WORKSHOP:
High-Performance Computing at eRSA

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HPC at eRSA

- eRSA has some local facilities available for what has traditionally been called High Performance Computing (HPC) or Supercomputing.
- Shared resources, managed by eRSA, for the academic research community of SA.
- Available for any researcher, in any discipline, from any of the 3 SA universities.
- Aim to satisfy the different types of resource demands of quite different groups of researchers.
- Set up in a standard way for HPC facilities.

HPC Facilities at eRSA

- Great success in procuring world-class HPC for SA
  - 1999 Perseus - largest cluster in Australia
  - 2000 Orion - #1 in Australia
  - 2003 Hydra - #2 in Australia
  - 2004 Aquila - large shared memory
  - 2007 Corvus - #2 in Australia
  - 2012 Tizard
  - 2015 Emu cluster in the cloud
- Supported several hundred users in the past 15 years
- Around 150 active users every year

eRSA HPC Facilities

- Tizard
  - CPU cluster
  - GPU cluster
  - Big memory nodes
  - Virtualization server
- Dedicated servers and clusters
- Emu cluster in the cloud
- Expect new HPC system in 2017

Dedicated facilities

- Some research groups or Schools have dedicated compute servers
- Used for specific requirements that are hard to meet on a general-purpose shared system
  - VMs, different OS (e.g. Windows), interactive jobs, custom architecture, web applications, fast processing of data from gene sequencers, etc
- eRSA helps with design, procurement and hosting of these servers
- Now prefer to use cloud virtual machines if possible

Operating System

- Note that all eRSA HPC systems use a flavour of the Linux (Unix) operating system
  - Some dedicated servers or VMs use Windows and some applications have GUI or web interface
- So you will need to have a basic knowledge of Unix commands in order to use the HPC
- Unix text editor such as nano, vi/vim, emacs
  - Or edit files on your PC and copy them over
- Lots of online resources for learning Unix and text editors, including on the eRSA web site

Access to eRSA HPC Facilities

- Shared facilities are no cost to researchers at (or affiliated with) the 3 SA universities and SAHMRI
- Amount of usage is proportional to funds provided by research group, School, Faculty, university to purchase the equipment
- Dedicated facilities are paid for by their users
- User support (e.g. software installs, assistance with problems) is included

eRSA HPC Services

- Procuring and managing shared supercomputer facilities
- Hosting dedicated compute servers
- HPC in the cloud
- Installing application software
- User support and service desk
- Training
- Consulting and advice on porting applications to supercomputers
- Porting applications, software development

Service Desk and User Support

- Online user guides and help on eRSA web site http://support.ersa.edu.au
- For any question or problem, contact the eRSA helpdesk
  - http://www.ersa.edu.au/support/
  - Email servicedesk@ersa.edu.au (preferred)
  - Or call 7228 6236
- Email goes to a ticketing system so we can track your request and the right person responds, via email, phone or in person.
- Don't contact eRSA system administrators or support staff directly – always use the service desk email or phone

Using eRSA HPC facilities

Windows users: We recommend the following software:

- **PuTTy**, an ssh client for logging in to eRSA facilities.
- **FileZilla or WinSCP**, secure file copying programs with a drag and drop interface.
- **Xming**, a free X Windows server, needed for any gui based editors, such as emacs (get all fonts).

BEWARE the ^M problem when copying files from your Windows desktop to the Linux HPC systems. Can fix with

`dos2unix` *`filename`*

Or use programs like Notepad++ that can handle different formats

Mac or Linux users: can also use terminal window and Unix commands.

Other HPC facilities

- Some other HPC facilities are also available for SA researchers:
  - NCI – national HPC facility
  - Pawsey – national HPC facility
  - Colossus – Flinders Uni
  - Phoenix – Uni Adelaide
- Contact them directly or ask eRSA for help on which might suit your requirements
- Most of the information in today's training is also applicable to these facilities

National HPC Facilities

- SA researchers can also access national HPC facilities through a merit allocation process
  - National Computational Infrastructure (NCI)
  - The Pawsey Centre
- National Computational Merit Allocation Scheme
  http://ncmas.nci.org.au/
- Call for allocations in October each year
- Additional resource available for specialised research areas

National Computational Infrastructure

- NCI is the national supercomputer center
- Part of the resource is available on merit, some is specialised for climate and earth system science
- National facility at ANU
  - Raijin 1 Pflop CPU cluster
  - Aimed at large HPC users
- Specialist facilities
  - Bioinformatics (UQ)
  - Imaging (Monash) – GPUs
- More information at www.nci.org.au

Pawsey Centre

- Pawsey is a new $80M supercomputer centre in WA
  - Magnus 1.1 Pflop CPU cluster
  - A few smaller specialised systems, including GPU cluster and large shared memory
- Focus on radio astronomy (SKA) and geosciences
- A fraction of the resource is general-purpose national merit allocation
- More information at www.pawsey.org.au

Nectar Research Cloud

- The Nectar national research cloud is also a major compute resource
- Mostly for high-throughput computing
- But VMs with up to 16 cores, 64GB RAM
- Now almost 30,000 cores
- SA node has almost 3000 cores
- Can use as standalone VMs or a cluster e.g. Emu
- Merit allocation, can apply online any time www.nectar.org.au

eRSA

Advancing Research Innovation

Upcoming workshops

Running a Virtual Machine in the cloud
14 April, University of Adelaide

R-Studio in the Cloud
15 April, University of Adelaide

Talk to us after the workshop to register