VI-HPS

RIKEN

独立行政法人理化学研究所
計算科学研究機構
RIKEN Advanced Institute for Computational Science

京
K computer

14th VI-HPS Tuning Workshop

RIKEN AICS, Kobe, Japan

25-27 March 2014

BSC Barcelona Supercomputing Center Centro Nacional de Supercomputación
German Research School for Simulation Sciences
RWTH Rheinisch-Westfälische Technische Hochschule Aachen
TUM Technische Universität München
Universität Stuttgart
Université de Versailles Saint-Quentin-en-Yvelines
Jülich Forschungszentrum
Lawrence Livermore National Laboratory
Technische Universität Dresden
University of Oregon
The University of Tennessee UT

14th VI-HPS Tuning Workshop (RIKEN AICS)

VI-HPS

- Presenters
  - Jens Domke (Tokyo Institute of Technology)
  - Monika Lücke (German Research School for Sim. Sciences)
  - Judit Giménez (Barcelona Supercomputing Centre)
  - Brian Wylie (Jülich Supercomputing Centre)
- Thanks
  - Local organisation: Tomotake Nakamura, Itaru Kitayama
  - Hosts: RIKEN AICS
  - Sponsors:

KOBE UNIVERSITY

神戸大学 大学院

システム情報学研究科

Graduate School of System Informatics

GSIC

Global Scientific Information and Computing Center

学際大規模情報基盤共同利用・共同研究拠点

東京工業大学 学術国際情報センター

Global Scientific Information and Computing Center, Tokyo Institute of Technology

Outline

Tuesday 25th March

- 09:00-10:30 Welcome & Introduction
  - Introduction to VI-HPS & overview of tools
  - Introduction to parallel performance engineering
  - Lab setup for hands-on exercises with BT-MZ
- 11:00-12:30
  - Instrumentation & measurement with ***Score-P***
  - Execution profile analysis report examination with ***CUBE***
- 13:30-15:00
  - Configuration & customisation of Score-P measurements
- 15:30-17:00
  - Automated trace analysis with ***Scalasca***
  - Interactive trace analysis with ***Vampir***
- 17:00-17:30 Review of day and schedule for workshop

Outline of rest of week

Schedule to be determined!

Wednesday 26 March

- 09:00-17:00 *TBD*
- 16:00-16:30 Visit to ***K** computer*
- 17:00-17:30 Review

Thursday 27 March

- 09:00-17:30 *TBD*
- 17:00-17:30 Review of workshop

Friday 28th March

- Additional discussions (*TBD*)

- On-demand presentations and discussions on topics of interest
- Hands-on coaching to apply tools to analyse & tune your own codes on FX10 and ***K** computer*

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?
  - Fujitsu FX10/K, Cray, IBM BlueGene, 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, Fujitsu tools, 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 10 minutes with 1-4 compute nodes
    - 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)

Disclaimer

Tools will ***not*** automatically make you, your applications or computer systems more *productive*.

However, they can help you understand ***how*** your parallel code executes and ***when / where*** it's necessary to work on *correctness* and *performance* issues.

In case of doubt, confusion or alarm...

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.

Workshop system (hardware)

System	***pi***	***fx10***	***k***
Domain	ircpi.kobe-u.ac.jp	aics.riken.jp	aics.riken.jp
Model	Fujitsu FX10	Fujitsu FX10	***K** computer*
6D Tofu network	1x1x17x2x3x2	1x1x17x2x3x2	24x18x17x2x3x2
Processors	SPARC64 IXfx	SPARC64 IXfx	SPARC64 VIIfx
Frequency	1.848 GHz	1.848 GHz	2.0 GHz
Compute nodes	192	192	82,944
Chips per node	1	1	1
Cores per chip	16	16	8
Threads per core	1	1	1
Memory per node	32 GB	32 GB	16 GB

Workshop system (software environment)

System	***pi***	***fx10***	***k***
domain	ircpi.kobe-u.ac.jp	aics.riken.jp	aics.riken.jp
Filesystem	FEFS	FEFS	FEFS
Parallel filesys	/data	/data	/data [/work]
Compiler	*Fujitsu 1.2.1*	*Fujitsu 1.2.1*	*Fujitsu 1.2.0-15*
OpenMP flag	-Kopenmp	-Kopenmp	-Kopenmp
MPI	*Fujitsu MPI 2.1*	*Fujitsu MPI 2.1*	*Fujitsu MPI 2.1*
C compiler	mpifccpx	mpifccpx	mpifccpx
C++ compiler	mpiFCCpx	mpiFCCpx	mpiFCCpx
Fortran compiler	mpifrtpx	mpifrtpx	mpifrtpx
Queuing	*Parallelnavi Job Operation Software*		
job submit	pjsub job.sh	pjsub job.sh	pjsub job.sh
list jobs	pjstat	pjstat	pjstat