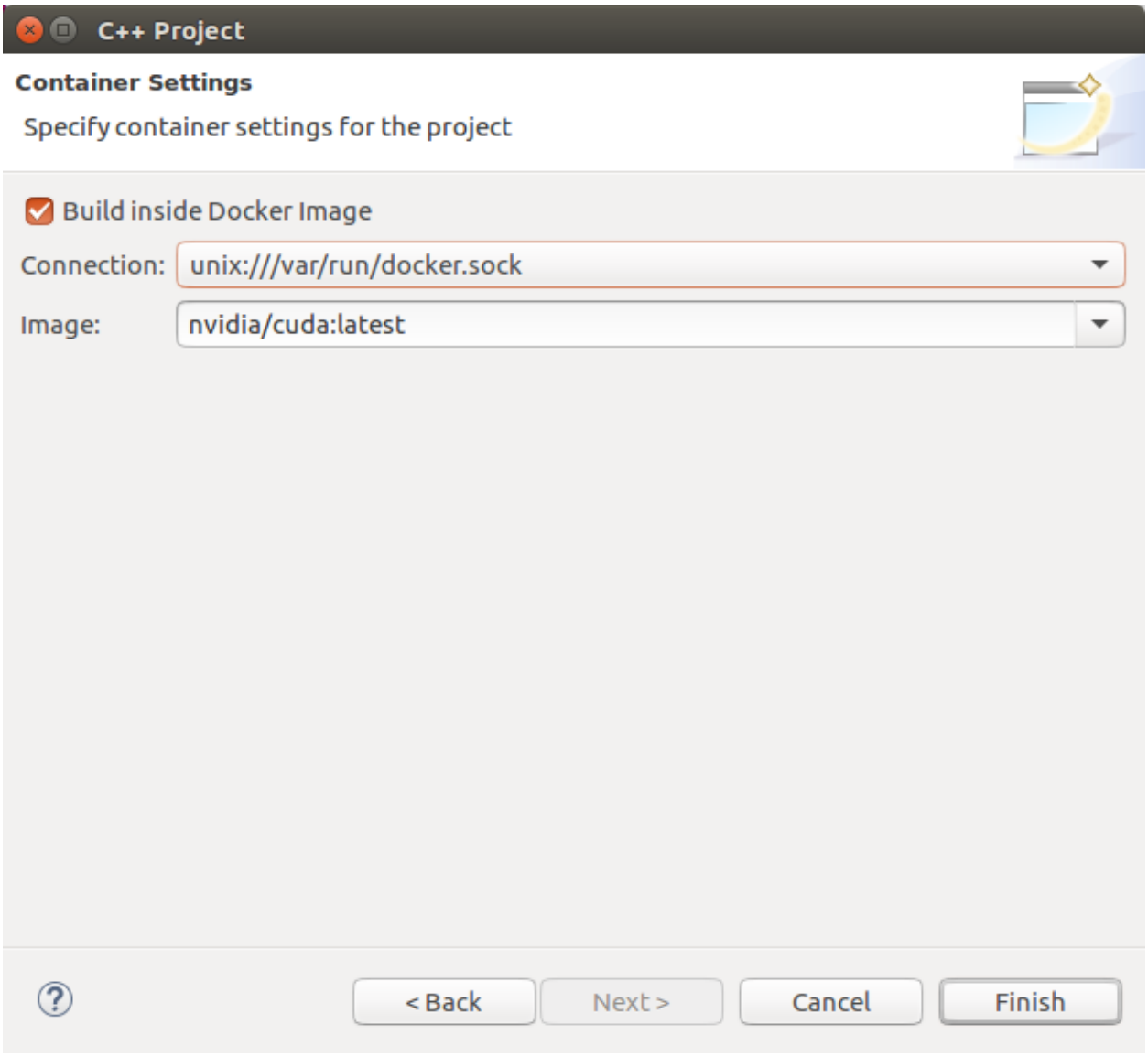
You can build and debug C/C++ and CUDA projects in a Docker container using Nsight Eclipse Edition. To get started, you need to first pull and install the Docker image that encapsulates the CUDA toolkit and cross platform tool chains. You can get the Docker images from NVIDIA GPU Cloud.Then you can use Nsight Eclipse Edition to build CUDA projects in a Docker container.

1. Open Nsight Eclipse Edition and configure the container settings.
2. Open the Preferences page, Window > Preferences and go to: CUDA > Container Settings

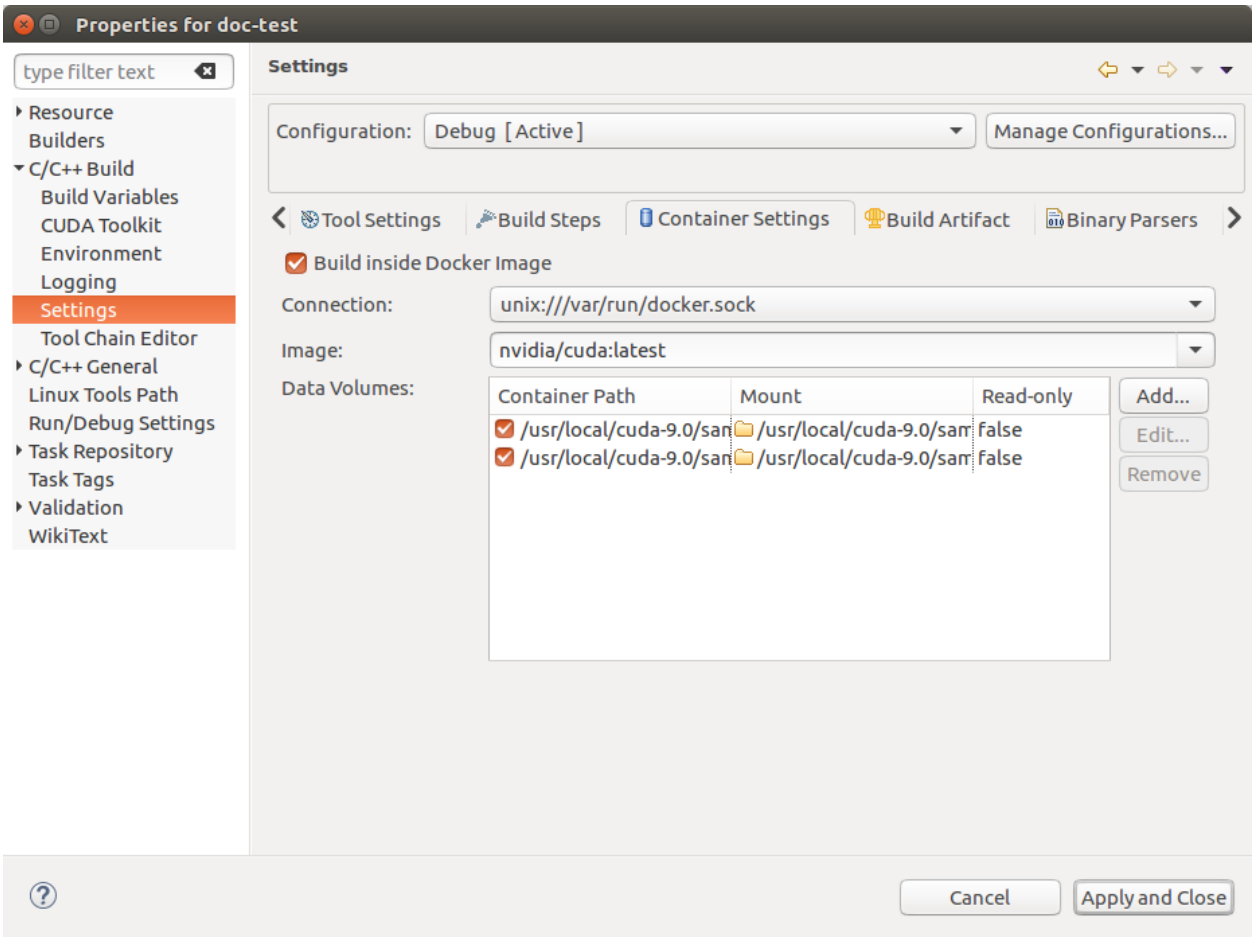


3. Select the option if you want to build the projects inside the Docker container. Make sure the CUDA toolkit path that is specified in the CUDA preferences is the path of the CUDA toolkit inside a Docker container.
4. Select the Connection and the Image dropdown will display all the Docker images that are currently installed. Choose the docker image that you want to use to build/debug the projects. The preferences that are set here will be automatically displayed in the project setup wizard. You can choose to modify the container settings for the individual projects from the project setup wizard.
5. To create a project, From the main menu, open the new project wizard: File > New... > CUDA C/C++ Project
6. Specify the project name and project files location. And select the CUDA toolchain from the list of toolchains.

7. In the last page of project setup wizard, the container options will be displayed. The default container settings from the preference page will be displayed here. You can choose to modify the settings for this project in this Container settings page.



8. Complete the project setup wizard. The project will be created and shown in the Project Explorer view.
9. The project source directories will be automatically mounted to the docker container.
10. If you need to mount any other directories that contains the include files/libraries and etc to the docker container, you can mount those directories from the project property page.
11. Right click on the project and go to Properties. Select C/C++ Build > Settings > Container Settigns Tab. Additional directories can be mounted from this property page.
12. Build the project by hitting the hammer button on the main toolbar. The project is now built in the chosen Docker container the executable will be available on the host.

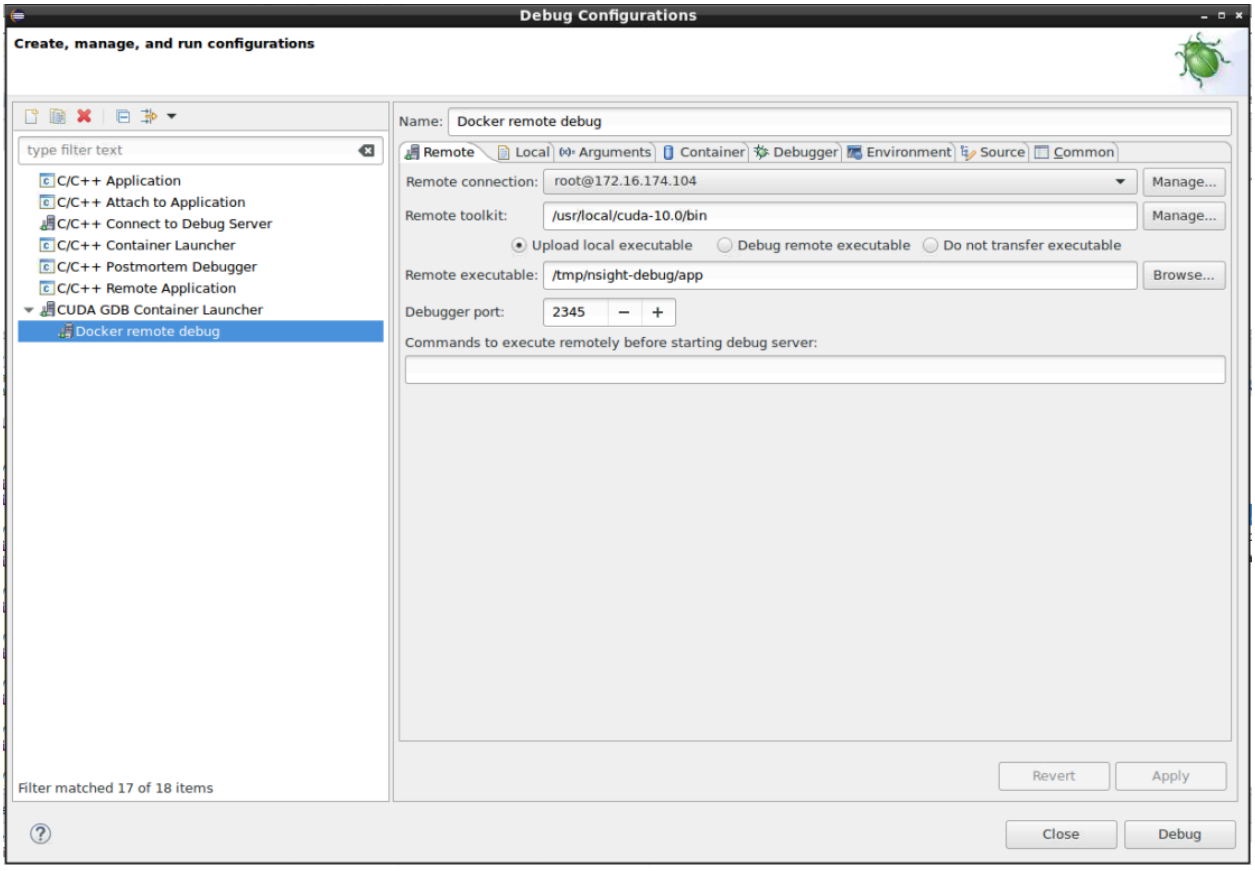

Properties for doc-test
type filter text
Resource
Builders
C/C++ Build
Build Variables
CUDA Toolkit
Environment
Logging
Settings
Tool Chain Editor
C/C++ General
Linux Tools Path
Run/Debug Settings
Task Repository
Task Tags
Validation
WikiText
Settings
Configuration: Debug [Active]
Manage Configurations...
Tool Settings
Build Steps
Container Settings
Build Artifact
Binary Parsers
Build inside Docker Image
Connection: unix:///var/run/docker.sock
Image: nvidia/cuda:latest
Data Volumes:
Container Path
Mount
Read-only
/usr/local/cuda-9.0/san
/usr/local/cuda-9.0/sam
false
/usr/local/cuda-9.0/san
/usr/local/cuda-9.0/sam
false
Add...
Edit...
Remove
Cancel
Apply and Close

2.12. Remote debugging using CUDA GDB inside Docker container

From Nsight Eclipse, you can remote debug the applications running on the target using the CUDA GDB inside the Docker container running on the host. Docker images with CUDA GDB and CUDA toolkit must be already installed on the host. The remote machine must be accessible via SSH and CUDA Toolkit must be installed on target machine.

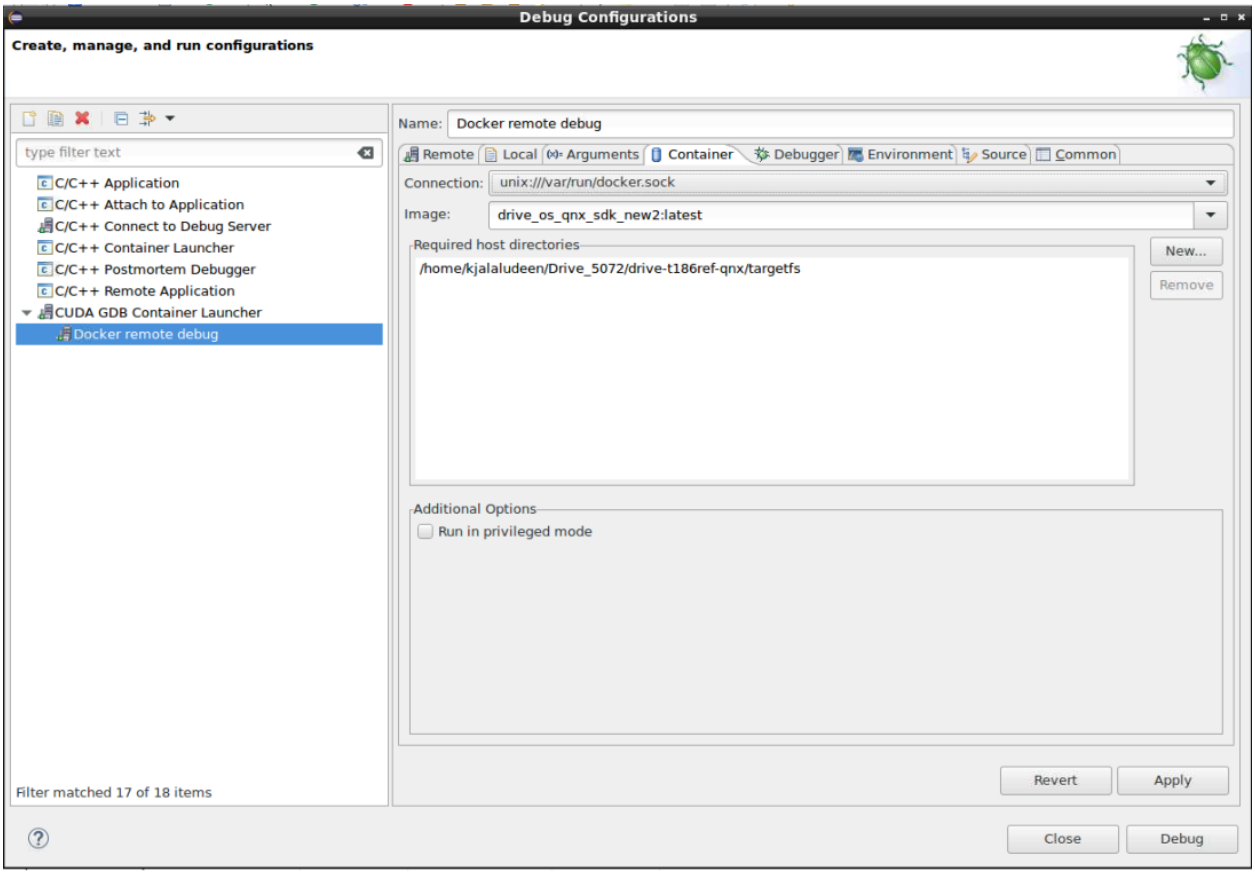
Note: If there is a firewall between the host and the target, it must be set up to let RSP messages through, or SSH port-forwarding must be used.

1. From the main menu, goto Run>Debug Configurations... menu item.
2. Create a new debug configuration under CUDA GDB Container Launcher either double clicking or using right click menu.
3. Configure the remote connection details in the “Remote” tab. If you are creating a new remote connection, click on the manage button in Remote Connection enter the host name(or IP address) as well as the user name. Select the SSH as system type. Also select the CUDA toolkit location on the target and choose the location to where to upload the executable.



4. Choose the project and the executable to upload to the target in the “Local” tab.

5. From the “Container” tab, select the connection and Docker image that contains the CUDA GDB. Also you can select any host directories required to mounted to the Docker container.



6. Select the debugger options from the “Debugger” Tab. Make sure to enter the CUDA GDB executable path inside Docker container. And add the required environment variables in the “Environment” tab.
7. Click on the Apply button to save the changes and click on the Debug button to start the debug session. This action will upload the local executable to the target system and will start CUDA GDB Server on the target. And the Docker container will be started on the host and CUDA GDB running inside the docker container will establish the remote debug session with the target.
8. You will be offered to switch perspective when you run the debugger for the first time. Click Yes. Perspective is a window layout preset specifically designed for a particular task.

The debugger will stop at the application main routine. You can now set breakpoints, or resume the application.

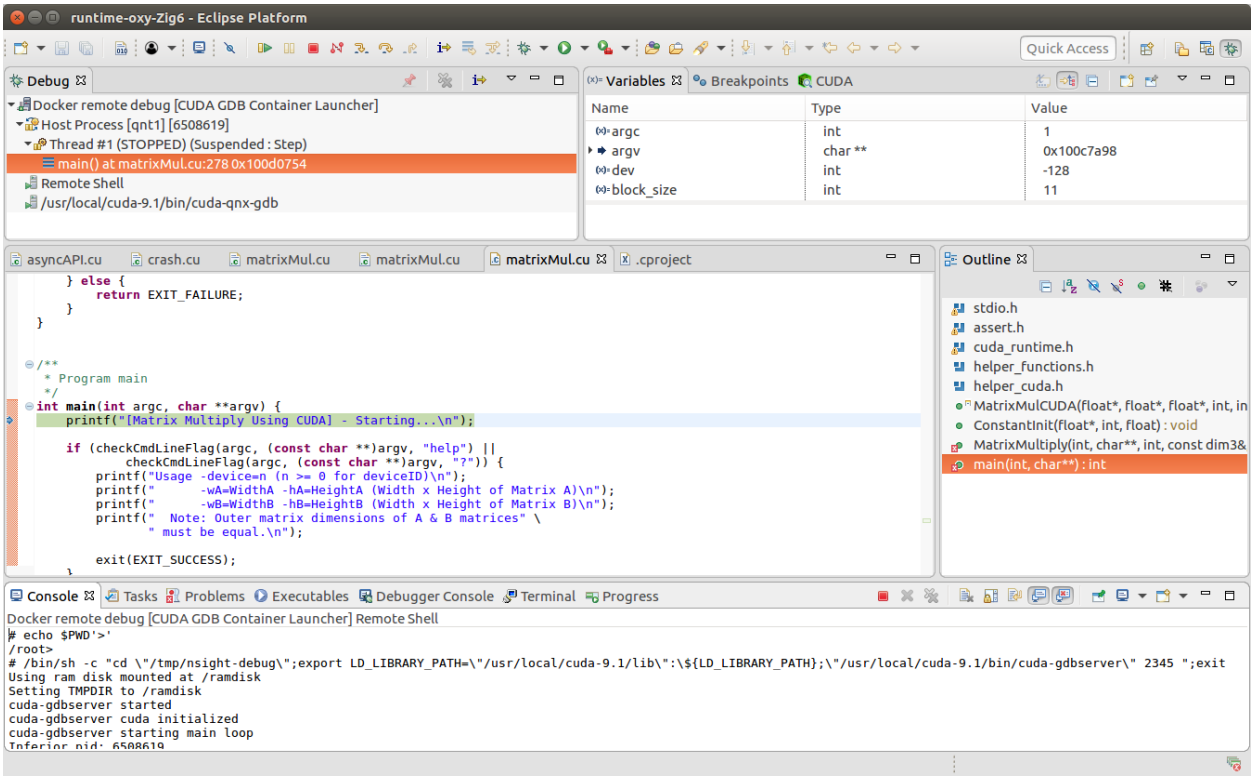
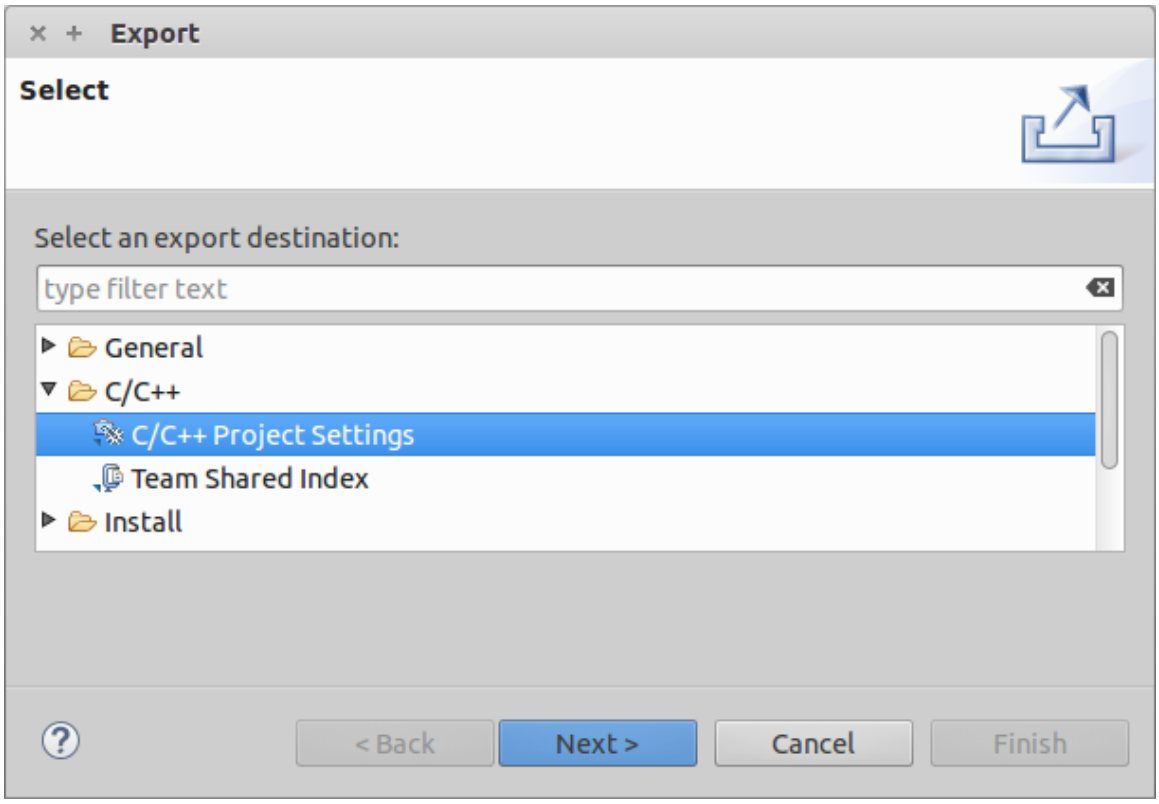


Fig. 6: Debugging remote CUDA application

2.13. Importing Nsight Eclipse Projects

The projects that are created with Nsight Eclipse Edition can be imported into the Eclipse workbench with Nsight Eclipse plugins.

1. Open Nsight Eclipse edition and select the project that needs to be exported.
2. Right click on the Nsight Eclipse project and go to - Export > C/C++ > C/C++ Project Settings > Next menu.
3. Select the project and settings to export.
4. Specify the “Export to file” location.
5. Settings will be stored in the given XML file.
6. Go to Eclipse workbench where the project settings needs to be imported.
7. Create a CUDA C/C++ Project from the main menu File > New > CUDA C/C++ Project
8. Specify the project name and choose Empty project type with CUDA toolchains.
9. Right click on the project to import the source files. Import > General > File System >(From directory) or copy the source files from the existing project.
10. Import the project settings like include paths and symbols using the following right click menu Import > C/C++ > C/C++ Project Settings >Next...
11. Select the location of the project settigns file and select the project and configuration on the next wizard page.

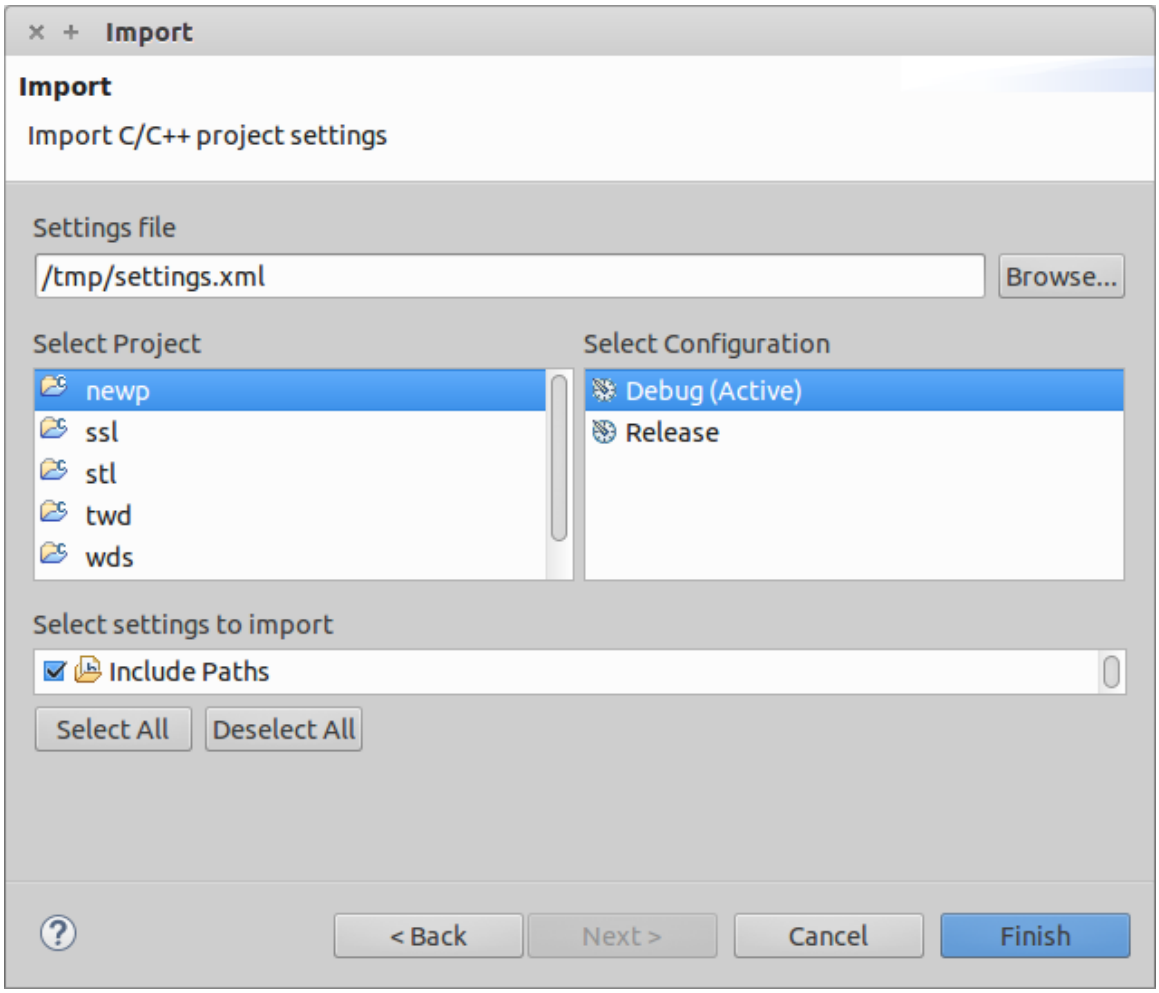


12. Complete the wizard. The project settings will be imported from the file exported from Nsight Eclipse Edition.
13. Build the project by clicking on the hammer button on the main toolbar.

2.14. Enabling Dark Theme in Eclipse

To work comfortably in dark environments, Eclipse offers a dark theme mode that's easy to activate:

1. Open Eclipse Preferences:
   - Click on "Windows" in the top menu.
   - Choose "Preferences" from the dropdown.
2. Access Appearance Settings:
   - In the Preferences window, select "General" on the left.
   - Click on "Appearance."
3. Choose Dark Theme:
   - Find the "Theme" dropdown.
   - Select your preferred dark theme option.
4. Apply and Enjoy:
   - Click "Apply and Close" to save settings.


Import
Import
Import C/C++ project settings
Settings file
/tmp/settings.xml
Browse...
Select Project
newp
ssl
stl
twd
wds
Select Configuration
Debug (Active)
Release
Select settings to import
Include Paths
Select All
Deselect All
< Back
Next >
Cancel
Finish

- Witness Eclipse transform with the new dark theme.

Enjoy coding with reduced eye strain and a sleek new look!

2.15. More Information

More information about the Eclipse CDT features and other topics is available in the Help contents. To access Help contents select Help->Help Contents from the Nsight main menu.

More information about CUDA, CUDA Toolkit and other tools is available on CUDA web page at http://developer.nvidia.com/cuda

Chapter 3. Known Issues

Executable must exist in order to start debug session for the first time

Nsight will not automatically perform build when starting debug session for a given project for the first time. Build must be invoked manually. Nsight will automatically rebuild executable when starting subsequent debug sessions.

Note: To manually build the project, select it (or any file within the project) in a Project Explorer view and click hammer icon on the main window toolbar.

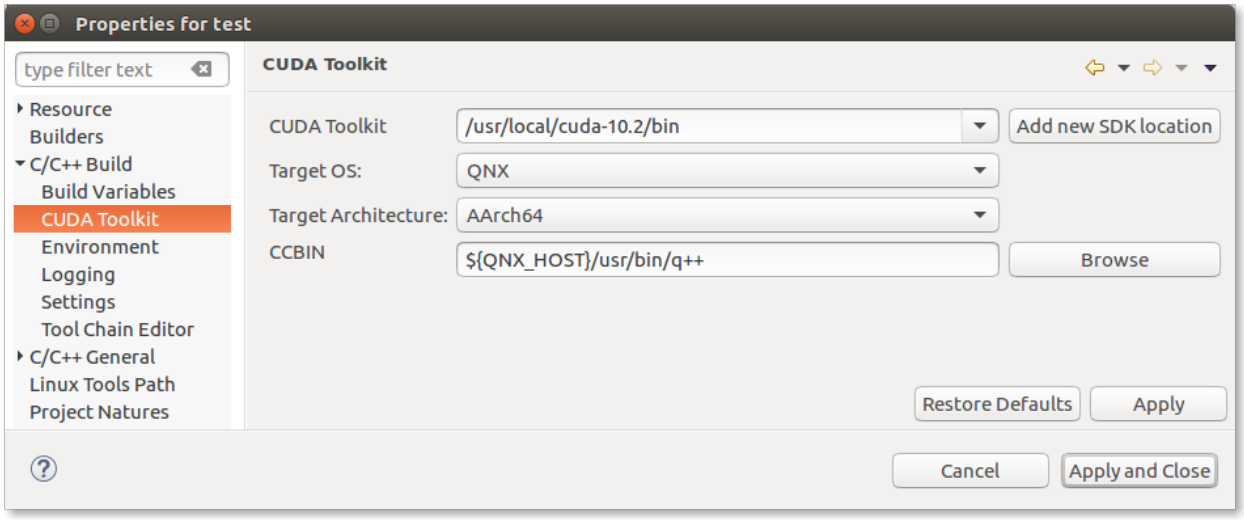
Source editors may show error markers on a valid code for the files in newly created projects.

These markers will be cleared after Nsight indexes included header files.

Nsight Eclipse Plugin Edition does not provide compilation support for using the QNX qcc and q++ compilers.

The workaround to compile using qcc and q++ is

- Specify the q++ path in CCBIN field on toolkit configuration page on project properties dialog as shown below. You can access toolkit configuration page by clicking main menu Project > Properties > C/C++ Build > CUDA Toolkit



- Change default CONF to gcc_ntoaarch64le in the file ${QNX_HOST}/etc/qcc/gcc/5.4.0/default as below

```
CONF=gcc_ntoaarch64le
```

Chapter 4. Additional Licensing Obligations

For more details on licensing, please visit the CUDA Toolkit Supplement to NVIDIA SDKs License Agreement page: https://developer.nvidia.com/cuda-downloads

Chapter 5. Notices

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