Report on RSNZ High Performance Computing Workshop

Thursday 19th October, Christchurch

Objective

The meeting was organised with the help of the RSNZ with the following objectives:

1. To develop an inventory of HPC resources and plans
2. To reach a preliminary position on the desired state for HPC resources for New Zealand.
3. To identify areas of co-ordinated activity including bids to the Research Infrastructure Advisory Group (RIAG) and the nature of private sector participation.

Participants

The meeting was attended by over 35 people including academics, HPC users and CRI researchers. Representatives from all Universities attended, along with staff from NIWA, Landcare, Canterbury Development Corporation, NZTE, MoRST and REANNZ.

Professor John O'Callaghan (Executive Director of the Australian Partnership for Advanced Computing) introduced the seminar with an overview of the Australian Partnership for Advanced Computing. They have a central facility in Canberra using SGI hardware, connecting with all State Advanced Computing sites via AARNET. The main issues for NZ it would seem are:

- central government leadership and funding is needed
- a cooperative approach works best
- the key ingredient is the development of a seamless service for all users
- data management as a looming issue
- staffing and capability building
- identity management

John is willing to consider acting as a consultant in the future especially if planning for a New Zealand national facility gets underway.

Other speakers included:

1. Michael Uddstrom (Science Leader: Environmental Forecasting Principal Scientist: Meteorology and Remote Sensing, NIWA) who summarised both the extensive experience gained by NIWA in operating an HPC, and the associated costs - which include ROI, depreciation, maintenance and operating. Other impediments to uptake of advanced computing capabilities include an absence of research-related HPC funding support. Reiterated the data management issue raised by John O'C.

2. Charles Jarvie (Develop Manager, KAREN) who summarised the current status of Kiwi Advanced Research and Education Network (KAREN) and outlined

potential models for a national HPC environment and the issues that will need to be addressed to provide an acceptable solution to researchers and participating institutions.

3. Paul Bonnington (Associate Dean for Information Technology, University of Auckland who summarised the BestGrid project. This will focus on the development of middleware and the support of shared databases for a number of joint research projects, initially between the Auckland, Massey and Canterbury Universities.

4. Sergei Gulyaev and Slava Kitaemm from AUT who described their Masters programme in HPC, their involvement in a Trans-Tasman astrophysics project and a forthcoming HPC seminar.

5. Tim David (Chair of High Performance Computing Advisory Group, University of Canterbury) who summarised the relationship that UC has developed with IBM and the new HPC facility.

Resources

The group identified the following advanced computer resources in New Zealand (the IBM P series 595, IBM P5 575, and Cray T3 1200e below are “capability” machines – the others are “capacity” machines):

University of Auckland:

- High-performance computer system composed of
  - IBM P Series 595
  - 64 x Power5 1.9 GHz CPUs
  - 256 Gb of memory (available to all 64CPUs)

- Super-cluster (Linux) cluster
  - 8 x IBM P Series 550
  - 2 x Sun each with 8 CPU, total 80 CPUs + 348Gb in total

- “Follow the Moon” Cluster
  - < 1400 CPUs (x86 Linux) (lab based)
  - Java scheduler, XEN in future

Massey University:

- Double Helix Rocks Based Linux Cluster
  - I Master and 19 Slave Nodes

University of Canterbury:

- High-performance computer system composed of
  - IBM's p5-575 high-end compute nodes
  - 8 Nodes each with 16 IBM Power 5 CPUs, (1.9GHz) and 32GBytes memory
  - Total 128 processor machine

New Zealand Supercomputing Centre (Wellington), (WETA and Gen-i):

- IBM Linux cluster

- x 2.8 GHz Intel Xeon processors with 3GB RAM each
- 554 x 3.2GHz Intel Xeon processors with 1 GB RAM each

NIWA (Wellington):

- High-performance computer system composed of
  - CRAY T3E 1200e
  - 544 PEs
  - 120 GB Memory – available to all 544 Processors
  - 2 TB of FC RAID III disk
  - 70 TB integrated tertiary storage

Outcomes

The following general principles were agreed:

1. There is support for connecting New Zealand's advanced computing systems to research users via KAREN. These systems include both capacity (i.e. cluster computers) and capability (i.e. high performance computers) class facilities.
2. The issue of data management was not considered in detail, but having a data-centric view will be important for the development of advanced computing in New Zealand.
3. For university researchers New Zealand might consider emulating the APAC model. However this model is unlikely to suit researchers with operational-level performance requirements. There will be a need for human resource training and funding to ensure that a good service is provided to users.
4. It was clear that the current computer power available is insufficient to support the research and operational requirements of the New Zealand advanced computing community. Remaining at this level would have a serious impact on the international status and participation opportunities of the researchers themselves. Current and future new CoREs (Centres of Research Excellence) have a significant high end computer requirement. It was therefore suggested that some of the capital funding to be allocated in the forthcoming CoRE funding round could be directed to an HPC facility(s).
5. A capability fund application would be prepared for the November REANNZ application round. This would be to support a working group to develop recommendations and a roadmap for the development of HPC in New Zealand. This should strategically inform policy agencies in this area and tactically assist in making the most of current and planned HPC resources.

It is important to note that the current Chair of Research Infrastructure Advisory Group should be briefed about the workshop and its implications.

Ian Town, Deputy Vice Chancellor, University of Canterbury

Chairman