

Scientific Software Development with Eclipse

IDEAS-ECP Best Practices for HPC Software Developers Webinar Series

Date: March 21, 2018

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Questions and Answers from the Webinar

1. Would it be possible to go through a real-world parallel debugging of a certain application ?

Unfortunately I haven't prepared a demo of the debugger. I could do this on another occasion though.

! that would be very good

! I agree - that would be great !!

2. Can eclipse be used as a debugger effectively? I usually use eclipse as editor only, and I build my apps from the terminal; debugger I use is ddd or gdb, from a terminal

There's a great visual debugging interface for gdb or lldb that is part of CDT. There is also a parallel debugger that is part of the parallel application developer package that can be used for debugging small parallel codes (small as in the number of processes). It can be a bit tricky to set up depending on your system.

3. Any tips for setting up gcc, etc., for a C++ development environment on Windows? I've tried to link Eclipse into Cygwin before, but it only partially works (syntax highlighting works but not the compiler with cmake files, etc.), so pointers or good resources would be helpful!

I don't use Windows myself, but I would say the best resource is to ask the CDT forum. There are many active users who could help out with Cygwin related questions. I know Windows support has waxed and waned over the years, so I'm not sure where it is at currently. You could also check out the CDT wiki that has a lot of documentation for setting up Eclipse for C/C++ development (wiki.eclipse.org/CDT). There are also some tutorials available there as well (these may be getting a bit old now).

4. Uninstalling old version of eclipse or upgrade? OK

The Eclipse application you installed is self-contained and can be easily uninstalled by moving it to the trash or deleting it. You can also install multiple versions of Eclipse side-by-side, however only one can have a particular workspace open at a time. Also, later versions of Eclipse tend to upgrade the workspace, so it may not be able to be opened with an earlier version. Upgrades

are done via the Help>Check for Updates or Help>Install New Software... menus and update Eclipse packages in place.

5. Is there any support for cross-language development, e.g. compiled python extensions written in C/C++?

Not specifically, however it is possible to create Python and C/C++ projects in the same workspace. If the C/C++ library is compiled to be dynamically loadable, may be possible to configure the PYTHONPATH to pick it up automatically.

6. The same question goes for hybrid parallelization (MPI + OpenMP) ?

The Parallel Application Developer package has some tools that target MPI and OpenMP (and OpenACC and OpenSHMEM) specifically. These are mainly limited to templates, code completion, and hover help. There are some static analysis tools that might be worth trying out, but this is an area that requires additional work.

7. How good is ubuntu 16 or linux support for parallel setup?

As long as Eclipse works under the particular version of Linux, the parallel tools will work also. There have been some issues with GTK support, but if you google around there appear to be ways to resolve most problems.

8. What happens to fortran files in the c++ project? I mean, can I inform eclipse that these are fortran, or is this automatic?

In this case we started with a general project, then told Eclipse is contained C++. It is still possible to open Fortran files at this point, and you will get the Fortran editor, however none of the advance features will be available. To enable these, you have to also tell Eclipse it is a Fortran project (Convert to Fortran Project) and then the Fortran analysis features will be enabled. If you create a Fortran project from scratch, then this is done automatically. Note that a Fortran project will always have C/C++ features available as well.

9. Is it possible to specify syntax highlights manually? Like coloring *.C file with Fortran rules.

The C/C++ > Editor > Syntax Coloring preference allows you to configure almost any aspect of the coloring rules. As far as I know there is no way to say "color everything like Fortran" though.

10. Can be C++ and Fortran at the same time?

Yes, a Fortran project always includes C/C++ features as well. There is no way to have a Fortran-only project.

11. Does Eclipse know about ORNL fobs?

It doesn't specifically know about them, but they can be used without problem. Eclipse uses ssh for all connections it makes to the target system, so you will be prompted for the passcode the same way you would be if you typed ssh from the command line. Eclipse will try to keep the ssh connection open as long as possible so you don't need to keep entering passcodes, however there are some situations where it will need to be entered multiple times (in the same way you would if you were using the command line).

In addition, there is support for multi-hop situations, where you are required to log into an intermediate machine before accessing the HPC system.

12. If you have time, can you go over how to fix the dependency chains in eclipse, e.g. the "Real" type in Nyx.cpp is highlighted as a bug in eclipse but I'm guessing eclipse just isn't finding the definition, whereas your project probably compiles without error using your external makefile...

The Nyx project depends on AMRex, so in this case you also need a copy of AMRex in your workspace. You can then open the Nyx project properties (right click on the project and choose properties) and go to the C/C++ General > Preprocessor Include Paths page. From here you can add the AMRex include directories as CDT User Setting Entries for C++. Once you have done this, Eclipse will re-index the files and the errors should go away.

Alternatively, you can disable the code analysis errors altogether using the C/C++ General > Code Analysis preference page.

I would be happy to run another webinar that goes into this in more detail, and also looks at how you can replicate your remote compiler environment on your local machine.