APAC National Grid

and

Trying to be all Things to all Users …

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Australian Partnership for Advanced Computing

apac

"providing national advanced computing, data management and grid services for eResearch"

Partners:

- **Australian Centre for Advanced Computing and Communications (ac3) in NSW**
- **CSIRO**
- **iVEC, The Hub of Advanced Computing in Western Australia**
- **Queensland Cyber Infrastructure Foundation (QCIF)**
- **South Australian Partnership for Advanced Computing (SAPAC)**
- **The Australian National University (ANU)**
- **The University of Tasmania (TPAC)**
- **Victorian Partnership for Advanced Computing (VPAC)**

4500 CPUs, 3PB storage

Changing User Base

- **National Collaborative Research Infrastructure Strategy**
  - **Ambitious plan to hand out $0.5B of federal money to fund research infrastructure collaboratively**

• Evolving Biomolecular Platforms and Informatics	$50.0M
• Integrated Biological Systems	$40.0M
• Characterisation	$47.7M
• Fabrication	$41.0M
• Biotechnology Products	$35.0M
• Networked Biosecurity Framework	$25.0M
• Optical and Radio Astronomy	$45.0M
• Integrated Marine Observing System	$55.2M
• Structure and Evolution of the Australian Continent	$42.8M
• Terrestrial Ecosystem Research Network	$20.0M
• Population Health and Clinical Data Linkage	$20.0M
• *Platforms for Collaboration*	*$75.0M*

Summer in Australia?

Recent Review

APAC in the future must be regarded not just as the National Facility, but as the sum of its component parts comprising:

[…]

The National Grid

[…]

That the APAC National Grid must be the pre-eminent grid in Australia and continue extending its coverage to include capabilities wherever they exist or develop. It must also nurture and support scientific research teams, NCRIS infrastructure and international partnerships

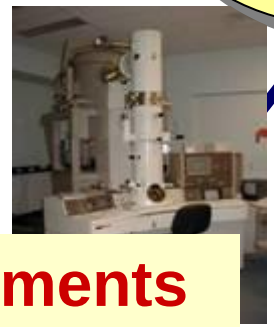
National Cyberinfrastructure

Research Teams

Sensor Networks

Data Centres

APAC National Grid
a virtual system of computing, data storage and visualisation facilities



Instruments

Other Grids:

Institutional

International

Core Grid Services - Work!!

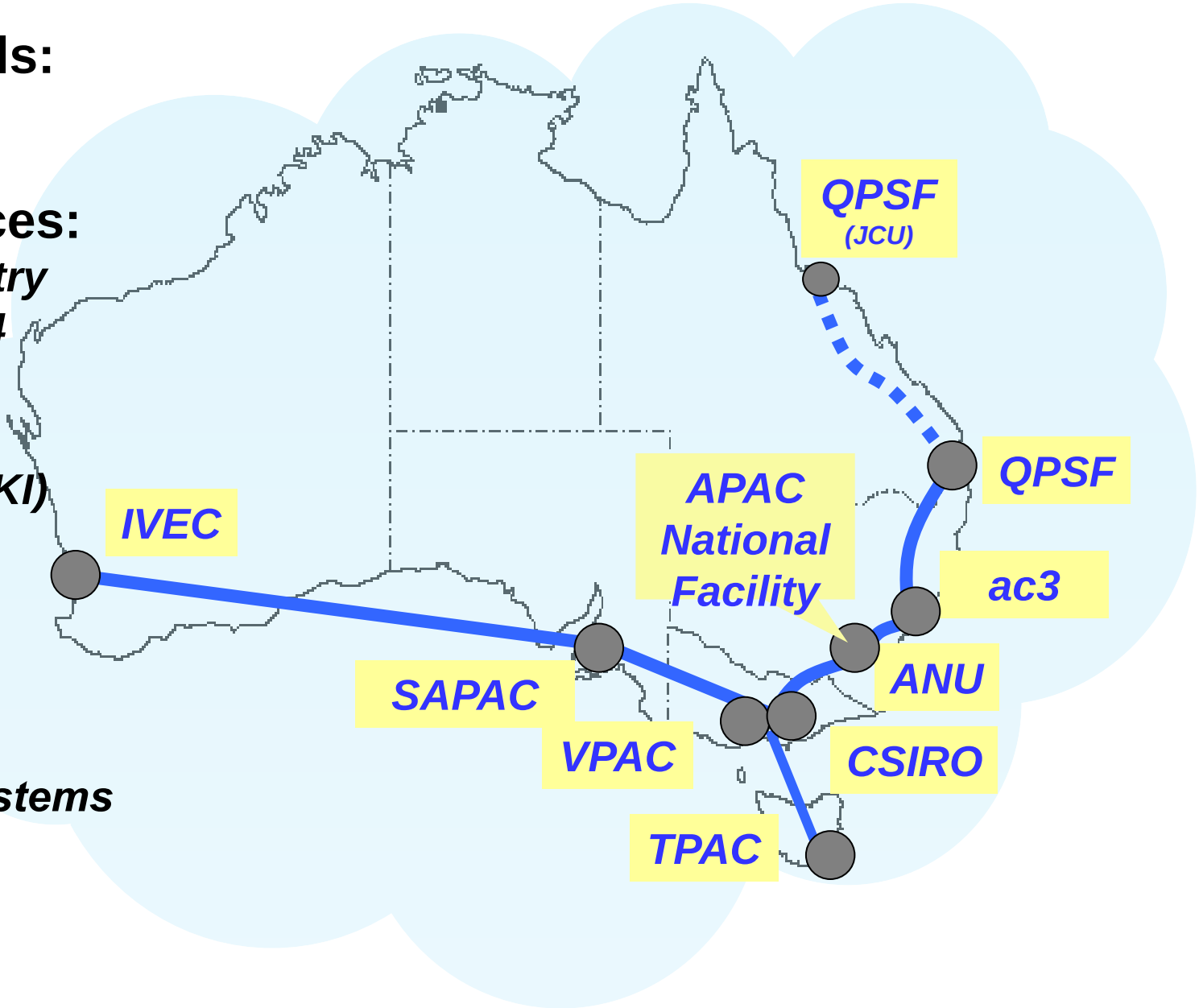
Portal Tools:
GridSphere

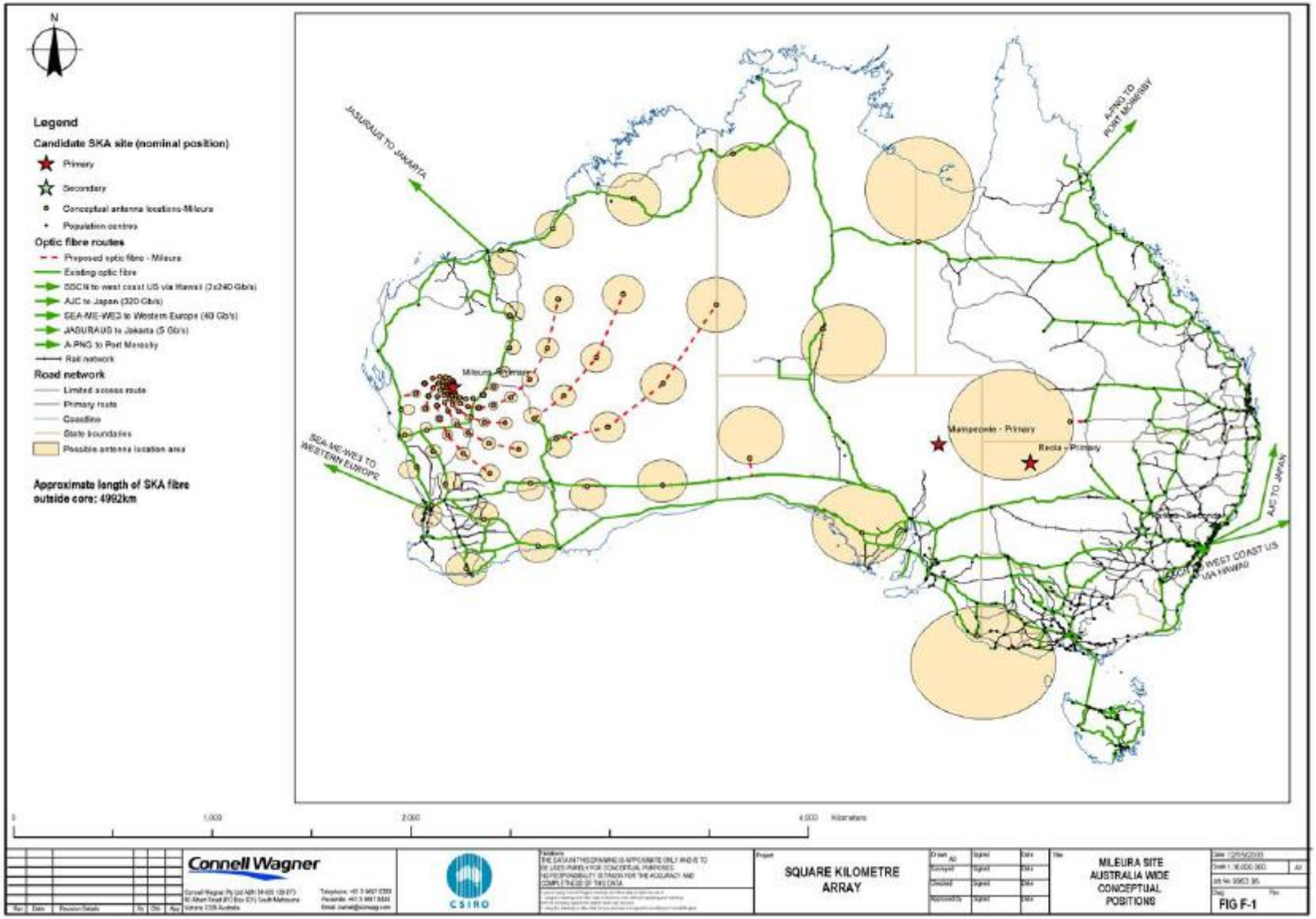
Info Services:
APAC Registry
MDS2, MDS4

Security:
APAC CA (PKI)
MyProxy
VOMRS

Systems:
Gateways
Partners' systems

Network:
AARNet3




N
Legend
Candidate SKA site (nominal position)
Primary
Secondary
Conceptual antenna locations-Mileura
Population centres
Optic fibre routes
Proposed optic fibre - Mileura
Existing optic fibre
SDCN to west coast US via Hawaii (2x240 Gb/s)
AJC to Japan (320 Gb/s)
SEA-ME-WE3 to Western Europe (40 Gb/s)
JASURAUS to Jakarta (5 Gb/s)
A-PNG to Port Moresby
Rail network
Road network
Limited access route
Primary route
Coastline
State boundaries
Possible antenna location area
Approximate length of SKA fibre outside core: 4992km
JASURAUS TO JAKARTA
A-PNG TO PORT MORESBY
Mileura - Primary
Mainpeowie - Primary
Reola - Primary
SEA-ME-WE3 TO WESTERN EUROPE
AJC TO JAPAN
SDCN WEST COAST US VIA HAWAII
0
1,000
2,000
4,000 Kilometers
Connell Wagner
CSIRO
SQUARE KILOMETRE ARRAY
MILEURA SITE AUSTRALIA WIDE CONCEPTUAL POSITIONS
FIG F-1

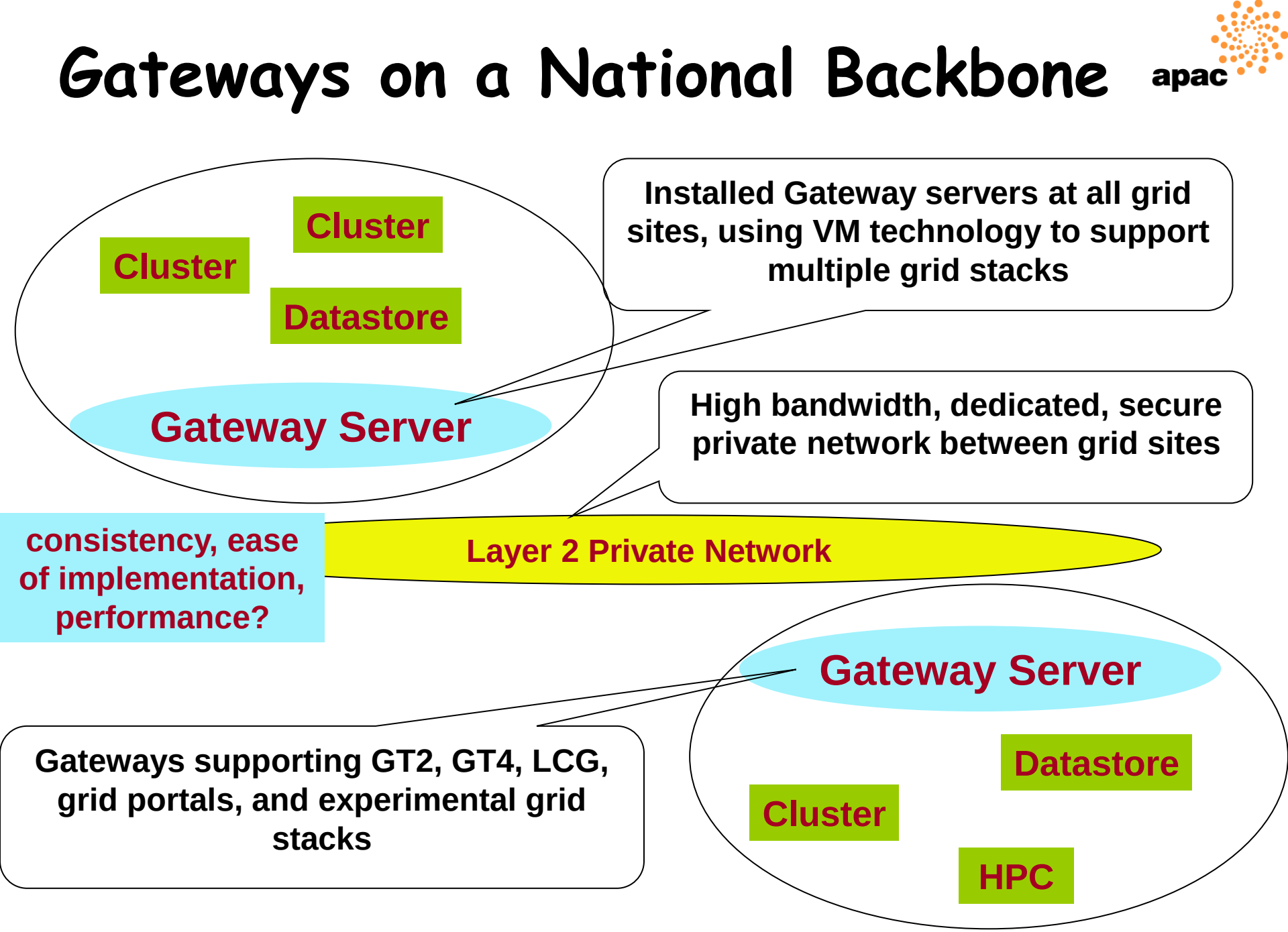
Gateways

- Rapid churn in the middleware
  - You need lots of test machines
- Different communities want different middleware
  - GT2, GT4, Gridsphere, SRB …
- Minimises interaction with non grid-dedicated production systems
- Virtualisation is well understood technology
- Xen has a nice price

Middleware Stack

- **We're using VDT**
  - **For both GT2 and GT4**
  - **Inclusion of VOMS/VOMRS/GUMS is nice**
- **Actively doing QA, and finding and reporting several bugs**
- **Add portal and data components to core VDT for other gateways**
  - **SRB, GridSphere**
- **Java tool Grix for simplified certificate management by users**
  - **APAC has IGTF-audited CA**

Gateways on a National Backbone



Data services

- **Data is hard**
  - **Different communities have different needs**
  - **Complex access controls**
- **We have gridftp between sites**
  - **Network consistency is interesting …**
- **SRB today; iRODS later this year**
- **Dcache, SRM, Gfarm as communities require**
- **Credible use cases for a global file system?**

Registry services

- MDS2, MDS4 running
- Deployed Modular Information Provider to present site and aggregated information more easily
- Using GLUE schema, but it's far from satisfactory for describing real-world production HPC resources

Improved AAA Services

- NCRIS will require e-research services to a much wider community than traditional HPC
  - PKI doesn't scale and is conceptually difficult for non computer weenies
- Australian Access Federation funded
- IAM Suite from MELCOE
  - Shibboleth authentication plus appropriate attributes generates short lived certificate
  - Tools for users to easily create shared workspaces and manage attribute release
- Only a few people will need real certificates
- But a year or two before being ready for prime time

Future Strategies

- **Expand the user base**
  - NCRIS, Merit Allocation Scheme, Partners
  - Open access to core grid services
- **Expand the services**
  - Workflow engines and tools – Kepler, Taverna
  - Data management: metadata support, collections registry
- **Expand the facilities**
  - Include major data centres
    - data from instruments, government agencies
  - Include institutional systems and repositories
- **Resulting changes:**
  - Policies: acceptable service provision
  - Organisation: coordinated user support
  - Architecture: scaling gateways
  - Technologies: Attribute-based authorisation