



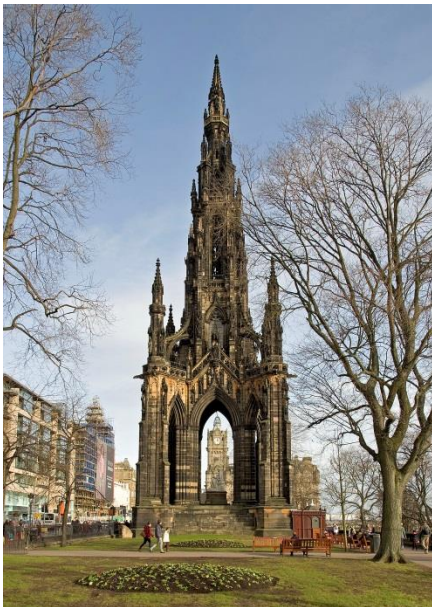
MPI / OpenMP Track IHPCSS 2017, Boulder, Colorado

Overview

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- David Henty
 - EPCC (Edinburgh Parallel Computing Centre)
 - University of Edinburgh, Scotland, UK
 - background in theoretical particle physics
 - (computational)
 - at EPCC since 1995
 - in charge of training including our 1-year masters course in HPC, PRACE Advanced Training Centre, ARCHER training, Supercomputing MOOC, online courses, ...
 - generally interested in parallel languages and models
- EPCC runs the UK national supercomputer ARCHER
 - Cray XC30 with 118,000 cores
 - around 70 full time staff
 - a range of work: national systems, research projects, European collaborations, MSc in HPC, commercial software development, ...







- MOOC: futurelearn.com/courses/supercomputing
 - free to attend – 2nd run starts 28 August 2017
 - introductory and conceptual
 - no programming involved
- Online courses: start January 2018
 - <https://www.epcc.ed.ac.uk/online-courses>
 - fee-paying 20-credit PG modules
 - Intro to HPC and to Data Science
 - some programming
 - predominantly hands-on
 - remote access to, e.g., ARCHER
 - part of the DSTI online MSc



- An introduction to
 - message-passing programming with MPI
 - shared-memory programming with OpenMP
 - hybrid (both MPI and OpenMP at the same time)
- Assumptions
 - you have used MPI
 - you have some knowledge of OpenMP
 - you have looked at the background material:
 - <http://www.hpc-training.org/xsede/moodle/mod/page/view.php?id=389>
 - see Hands-on Session Prerequisites -> MPI/OpenMP (Classic Track)
- All exercises are based around the parallel traffic model

- Slides on XSEDE moodle
- Additional material other than slides:
 - instructions for running on bridges: `bridges-cribsheet.pdf`
 - MPI/OpenMP exercise sheet: `traffic-ihpcss17.pdf`
 - MPI/OpenMP codes: `IHPCSS-pi.tar` and `IHPCSS-traffic.tar`
 - challenge talk: `IHPCSS2017_Hybrid_Computing_Challenge.pdf`
 - challenge code: `challenge.tar`

- 13:30 Introduction and recap
- 14:00 Log on; walkthrough of pi example
- 15:00 Break
- 15:30 Communicators, tags and modes
- 15:50 Traffic Model
- 16:10 Non-blocking communications
- 16:30 Practical session: traffic model
- 17:30 Close

- 11:45 OpenMP overview
- 12:15 Walkthrough of pi example
- 12:30 Lunch
- 13:30 Worksharing
- 14:15 Practical session: traffic model
- 15:00 Coffee
- 15:30 HPC Challenge example
- 15:45 Hybrid MPI / OpenMP
- 16:15 Practical session
- 17:30 Close

- A challenge to teach an audience with such a wide variety of previous experiences ...
- Practical
 - a range of options from basic to advanced
 - identical parallelisation to HPC challenge so a useful playground
- Lectures
 - I am happy to cover whatever you want to know
 - let me know!