Debugging with the Intel® Parallel Studio XE Composer Edition Quickstart Guide

Intel® Parallel Studio XE 2015 Composer Edition for C++ Linux*, OS X*

Intel® Parallel Studio XE 2015 Composer Edition for Fortran Linux*, OS X*

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Introduction

This document provides an entry point to using the GNU* Project Debugger (GDB) for debugging applications natively on IA-32 or Intel® 64 Architecture systems and debugging applications remotely on Intel® Xeon Phi™ coprocessor systems (Linux* OS host only).

For new debugger features, hardware and software requirements, other prerequisites, and known issues, refer to your product's release notes.
Using the GNU* Project Debugger (GDB)

The GNU* Project Debugger (GDB) provided with the Intel® Parallel Studio XE Composer Edition is based on GDB with enhancements provided by Intel. It comes in different versions:

**IA-32/Intel® 64 Architecture debugger:**
Debug applications natively on IA-32 or Intel® 64 Architecture systems.

**Intel® Xeon Phi™ coprocessor debugger (Linux* OS only):**
Debug applications remotely on Intel® Xeon Phi™ coprocessor systems. The debugger runs on a host system and a debug agent (`gdbserver`) runs on the coprocessor.

There are two options:
- Use the command line version of the debugger. This only works for native Intel® Xeon Phi™ coprocessor applications.
- Use the Eclipse* IDE plugin. This works only for offload enabled Intel® Xeon Phi™ coprocessor applications. Native applications need to be debugged with the command line version.

**NOTE**
For any of the debugger versions mentioned above, always source the following script in the same environment where you use the debugger:

```
source <install-dir>/bin/debuggervars.[sh|csh]
```

**Starting GDB for Native IA-32/Intel® 64 Architecture Applications**

To debug applications natively on IA-32 or Intel® 64 Architecture systems, start GDB with the following command:

```
gdb-ia
```

The actual debugger usage is the same as for the GNU* Project Debugger. Extensions for IA-32/Intel® 64 Architecture are described in the debugger documentation.

**Starting GDB for Intel® Xeon Phi™ Coprocessor Applications (Linux* OS Only)**

Debugging applications for the Intel® Xeon Phi™ coprocessor is different to debugging local applications because of the difference of host and target:

The host is running the debugger GNU* GDB. This system can be the host containing the coprocessor cards or any other development host.

The target, here the coprocessor itself, executes a debug agent (`gdbserver`) to which the host connects to.

For more information on debugging on the Intel® Xeon Phi™ coprocessor, see also http://software.intel.com/en-us/articles/debugging-intel-xeon-phi-applications-on-linux-host.

You can either start the debugger from the command line or from Eclipse* IDE:
Starting the debugger from the command line

1. Transfer the debug agent to the Intel® Xeon Phi™ coprocessor, such as:

   ```
   $ scp <install-dir>/debugger/gdb/target/mic/bin/gdbserver mic0:/tmp
   ```

2. Start GDB on the host and connect to the target, such as:

   ```
   $ gdb-mic
   (gdb) target extended-remote | ssh mic0 /tmp/gdbserver --multi -
   ```

   - To load and execute an application on the coprocessor, issue the following commands:
     ```
     (gdb) file <path_on_host>/application
     (gdb) set remote exec-file <path_on_target>/application
     ```
   - To attach to a process already running on the coprocessor with PID `<pid>`, issue the following commands:
     ```
     (gdb) file <path_on_host>/application
     (gdb) attach <pid>
     ```

Starting the debugger from Eclipse® IDE

1. Set the following additional environment variables on your host system for Intel® Manycore Platform Software Stack (Intel® MPSS) 3.1 or higher:

   ```
   AMPLXE_COI_DEBUG_SUPPORT=TRUE
   MYO_WATCHDOG_MONITOR=-1
   ```

2. Start Eclipse® IDE.
3. Click Help > Install New Software....
4. Click the Add... button.
5. Click the Local... button and select the directory `<install-dir>/debugger/cdt/`.
6. Uncheck Group items by category (checked by default).
7. Check the plugin Debugger Integration for Intel® 64 and Intel® MIC Architectures.
8. Complete the installation of the plugin. There might be a warning about unsigned content. This can be ignored.

9. Restart Eclipse* IDE

10. Select Run > Debug Configurations and create a new debug configuration.

11. For Using Standard Create Process Launcher, click Select other... and select MPM (DSF) Create Process Launcher.

Configuring Eclipse* for Debugging Fortran Applications with GDB

**NOTE**
Make sure to source the following script in the same environment where you start Eclipse* IDE:

```
source <install-dir>/bin/debuggers.sh
```

1. Start Eclipse* IDE.
2. Click Help > Install New Software
3. From the Work with: dropdown menu select the appropriate Eclipse* version. For example, Kepler -http://download.eclipse.org/releases/kepler*. 
4. Expand Programming Languages and check the checkboxes for
   • Fortran Development Tools (Photran) 
   • Linux Intel(R) Fortran Compiler Support
5. Complete the installation of these two plugins.
6. For every Fortran project:
   a. Click Run > Debug Configurations ...
   b. Select C/C++ Application and click New_configuration.
   c. Enter the configuration for the respective Fortran project.
   d. Go to the Debugger tab.
   e. Check the checkbox Stop on startup at: and enter main __
   f. Close the Debug Configurations dialog box

Eclipse* is now configured to debug Fortran Applications with GDB.
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