



EPSRC

ARCHER Single Node Optimisation

Overview

Slides contributed by Cray and EPCC



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- UK National Supercomputer Service, managed by EPSRC
 - housed, operated and supported by EPCC
 - hardware Supplied by Cray
- Training provided by the ARCHER Computational Science and Engineering (CSE) support team
 - 72 days per year at various locations round the UK
 - free to all academics



What is EPCC?

- UK national supercomputer centre
 - founded in 1990 (originally Edinburgh Parallel Computing Centre)
 - a self-funding Institute at The University of Edinburgh
 - running national parallel systems since Cray T3D in 1994
 - around 65 full-time staff
 - a range of academic research and commercial projects
 - one-year postgraduate masters in HPC www.epcc.ed.ac.uk/msc/
- Get in contact if you want to collaborate
 - many staff are named RAs on research grants
 - joint research proposals
 - European project consortia
 - ...



Key ARCHER Resources

- Upcoming courses
 - <http://www.archer.ac.uk/training/>
- Material from past courses
 - http://www.archer.ac.uk/training/past_courses.php
- Virtual tutorials (online)
 - <http://www.archer.ac.uk/training/virtual/>
- Technical forum (online)
 - <http://www.archer.ac.uk/community/techform/>
- Documentation
 - <http://www.archer.ac.uk/documentation/>



Who am I?

Mark Bull markb@epcc.ed.ac.uk

- Senior researcher at EPCC
 - Interests in parallel algorithms, parallel programming models, benchmarking, novel uses of HPC
- Lecture on EPCC's MSc in HPC
- EPCC's representative on the OpenMP ARB



Other Resources

- Please fill in the feedback form!
 - <http://www.archer.ac.uk/training/feedback/>
- General enquiries about ARCHER go to the helpdesk
 - support@archer.ac.uk
- EPCC runs one-year taught postgraduate masters courses
 - **MSc in HPC** and **MSc in HPC with Data Science**
 - awarded by the University of Edinburgh since 2001
 - scholarships available
 - <http://www.epcc.ed.ac.uk/msc/>



MSc in HPC / HPC with Data Science



- taught by EPCC staff (plus options in Informatics, Maths, Physics, ...)
- 12 taught courses (8 months); research dissertation (4 months)



Access to ARCHER

- Guest accounts for duration of course
 - can be used in the evenings while the course is running
- Accounts will be closed immediately after the course
 - all files etc will be deleted
- Take copies of all your work before course ends!
- Course materials (slides, exercises etc) available from course web page
 - archived on ARCHER web pages for future reference



Timetable – Day 1

- 0900 - 1100 Performance Optimisation, ARCHER Hardware, Profiling
- 1100 - 1130 Coffee
- 1130 - 1230 Practical – profiling
- 1230 - 1330 Lunch
- 1330 - 1500 Optimising with the compiler
- 1500 - 1530 Coffee
- 1530 - 1630 Practical - optimisation



Timetable – Day 2

- 0900 - 1100 Vectorisation, Caches, Memory Hierarchy Optimisation
- 1100 - 1130 Coffee
- 1130 - 1230 Practical – memory and cache blocking
- 1230 - 1330 Lunch
- 1330 - 1500 Hybrid Program Optimisation
- 1500 - 1530 Coffee
- 1530 - 1630 Practical – OpenMP optimisation



Lecture notes etc.

http://www.archer.ac.uk/training/course-material/2014/12/Sg1Node_Camb/

...or go to

<http://www.archer.ac.uk/training>
and follow the links!



Practical exercises source code

To download the source code for the practical exercises, make sure you are in your **work** directory on ARCHER, then use the following command :

```
wget --no-check-certificate http://tinyurl.com/nsdxhqr
```

