



arcs

Australian Research Collaboration Service

Australian Research Collaboration Service (ARCS)

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Supported by:



An Australian Government Initiative
**National Collaborative Research
Infrastructure Strategy**

ARCS Mission

“To provide long-term eResearch support services including, but not limited to, interoperability and collaboration infrastructure and services through a continuous and open process of consultation and engagement with the Australian research community.”

Central goals include *improved and transparent access to:*

- Online collaborative interaction & collaboration spaces
- Seamless resource sharing
- Data Fabric: movement, federation & digital repositories
- Virtual environments & collaborative compute resources
- Scientific instruments - remote access and operation
- Web applications & services

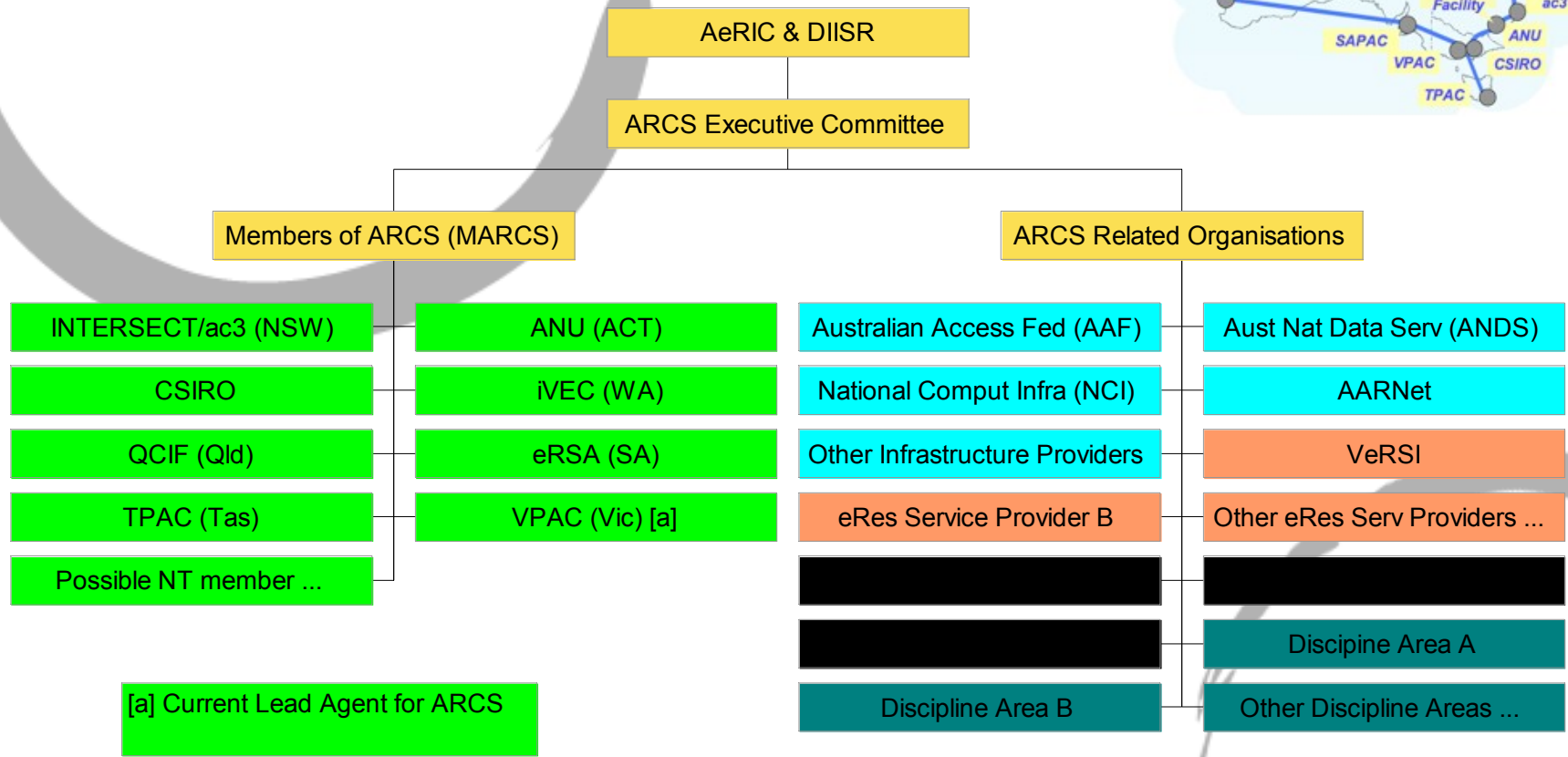
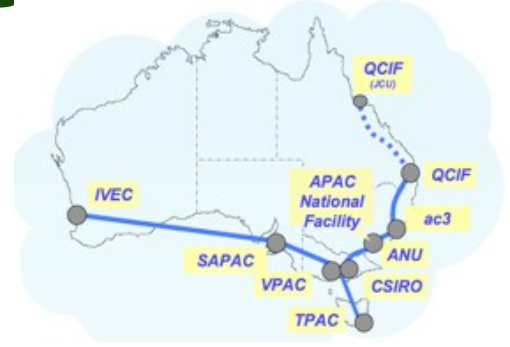
Target User Communities

Including but not limited to:

- Biomolecular Platforms (NCRIS 5.1);
- Characterisation (NCRIS 5.3);
- Astronomy (NCRIS 5.10);
- Integrated Marine Observing Systems (IMOS) (NCRIS 5.12);
- Structure and Evolution of the Australian Continent (NCRIS 5.13);
- Climate Modeling;
- Computational Chemistry;
- Earth System Science;
- High-Energy Physics;
- Gravity Wave (LIGO).
- Integrated Biological Systems (NCRIS 5.2);
- Australian Biosecurity Intelligence Network (NCRIS 5.8);
- Australian Environmental Observation Network (AEON) (NCRIS 5.11);
- Humanities;
- Social Sciences;
- other research communities.

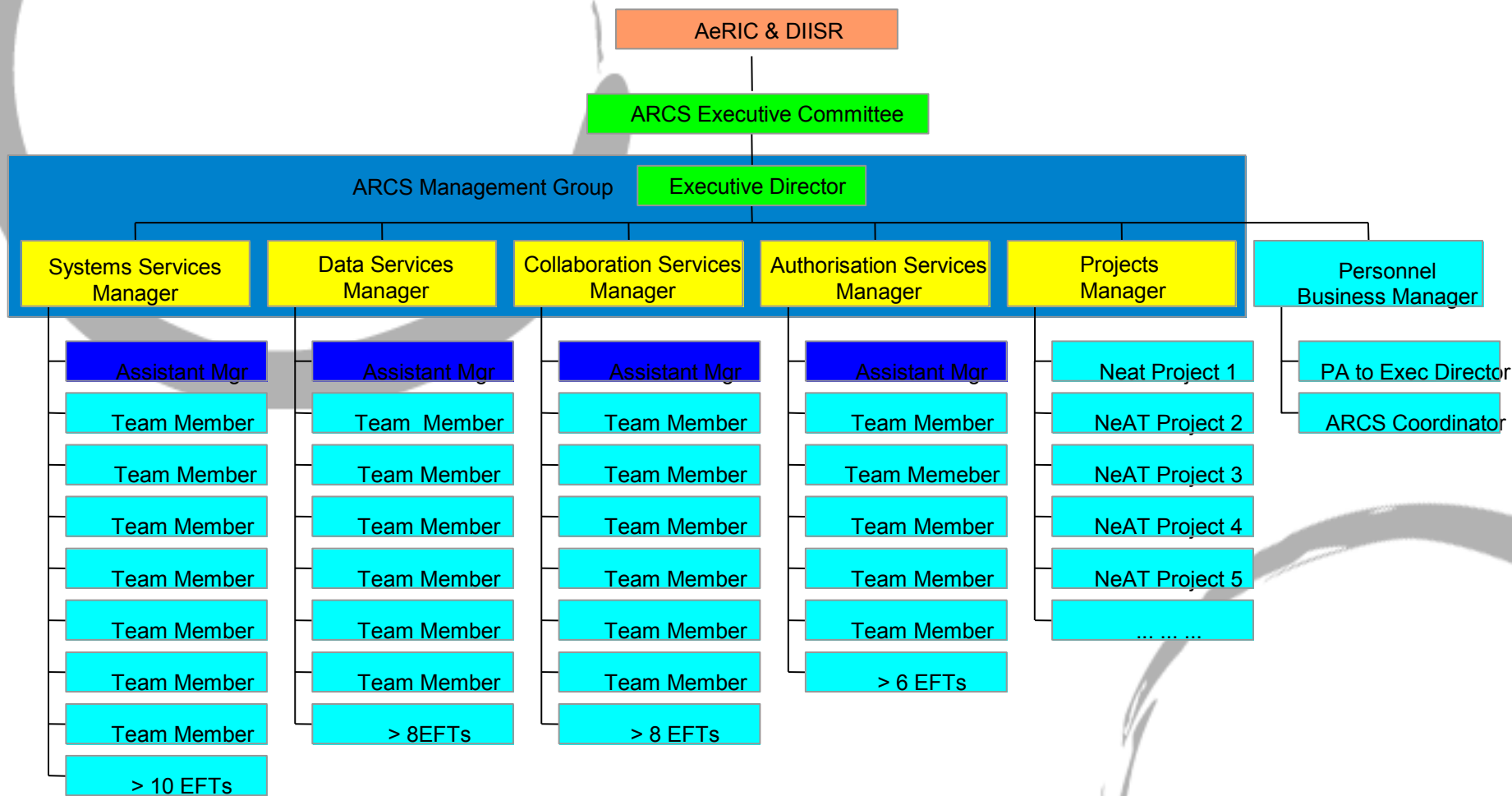
Collaboration Structure

ARCS - Collaboration Structure



Organisational Structure

ARCS Organisational Structure



ARCS Teams

- **Systems Services** (Workshop Fri AM)
- **Data Services** (Tue 1:30)
 - The ARCS “Data Fabric” (Workshop Thu PM)
- **Collaboration Services** (Wed 10:45)
 - Web Based Tools, Video Conferencing (Workshop Thu AM)
- **Authorisation Services**
 - AAF

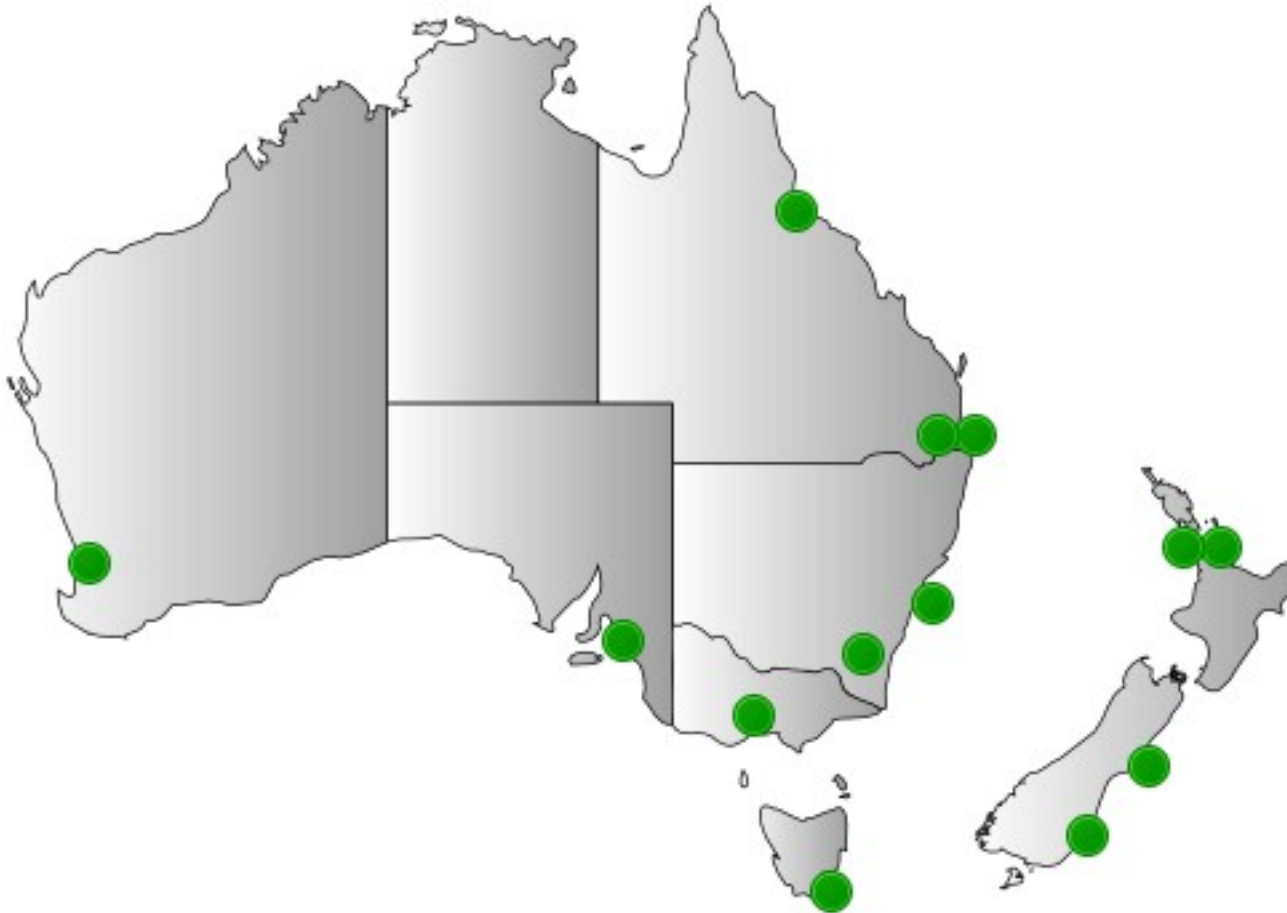
ARCS Systems Services

- 12 staff members hosted at Members of ARCS - trusted members of local Sys Admin team
- Host basic infrastructure to support ARCS services:
 - Mail, including lists
 - IM – Jabber (all staff available, others may use to communicate with us)
 - Wiki, Development repositories (Trac/Subversion)
 - Help desk - Request Tracker
- Develop and document best practices for:
 - Use of OS Virtualisation (Xen/VMWare ...) - allows different middleware to be supported
 - Deploying/monitoring services – generally on CentOS Linux
- Deploy other services as required by Data, Collaboration or Authorisation teams
 - Sakai, SRB (ARCS Data Fabric), IdP, SLCS, etc ...

Continued ...

- Major role is to manage the **ARCS National Grid** (originally APAC Grid)
 - A number of HPC, data and other facilities available to Australian researchers – thousands of CPUS, many TB of storage
 - Consistent interface using standards for job submission and data transfer
 - Develop and support easy to use tools
 - Publish information about the resources available (MDS)

ARCS National Grid



Example Users & Applications

- Bio-Sciences (including NCRIS 5.1) – genomics, protein modelling, drug discovery, phylogenetics
 - BLAST, RepeatMasker, MrBayes, BEAST, Dock ...
- Computational Chemistry
 - NAMD, Gaussian, Siesta, GAMESS, Dock
- Geoscience (Auscope, NCRIS 5.13)
 - escript/Finley, Underworld
- High-energy physics
 - Simulation and data analysis for theory and experiment

HPC – Problems

- Each supercomputer is slightly different
 - Architecture (eg, 32bit vs 64bit, ...)
 - Operating System and Libraries
 - Queuing Systems
 - Environments
 - Communications mechanisms
- Often difficult to use
 - Unix command line
 - Batch scripts for the queue
 - Restricted network access
- Systems may be fully used – no free CPUs

Grid Technologies

- Common interface to Submit Jobs and Transfer Data
 - Globus Toolkit 4 – GRAM/GridFTP
- Resource Information
 - MDS (Monitoring and Discovery Service). GLUE XML Schema, Central Index
- Security
 - X509 Certificates: APACGrid CA – Internationally Recognised
 - SLCS – AAF, currently Shibboleth
- Virtual Organisations – VOMRS
- Monitoring – INCA, Status

Using the Grid

- RSL – XML Job Scripts. More complicated than Unix command line!
- Portals
 - Nimrod – parameter sweep jobs. Web interface
- Condor/G – simpler job submission scripts, supports multiple jobs
- Grisu
 - Generic GUI submission interface (inc file transfers)
 - A framework, examples:
 - customised for Underworld
 - Batch and command line clients
- GDIS and JMolEditor (3D Chemistry)

Demos

- **Grisu**
 - Shibboleth login 2min
 - NAMD/VMD 2.5min

Future

- Roll-out Glite nationally – used by high energy physics (CERN LHC)
- Condor – make use of computing pools (Windows)
- Metascheduler – Gridway
 - Automatically match jobs to available resources
 - Uses MDS
- GLUE2 schema – involved with OGF working group to improve information

Getting Started

- Discuss your needs with ARCS or your local member of ARCS
 - ARCS will help negotiate access to resources (quota) and setup a virtual organisation (VO)
- Helpdesk
 - help@arcs.org.au
 - 1 800 TOARCS
- <http://www.arcs.org.au>
 - user guides/videos (in progress)