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Abstract

HPC technologies and the national e-infrastructure are vital for advancements in science, business and industry. However, there is a shortage of HPC skilled staff: HPC architects, administrators, researchers and research software engineers. Currently, HPC skills are acquired mainly by students and staff taking part in HPC-related research projects. To address the issue of skills shortages in the HPC it is essential to provide teaching and training as part of both postgraduate and undergraduate courses, and to engage with children and college level students through inspirational outreach events.

Background and Motivation

- HPC technologies are vital for the advancement in science, business and industry.
- HPC postgraduate and undergraduate courses are needed to educate skilled HPC staff.
- The design and development of HPC courses is challenging since the technologies and software are undergoing continuous change.
- Current solution from large universities and well funded research organisation do not translate easily into the application in HEIs



HPC resources development 2010-2017

- Our aim was to develop an affordable and sustainable solution for HPC resources for teaching and research at the University of Huddersfield
- We utilise available resources at the university and open source solutions whenever possible
- Building HW/SW for department clusters and applications
- Unifying the clusters and grids from various schools within the campus into a QGG, and accessing external HPC resources

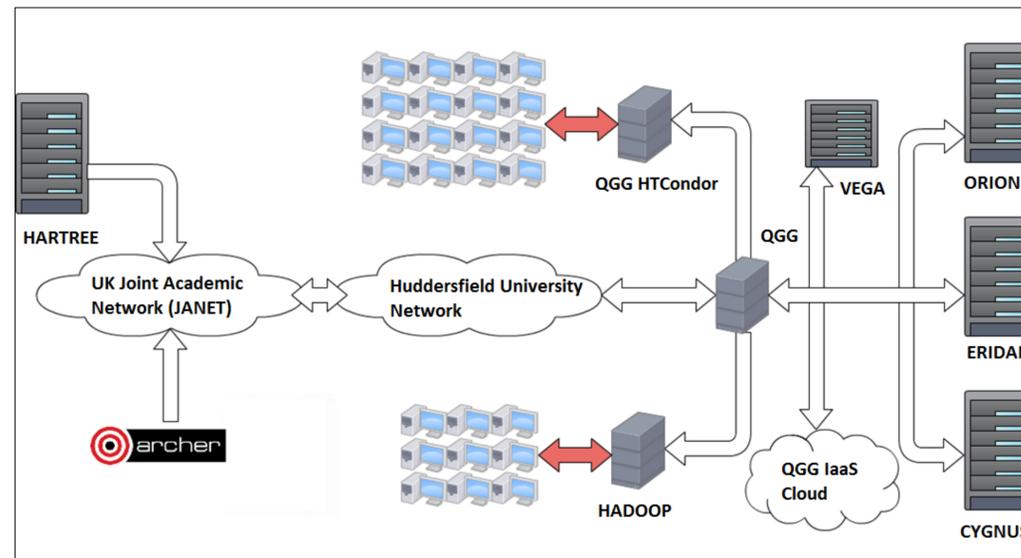


Figure 1. Huddersfield University Queensgate Campus Grid



Figure 2. HPC teaching laboratory



Figure 3. ERIDANI, VEGA, CYGNUS

Coursework Projects

- HPC Computer cluster projects - building lab clusters using novel VCC middleware and re-claimed PCs; performance testing of laboratory and QGG clusters.
- HTCondor projects – building lab HT clusters using HTCondor middleware, and running jobs on university HT pool.

Challenges

- Keeping up with continuous changes in open-source software: Linux operating system and cluster middleware.
- Broad computing and engineering knowledge required when building and programming laboratory clusters.

Outreach

- Supercomputing Workshop – ARCHER @ Huddersfield



Summary

- Delivery of the course using practical hands-on approach, using laboratory and university HPC resources, is inspiring and motivating the students to become researchers and practitioners in HPC.
- Every year since 2010, at least one graduate from this course joined the HPC Research Group as a Master by Research or a PhD student.
- Other graduate destinations are UK research institutes and universities.