Western Australian Supercomputer Program

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National Collaborative Research Infrastructure strategy (NCRIS)

- Purpose is to develop roadmap to inform decisions on where Australia should make strategic infrastructure investments to further develop research capacity
  - Concentrate on areas of greatest impact
  - Increase collaboration with the research system
  - Reduce duplication and sub-optimal use of resources arising from lack of coordination
- Prioritize capabilities
  - $60M investment per capability

2006 Capabilities to be supported (WA Interests)

- Evolving biomolecular platforms and informatics
- Integrated biological systems
  - Animal models of disease, plant phenomics, Biological collections
- Microelectron Characterization
  - Neutron scattering, X-ray techniques, optical and electron microscopy/microanalysis
- Fabrication of advanced materials
  - Nanomaterials, bio- and chemo commercial synthesis, fabrication, rapid prototyping
- Biotechnology products
- Networked biosecurity framework
- Optical and Radio Astronomy
- Integrated Marine Observing System
- Structure and Evolution of the Australian Continent

Supercomputing application areas are global

Platforms for Collaboration

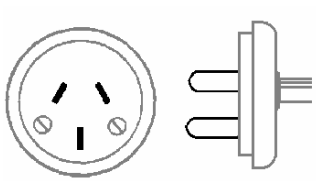
- Acknowledges need for coordinated development of cyber-infrastructure and cyber-domains at a national level
  - Data access and discovery, storage, and management
    - Data Management and Transport
  - Grid enabled technologies and infrastructure
    - Grid middleware
  - Technical expertise
    - Software environments, programming frameworks support
  - High performance computing
    - High performance I/O and file systems
    - Parallel and distributed algorithm development
    - Fault tolerance, reliability and availability for HPC applications
    - Resource management, scheduling and load-balancing
  - High capacity communication networks
  - Security, configuration, policy, and management issues

Supercomputing Issues Are Global

Non US Issues for Supercomputing

(Thanks to Ron Brightwell, Rolf Riesen, and Barney McCabe)

- Coriolis effect of Data storage
  - Disks rotate in the opposite direction
- Boomerang phenomena of Data transfer
  - No matter how fast you transfer data, it keeps coming back
- Connectivity Issues



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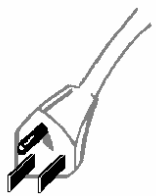

- Voltage problems
  - 240V/50Hz vs 110V/60Hz

Non US Supercomputing Issue #1

- Smaller funding capability
  - $1.36M grant from the Australian Research Council for HPC computer
    - One of the largest grants awarded
  - Can’t compete with HPC opulence in the US
  - Currency exchange rate further limits purchasing power
    - Most machines are built by US companies

Non US Supercomputing Issue #2

- HPC is a Relatively New Domain
  - A 164 node Cray XT3 super computer, with 32 TBytes of storage is a big machine
    - "It is the first supercomputer of its kind in Australia that will be accessible to researchers…" UWA Press Release
    - WASP is the first HPC Centre on a University Campus in Western Australia
  - Access to only one National Facility
    - 1680 Node –SGI Altix
  - APAC, VPAC, QPSF, iVEC, Ac3 are main state/federal consortia
  - Most HPC issues are application oriented
    - Little or no harware development

Non US Supercomputing Issue #3

- Smaller pool of talent
  - Initial efforts will be in educating the researchers about distributed computing
  - Current beliefs by the untrained
    - Complex calculations and loading of huge amounts of data can be accomplished in under three seconds
    - Most supercomputers have reality-defying three-dimensional, real-time, photo-realistic knowledge extraction capabilities
    - All application software is usable by all computer platforms

What makes them different from those in the US

- Smaller funding capability
  - US had funding issues but at least an order of magnitude greater
- HPC is a Relatively New Domain
  - US is the leader in HPC development
- Smaller pool of talent
  - Catching up vs keeping ahead

How do you address these issues?

- Smaller funding capability
  - Do not rely on single source funding
- HPC is a Relatively New Domain
  - Be a tall poppy and create HPC Centres
  - Impress on state governments the usefulness of HPC to economic development
- Smaller pool of talent
  - Institute HPC development programs
  - International collaboration, bring the talent to Australia
    - Funding available

Is the any generality for us all?

- State-of-the-art computing
  - Any computer you can't afford
- Obsolete Computer
  - Any computer you own
- Microsecond
  - The time it takes for your State-of-the-art-computer to become obsolete
- We all have similar problems and issues
  - Different scales

WASP

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