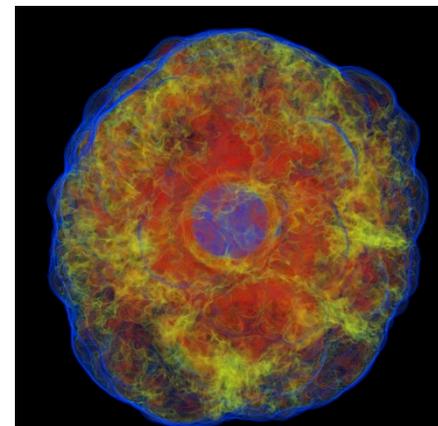
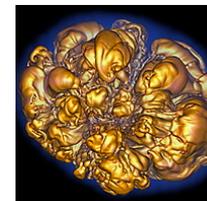
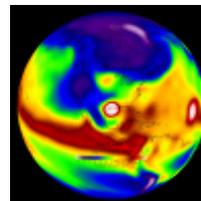
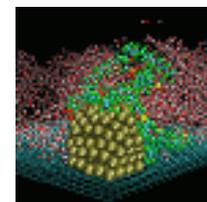
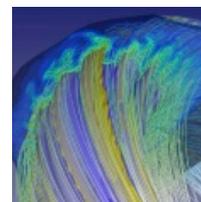
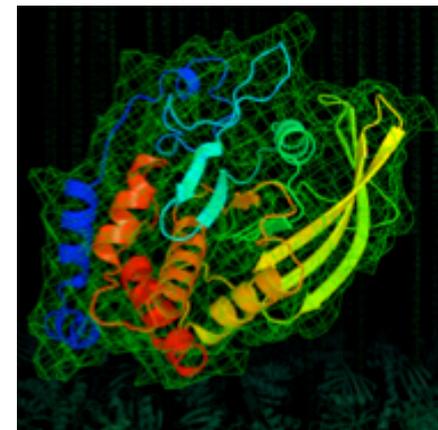
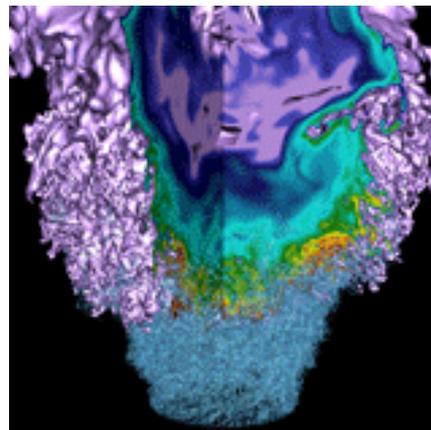


Overview

Debugging and Profiling with Allinea (ARM) Tools and Others



Woo-Sun Yang
User Engagement Group, NERSC

April 24, 2018

Debugging and Profiling with ARM tools (and others)



- **Mainly about how to use ARM Forge and perf-report**
- **Ryan Hulguin, an ARM engineer, will teach ARM tools**
- **Woo-Sun Yang will cover other debugging tools**

Topic	Time (PDT)
Welcome	9:00-9:10
Debugging with ARM DDT	9:10-10:10
Other Debugging Tools	10:10-10:30
Break	10:30-10:45
Debugging Hands-on Examples/Own code	10:45-12:00
Lunch (on your own)	12:00-1:00
Profiling with ARM MAP and performance reports	1:00-1:45
Profiling Demo	1:45-2:00
Profiling hands-on Examples/Own code	2:99-3:30

If you work far away from NERSC



- Remote X window application (GUI) over network: slow response
- Two solutions
 - Use NX to improve the speed
 - Works for X window applications
 - <https://www.nersc.gov/users/network-connections/using-nx/> (general)
 - http://portal.nersc.gov/project/mpccc/nx/NX_Tutorial/Start_Over.html (installation and quick user guide)
 - Use ARM Forge remote client (for those who will use ARM Forge)
 - Runs on your desktop/laptop
 - Submit a debugging batch job from a NERSC machine and make the client **reverse connect** to the job
 - Displays results in real time
 - No license file required on your local desktop/laptop
 - <https://www.nersc.gov/users/software/performance-and-debugging-tools/ddt#toc-anchor-5> (**setup**)
 - <https://developer.arm.com/products/software-development-tools/hpc/downloads/download-arm-forge> (for downloading remote clients)

Using NX



The screenshot displays the NX IDE interface. The main window shows a Fortran source file named 'jacobi_mpi.f90'. The code includes variable declarations for integers (i, j, k, np, myid, js, je, js1, je1, nbr_down, nbr_up, status), a real variable (h, utmp, diffnorm), and several MPI-related function calls. The current line of execution is highlighted at line 21: `call mpi_comm_size(mpi_comm_world, np, ierr)`. A 'Locals' window is open, showing the current values of 'ierr' and 'np', both set to 0. The 'Stacks' window at the bottom shows the current stack frame: 'jacobi_mpi (jacobi_mpi.f90:21)'. The interface also features a 'Project Files' tree on the left, a toolbar with execution controls, and a status bar at the bottom indicating 'Ready'.

Using Arm Forge remote client



(1) Select 'Configure' to create a configuration for a NERSC machine

2nd entry for a MOM node
Cori: cmom02 or cmom05
Edison: edimom01, ... or edimom06

(2) Create a configuration

Installation path on Edison: /global/common/sw/cray/cnl6/ivybridge/allinea-forge

Using Arm Forge remote client (Cont'd)



(3) Select a machine

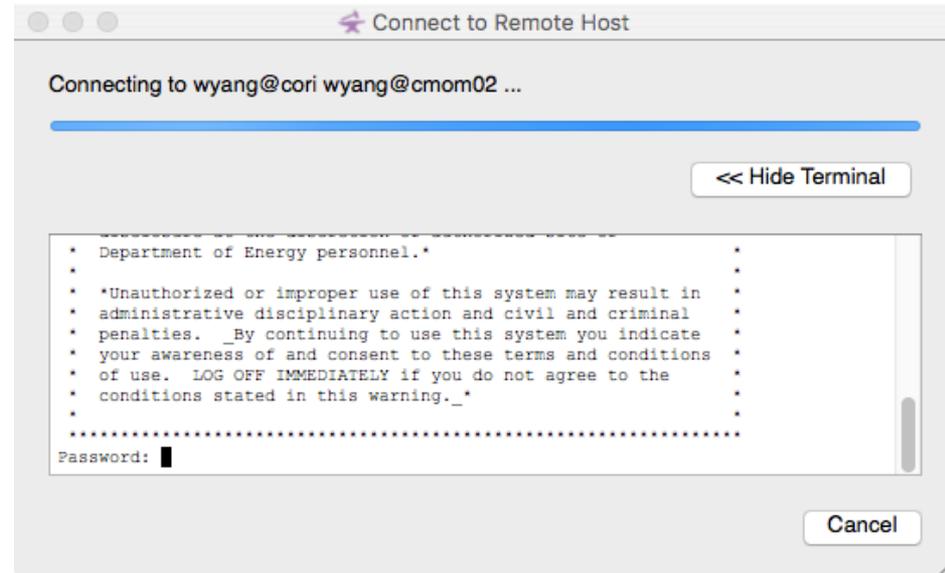
- RUN**
Run and debug a program.
- ATTACH**
Attach to an already running program.
- OPEN CORE**
Open a core file from a previous run.
- MANUAL LAUNCH (ADVANCED)**
Manually launch the backend yourself.

OPTIONS

Remote Launch:

- ✓ Off
- Configure...
- cori**
- edison

(4) Enter the NIM password



Using Arm Forge remote client (Cont'd)



(5) Submit a batch job on a NERSC machine and start DDT

```
$ salloc -N 1 -t 30:00 -q debug -C knl
...
$ module load allinea-forge
$ ddt --connect ./jacobi_mpiomp
```

(7) Set parameters and run

The screenshot shows the configuration window for the Arm Forge remote client. The application is set to `/global/cscratch1/sd/wyang/debugging/jacobi_mpiomp`. The MPI settings are configured for 16 processes using SLURM (MPMD). The OpenMP settings are configured for 8 threads. The window includes buttons for `Run` and `Cancel`.

(6) Accept the request

A dialog box with a warning icon and the following text: "A new Reverse Connect request is available from nid08791 for Allinea DDT. Command Line: `-connect ./jacobi_mpiomp` Do you want to accept this request?". At the bottom, there are three buttons: "Help", "Accept", and "Reject".



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