parallel tools platform

http://eclipse.org/ptp

PTP Overview

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Parallel Tools Platform (PTP)

- ✦ The Parallel Tools Platform aims to provide a highly integrated environment specifically designed for parallel application development
- ✦ Features include:
  - ✦ An integrated development environment (IDE) that supports a wide range of parallel architectures and runtime systems
  - ✦ A scalable parallel debugger
  - ✦ Parallel programming tools (MPI, OpenMP, UPC, OpenSHMEM, OpenACC, etc.)
  - ✦ Support for the integration of parallel tools
  - ✦ An environment that simplifies the end-user interaction with parallel systems
- ✦ http://www.eclipse.org/ptp
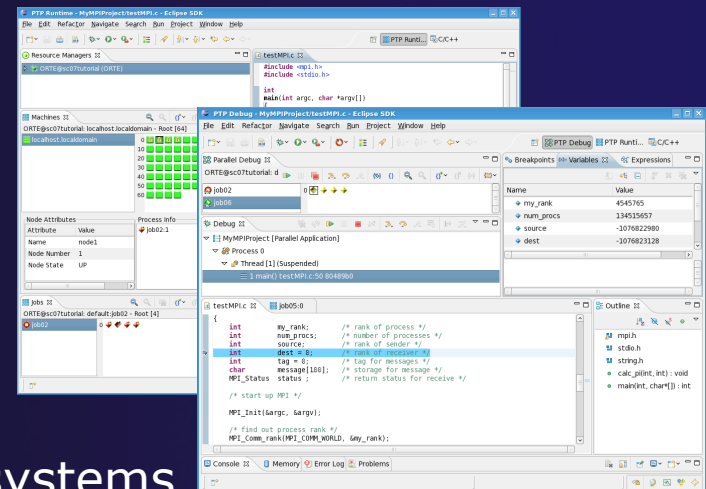
Eclipse PTP Family of Tools

Coding & Analysis
(C, C++, Fortran)

Launching & Monitoring
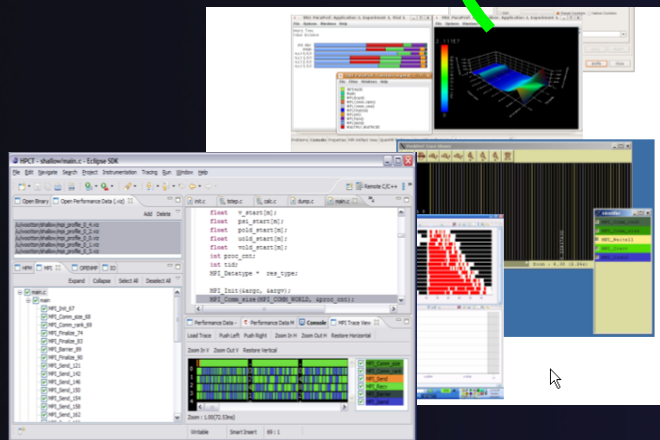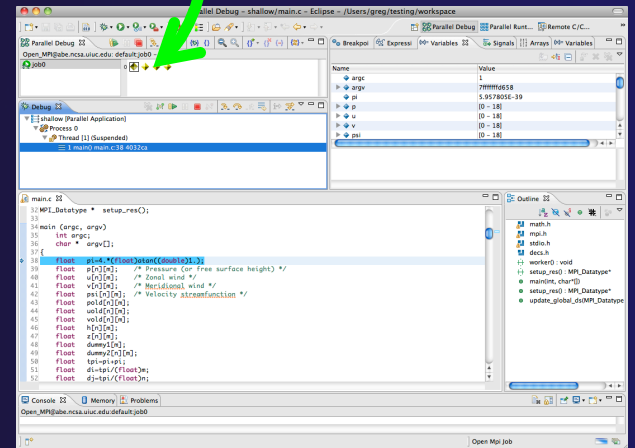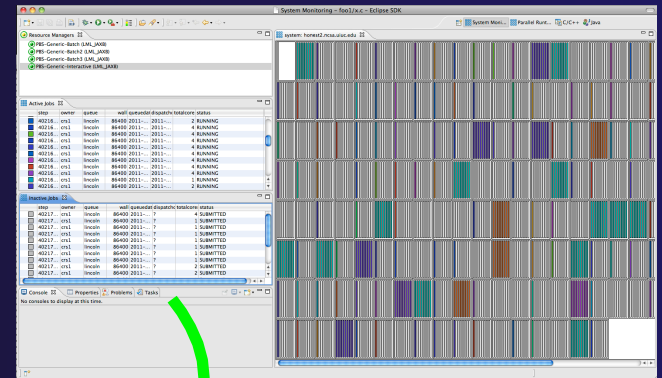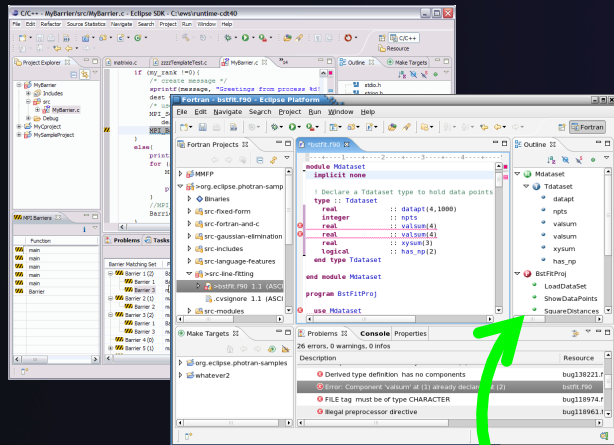
Performance Tuning
(TAU, PPW, …)

Parallel Debugging

Download PTP

✦ Eclipse is available in a number of different packages for different kinds of development
  ✦ http://eclipse.org/downloads
✦ For PTP, we recommend the all-in-one download:
  ✦ Eclipse for Parallel Application Developers

Eclipse for Parallel Application Developers, 200 MB
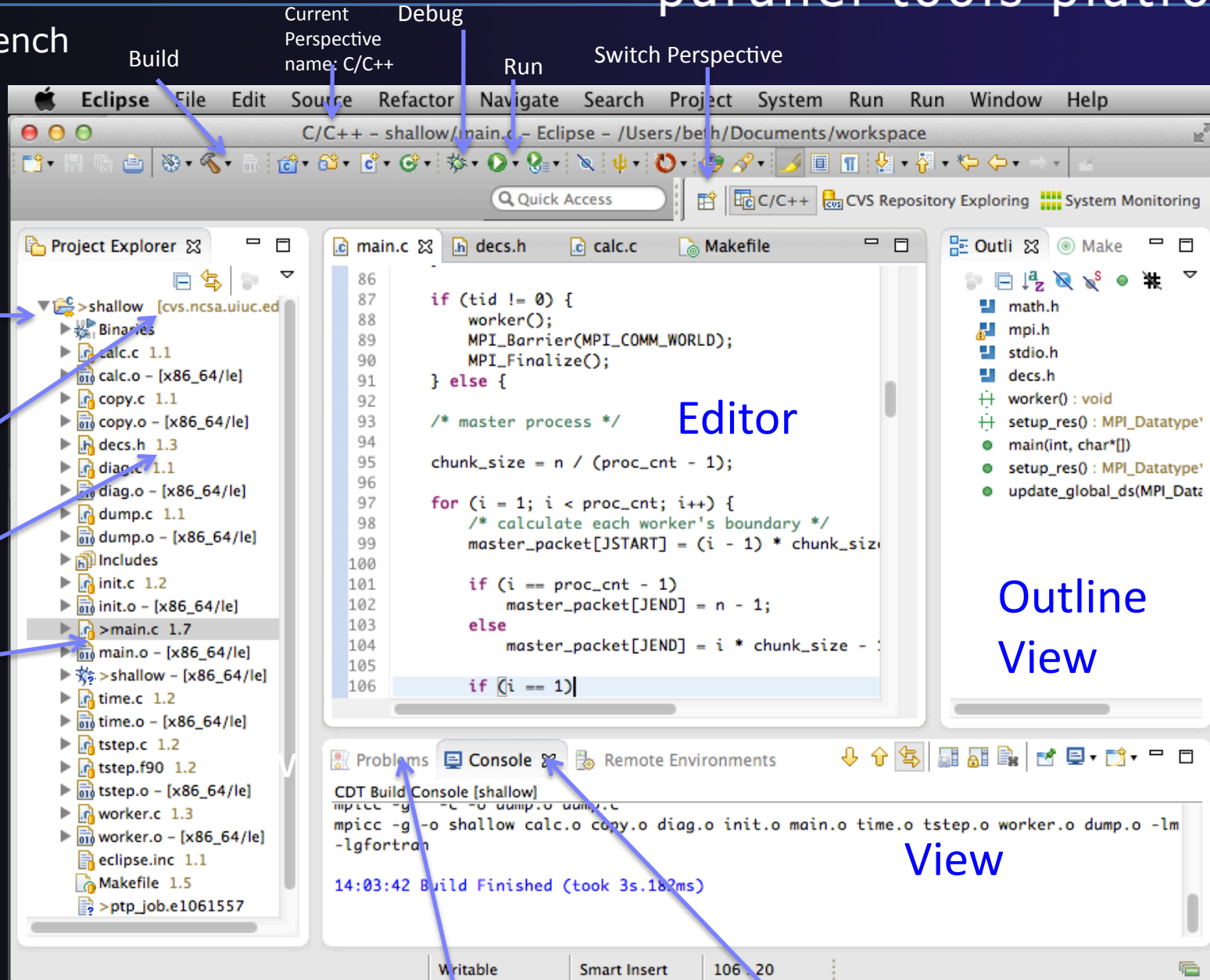Downloaded 88,437 Times   Details

We often call this the "Parallel Package"
  ✦ Update the package to current PTP release via instructions at http://www.eclipse.org/ptp/downloads.php

Highlight of PTP Features

parallel tools platform

Workbench

Build
Current Perspective name: C/C++
Debug
Run
Switch Perspective

Rightmouse for Project Properties

Source Code Repository

Version # in SCR

\> Indicates change from SCR

Editor

Outline View

Console view: Build output; Run output

Problems view: Build errors etc.

View

Preferences: Menu: Window>Preferences
Mac: Eclipse>Preferences
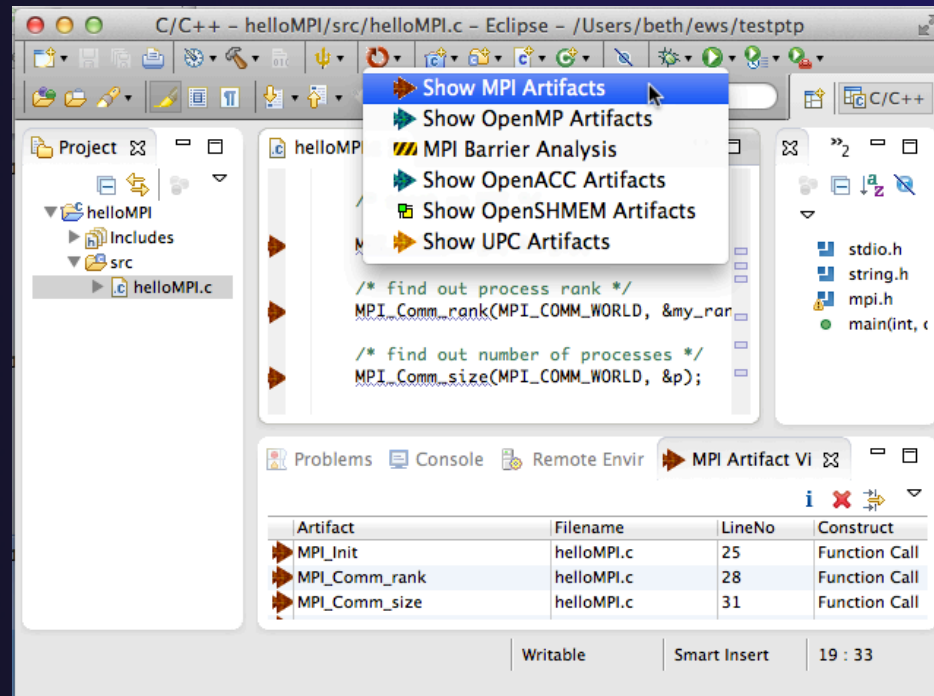
Synchronized Projects

✦ **Source is mirrored on local and remote host**

   ✦ Responsive editing and interactions on local
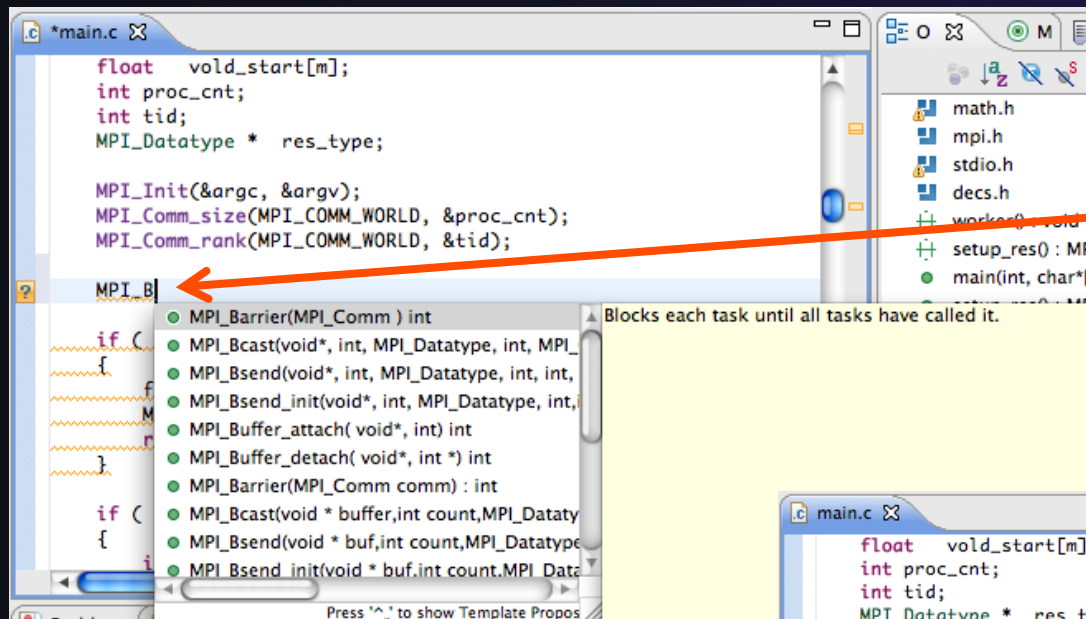
   ✦ Build and run on remote
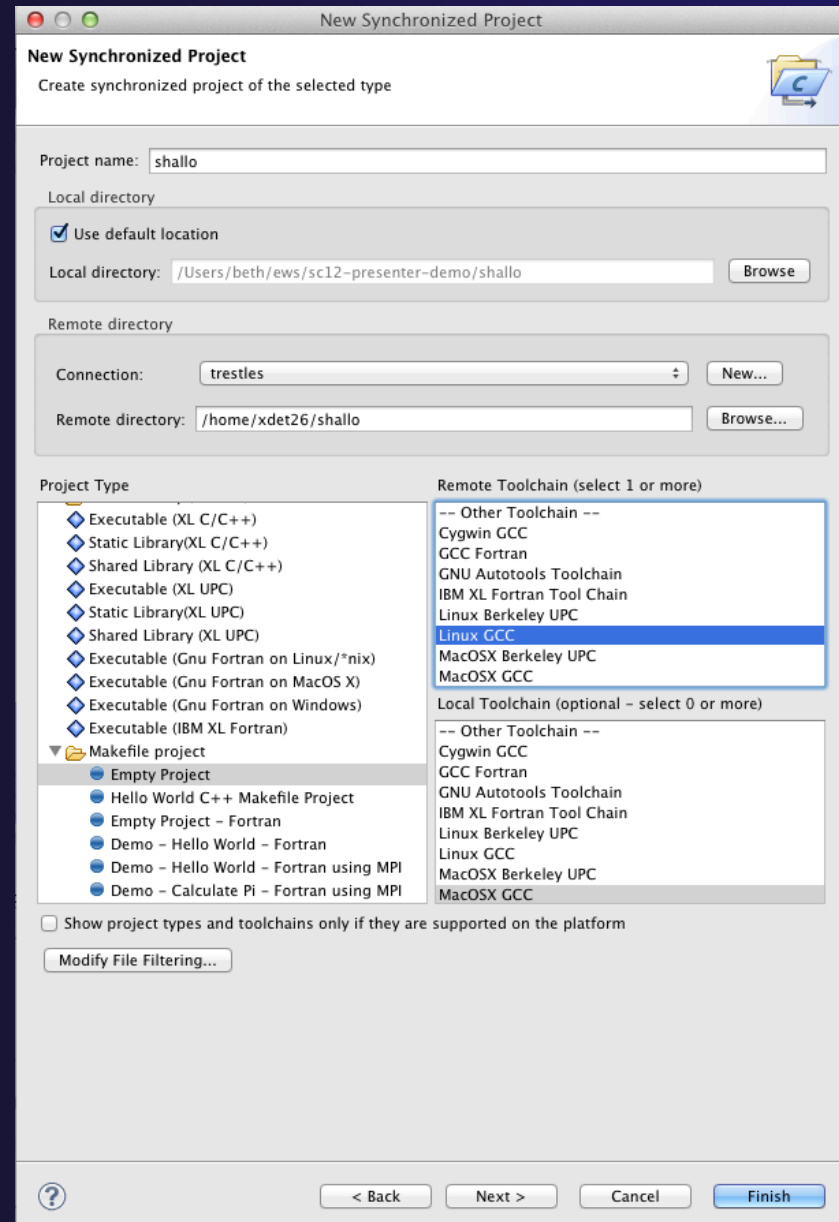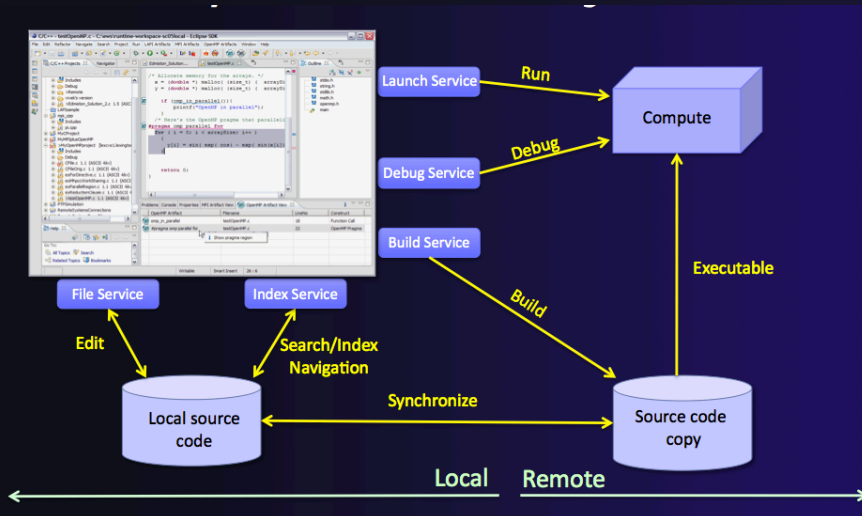
MPI, OpenMP, UPC, …. Support

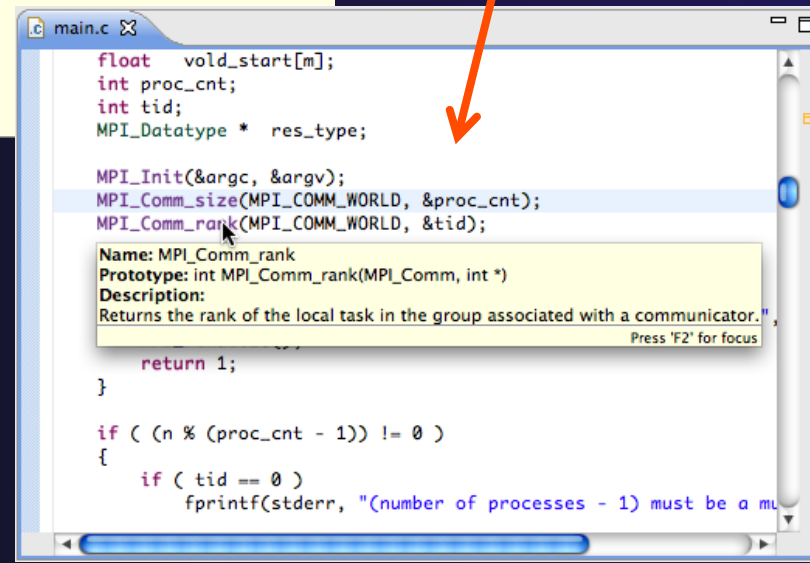Support for a variety of languages/APIs/ Libraries for parallel development
- ✦MPI
- ✦OpenMP
- ✦OpenSHMEM
- ✦OpenACC
- ✦UPC

Editor Features for Parallel Development

- ✦ Code completion will show all the possible MPI keyword completions
- ✦ Enter the start of a keyword then press <ctrl-space>

- ✦ Hover over MPI API
- ✦ Displays the function prototype and a description

- ✦ MPI Barrier Analysis
- ✦ Code templates for common idioms
- ✦ Similar tools for OpenMP, UPC, OpenSHMEM, OpenACC

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Fortran

✦ Photran: http://eclipse.org/photran/

Photran - An Integrated Development Environment and Refactoring Tool for Fortran

Photran is an IDE and refactoring tool for Fortran based on **Eclipse** and the **CDT**. **Photran 8.0** was released with Eclipse 4.2 (Juno) on June 27, 2012.

Photran 8.0 supports Fortran 77-2008. It includes 39 refactorings (including Rename, Extract Procedure, and loop transformations), as well as the following IDE features:

⇢ Syntax-highlighting editor
⇢ Outline view
⇢ Content assist*
⇢ Open declaration*
⇢ Declaration view and hover tips*
⇢ Fortran language-based searching*
⇢ Support for CVS & other VCS's**
⇢ Interactive debugger (*gdb* GUI)
⇢ Makefile-based compilation
⇢ Optional Makefile generation
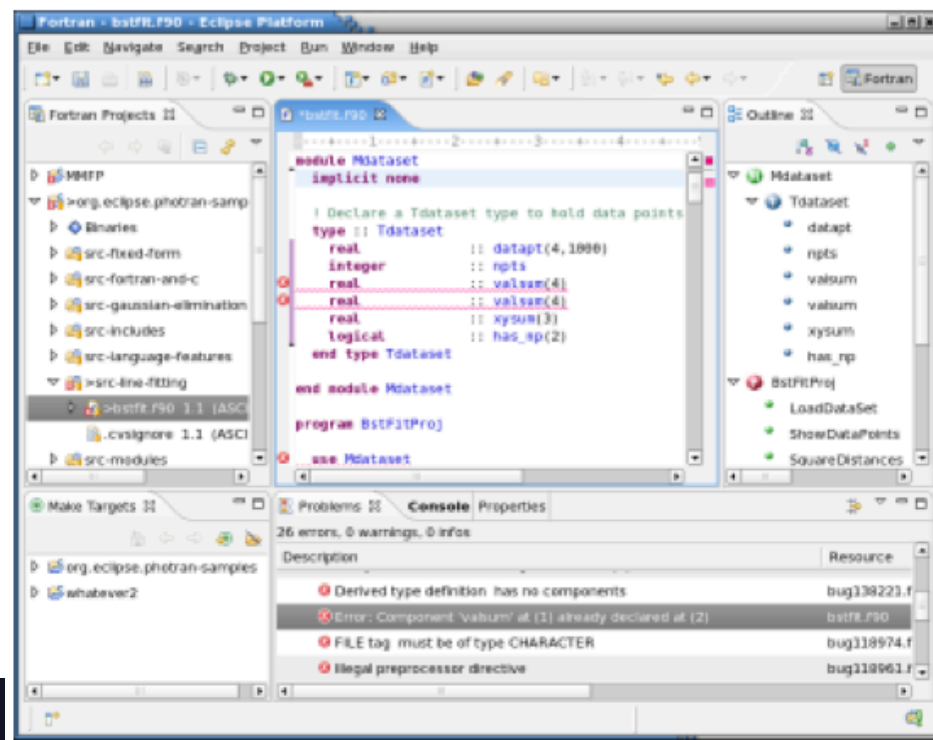
Refactoring Example:
Fortran Loop Transformations

✦ **Unroll Loop**

✦ Select a loop, click **Refactor▶Do Loop▶Unroll Loop...**
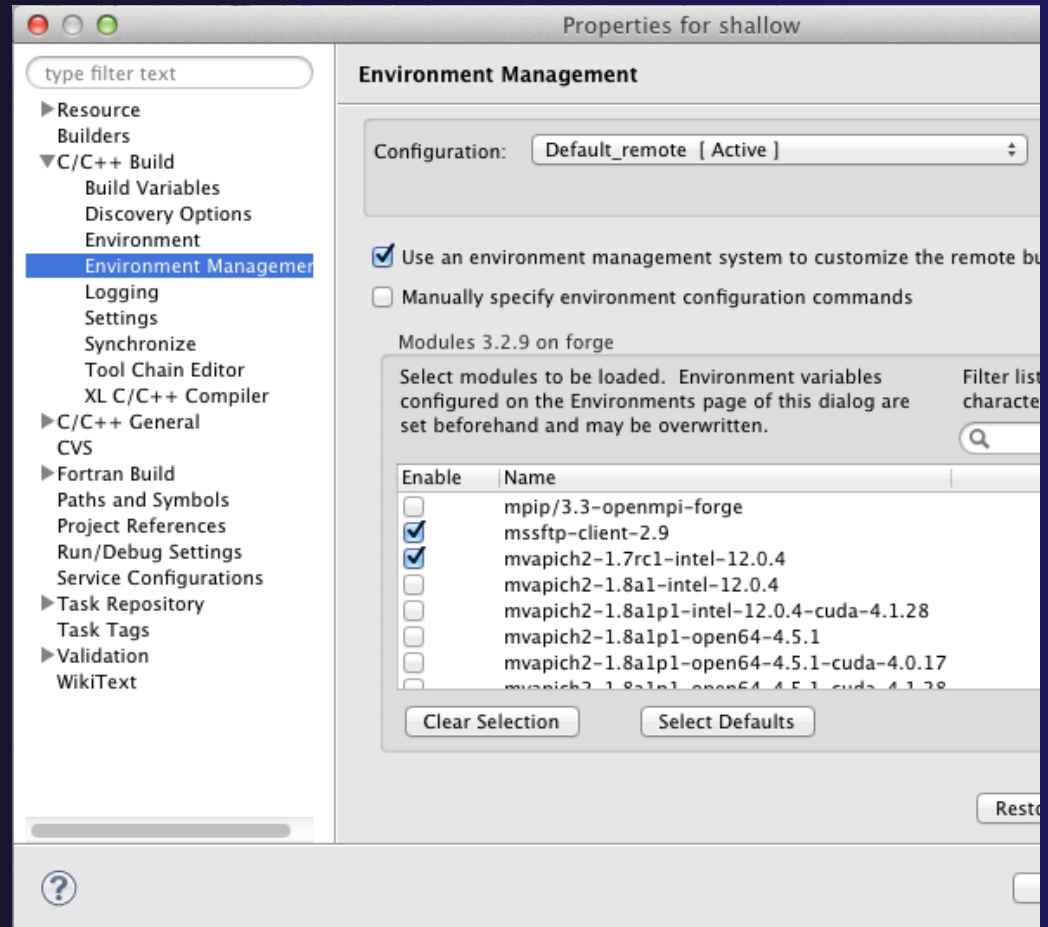
```
do i = 1, 10
  print *, 10*i
end do
```


Unroll 4×

```
do i = 1, 10, 4
  print *, 10*i
  print *, 10*(i+1)
  print *, 10*(i+2)
  print *, 10*(i+3)
end do
```
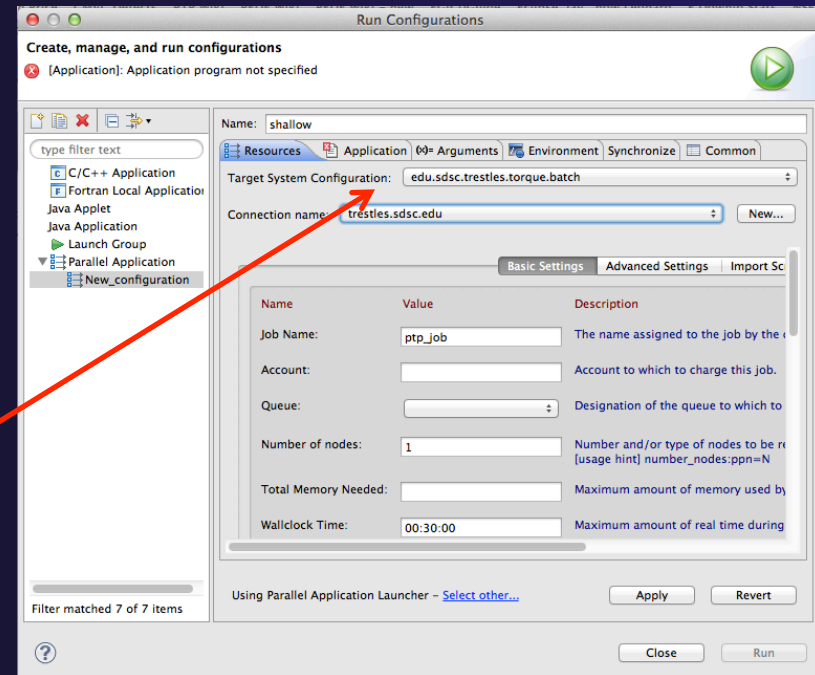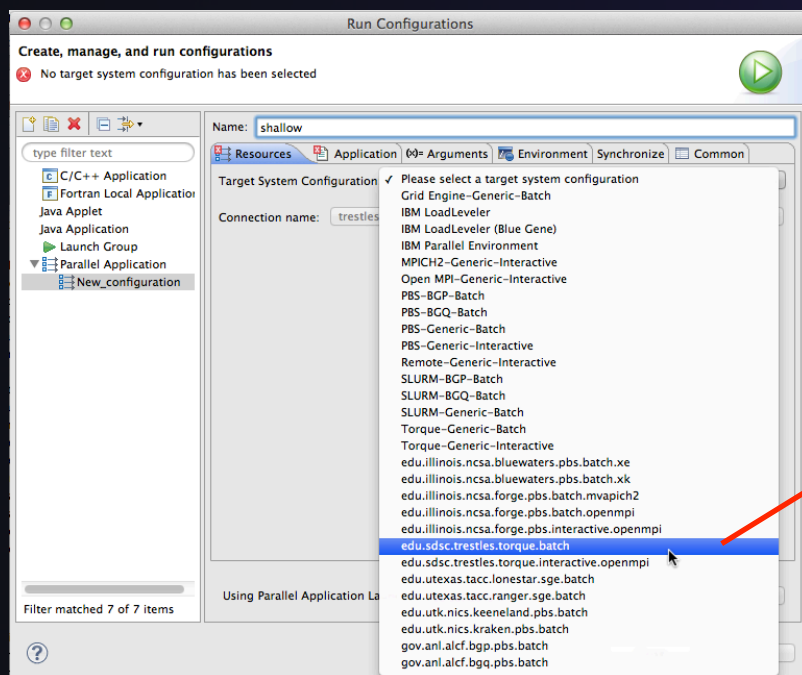

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Configuring Build Modules

✦ If the remote system has Modules installed, a custom set of modules can be configured for building C/C++ projects

Launching

✦ Flexible Target System Configurations

✦ UI solicits input depending on remote target

Monitoring

- System view
- Jobs running on system
- Active jobs
- Inactive jobs
- Messages
- Console

Scroll to see more

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Parallel Debugger

- **Parallel Debug view** shows job and processes being debugged
- **Debug** view shows threads and call stack for individual processes
- **Source** view shows a **current line marker** for all processes

Parallel Debugging   -14

Tutorial, VM

- ✦ Tutorial slides
  - ✦ http://wiki.eclipse.org/PTP/tutorials/SC12

- ✦ Virtual Box + Torque vm
  - ✦ Good sample target platform for PTP

  - ✦ https://www.cct.lsu.edu/~dcastl2/ptp/vbox.php

Commercial Products
that include PTP

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that include PTP

✦ IBM Parallel Environment Developer Edition

- ✦ Eclipse, PTP
- ✦ IBM HPC Toolkit
- ✦ Assistance tools for
      IBM PAMI & LAPI
- ✦ XLC Compiler Transformation
    Report viewer

- ✦ http://ibm.co/tdM7QD

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Online Information

✦ Information about PTP
  ✦ PTP online help
    ✦ http://help.eclipse.org
  ✦ Main web site for downloads, documentation, etc.
    ✦ http://eclipse.org/ptp
  ✦ Wiki for designs, planning, meetings, etc.
    ✦ http://wiki.eclipse.org/PTP

✦ Information about Photran
  ✦ Main web site for downloads, documentation, etc.
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Mailing Lists

✦ User Mailing Lists
  ✦ PTP
    ✦ http://dev.eclipse.org/mailman/listinfo/ptp-user
  ✦ Photran
    ✦ http://dev.eclipse.org/mailman/listinfo/photran
  ✦ Major announcements (new releases, etc.) - low volume
    ✦ http://dev.eclipse.org/mailman/listinfo/ptp-announce

✦ Developer Mailing Lists
  ✦ Developer discussions - higher volume
    ✦ http://dev.eclipse.org/mailman/listinfo/ptp-dev

Getting Involved

- ✦ See http://eclipse.org/ptp
- ✦ Read the developer documentation on the wiki
  - ✦ http://wiki.eclipse.org/PTP
- ✦ Join the mailing lists
- ✦ Attend the monthly developer meetings
  - ✦ Conf Call Monthly: Second Tuesday, 1:00 pm ET
  - ✦ Details on the PTP wiki
- ✦ Attend the monthly user meetings
  - ✦ Teleconf Monthly: 4th Wednesday, 1:00 pm ET
  - ✦ Details on the PTP wiki
- ✦ Annual PTP User-Developer meeting