VI-HPS


epcc

PRACE

# 16th VI-HPS Tuning Workshop

EPCC, Edinburgh, Scotland

29 April - 1 May 2014

http://www.**vi-hps.org**/training/tws/**tw16**.html

# 16th VI-HPS Tuning Workshop (EPCC)

- Presenters
  - Joseph Schuschart (Technische Universität Dresden)
  - Patrick Wohlschlegel (Allinea Software Ltd)
  - Brian Wylie (Jülich Supercomputing Centre)

- Thanks
  - Local arrangements & facilities (EPCC)
    - David Henty & Andrew Turner
  - Sponsors: PRACE

# Workshop outline

Tuesday 29 April
- 09:30-13:00 Parallel debugging: **DDT**
- 14:00-17:30

Wednesday 30 April
- 09:30-13:00 Parallel profiling: **Score-P** & **CUBE**
- 14:00-17:30

Thursday 1 May
- 09:30-13:00 Parallel tracing: **Scalasca** & **Vampir**
- 14:00-17:30

- Hands-on exercises part of each tool presentation
- Hands-on coaching to apply the tools to your own codes each afternoon

# Participant survey

We'd like to know a little about you, your application(s), and your expectations and desires from this tutorial

- What programming paradigms do you use in your app(s)?
  - only MPI, only OpenMP, mixed-mode/hybrid OpenMP/MPI, ...
  - Fortran, C, C++, multi-language, ...
- What platforms/systems *must* your app(s) run well on?
  - Cray XC/XK/XE/XT, IBM BlueGene Q/P/L, Linux cluster™, ...
- Who's already familiar with *serial* performance analysis?
  - Which tools have you used?
    - time, print/printf, prof/gprof, VTune, ...
- Who's already familiar with *parallel* performance analysis?
  - Which tools have you used?
    - time, print/printf, prof/gprof, CrayPAT, Scalasca, Vampir, ...

# Prepare to analyse your own application codes


- Ensure your application codes build and run to completion with appropriate datasets
  - initial configuration should ideally run in less than 15 minutes with 1-4 compute nodes (up to 96 processes/threads)
    - to facilitate rapid turnaround and quick experimentation
  - larger/longer scalability configurations are also interesting
    - turnaround may be limited due to busyness of batch queues
- Compare your application performance on other systems
  - VI-HPS tools already installed on a number of HPC systems
    - if not, ask your system administrator to install them (or install a personal copy yourself)

# Workshop system (hardware)

| | |
|---|---|
| **System** | ***archer*** |
| Domain | ac.uk |
| | |
| Vendor | Cray |
| Model | XC30 |
| Network | Aries (dragonfly topology) |
| | |
| **Processors** | Intel E5-2697 v2 (Ivy Bridge) |
| Frequency | 2.7 GHz |
| | |
| **Compute nodes** | 3008 |
| Chips per node | 2 |
| Cores per chip | 12 |
| Threads per core | 2 |
| Memory per node | 64 GB (or 128 GB) |

# Workshop system (software environment)

| | | | |
|---|---|---|---|
| **System** | ***archer*** | | |
| **Operating system** | *Cray Linux Environment (CLE)* | | |
| **Parallel filesys** | Lustre (/work)<br>NB: /home not accessible from compute nodes! | | |
| **PrgEnv-Compiler** | *Cray* | *GNU* | *Intel* |
| OpenMP flag | -homp | -fopenmp | -openmp |
| **MPI** | *Cray MPI-3.0 (based on MPICH)* | | |
| C compiler | cc | | |
| C++ compiler | CC | | |
| Fortran compiler | ftn | | |
| **Queue** | *PBS* | | |
| job submit | qsub | | |
| list jobs | qstat | | |

# DON'T PANIC!

The workshop presenters are here to assist you.

NB: On the assumption that nothing terrible is going to happen and everything's suddenly going to be alright really, all advice may be safely ignored.