22nd November 2017

High End Computing Cluster

Mike Pacey

What is the HEC?

- An ISS-managed system to support the computational workloads of researchers at Lancaster
- Supports computational workloads needing:
  - large numbers of cores
  - high amounts of memory
  - long runtimes
- Available to all researchers and research students at Lancaster
  - A broad range of users from different departments
  - Heaviest users from Physics and Chemistry
- Centrally funded
  - Free at point of use
  - Heavy users are encouraged to contribute to expansion and upkeep
- Housed in the purpose built HEC Datacentre
  - Originally installed in 2010 and updated annually
  - Aims for high availability – supported by UPS

Local Research Using HEC

Animal Epidemic Modelling Health and Medicine	**Financial Market Modelling** Accounting and Finance	**Wind Turbine Modelling** Engineering
Pollution Modelling Geography	**Air Traffic Flow Management** Management Science	**Simulation of Crystal Growth** Chemistry
Functionality of Quantum Computing Devices Physics	**EEG Data Analysis** Psychology	**ATLAS (CERN)** Physics
Climate Modelling Environmental Science	**Economic Forecast Modelling using Neural Nets** Economics	**Building Language Models from Large Text Corpora** Psychology

Cluster Software

- Cluster management software is all open source
  - CentOS 7 (Linux) operating system
  - SGE (Son of Grid Engine) job scheduler
- Choice of compilers: Intel, Portland Group, Gnu
  - Support for parallel codes (OpenMP and Message Passing Interface)
- High performance libraries
  - Intel Math Kernel Library, Fast Fourier Transforms, Gnu Scientific Library
- Commercial numerical analysis and research software
  - Matlab, Stata, ANSYS, Gurobi
- Open source packages
  - R stats package, Python, OpenFOAM

Further Details

More details + User Guide at
http://www.lancs.ac.uk/iss/hec

HEC Cluster