



# APAC National Grid and Applications

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## What is Grid?

- **Foster's original definition**  
*"A computational grid is a hardware and software infrastructure that provides dependable, consistent, pervasive, and inexpensive access to high-end computational capabilities"*
- **Later realised social aspects are highly important**  
*"coordinated resource sharing and problem solving in dynamic, multi-institutional virtual organizations"*
- **A grid is a system that**
  - Coordinates resources that are not subject to centralized control
  - Using standard, open, general-purpose protocols and interfaces
  - To deliver nontrivial qualities of service



## Grid Middleware

- We are on a journey ...
- Globus Toolkit from Foster/Argonne dominates, but consider Europe
  - EGEE's glite
  - NorduGrid's Advanced Resource Connector
  - Germany's Unicore
  - UK's Open Middleware Infrastructure Institute
- Many extensions to the core
- Pick a standard – we have lots to show you
- Web services appears to be the destination
- Currently, grid middleware uses X509 certificates for authorisation
  - Lots of X509/shibboleth integration work occurring
  - My assertion - SAML/XACML part of the solution



## Some requirements

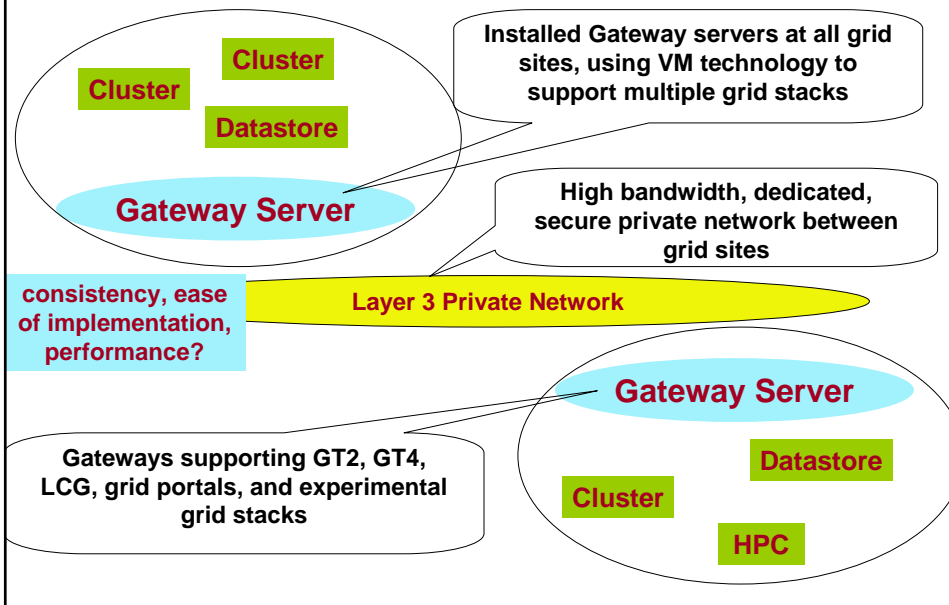
- Non dedicated resources
- Varied middleware requirements
- Complex virtual organisation structure
- Distributed data, workflows
- Simplified interface



## 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**
- **Grid Ireland did the same thing**

## Gateways on a National Backbone





## Virtual Organisations

- Overseas use tends to be large VO's
- We need small, dynamic VO's
  - Sakai, IAM Suite provide partial solutions
- VOMS/VOMRS has problems
  - Admin security model
  - myproxy interaction
  - gridmapfile – a user can be in one VO
- APAC adopted PRIMA/GUMS
  - Still complicated and not especially dynamic



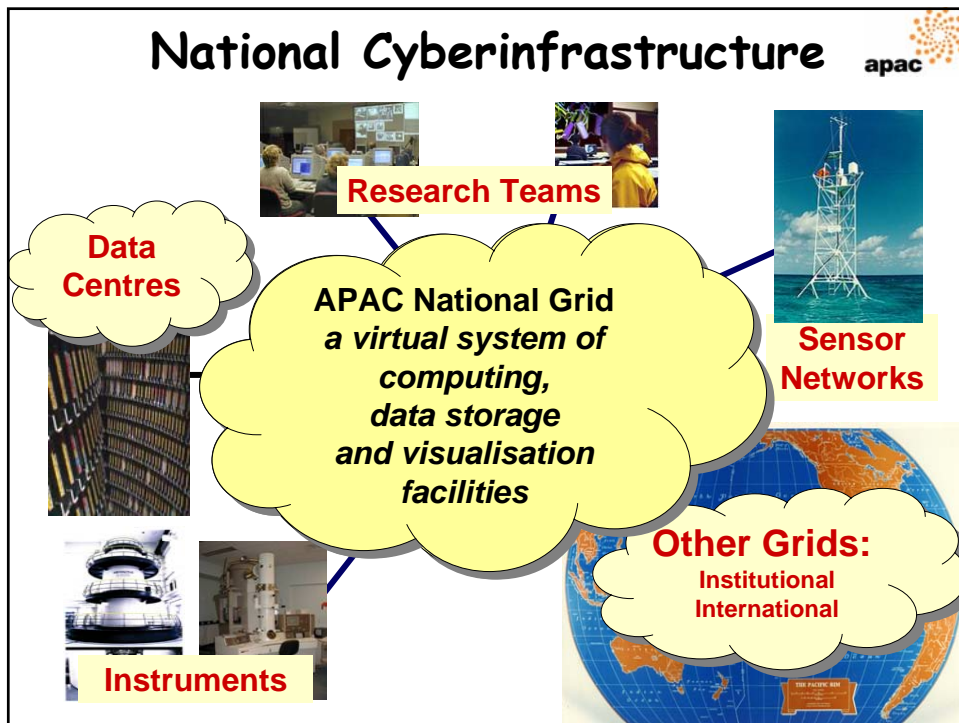
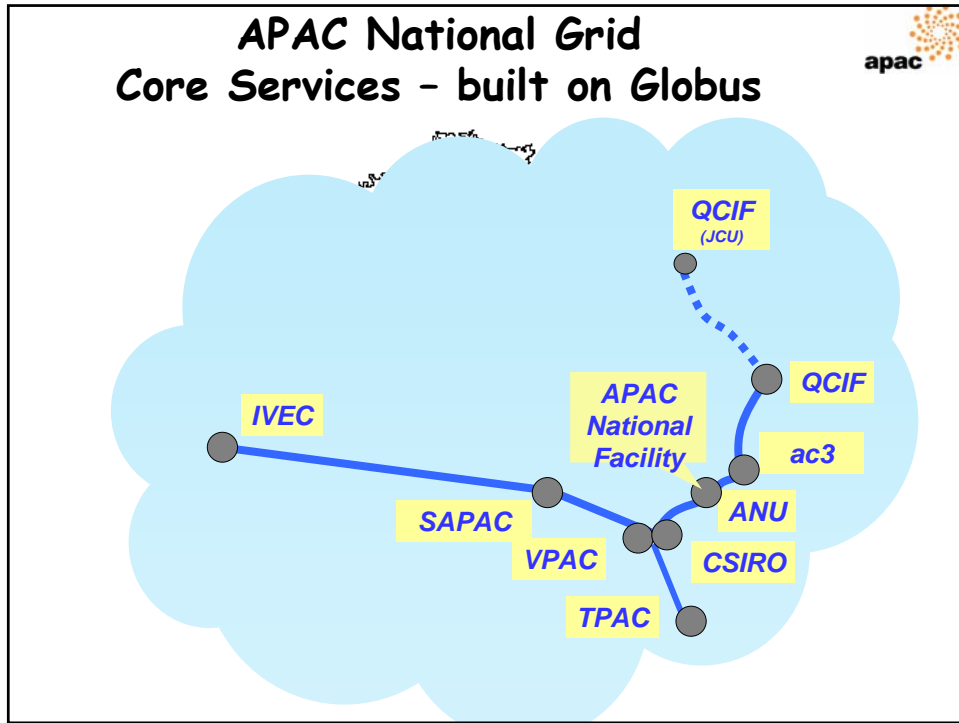
## Australian Partnership for Advanced Computing

*“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)

Infrastructure providers!





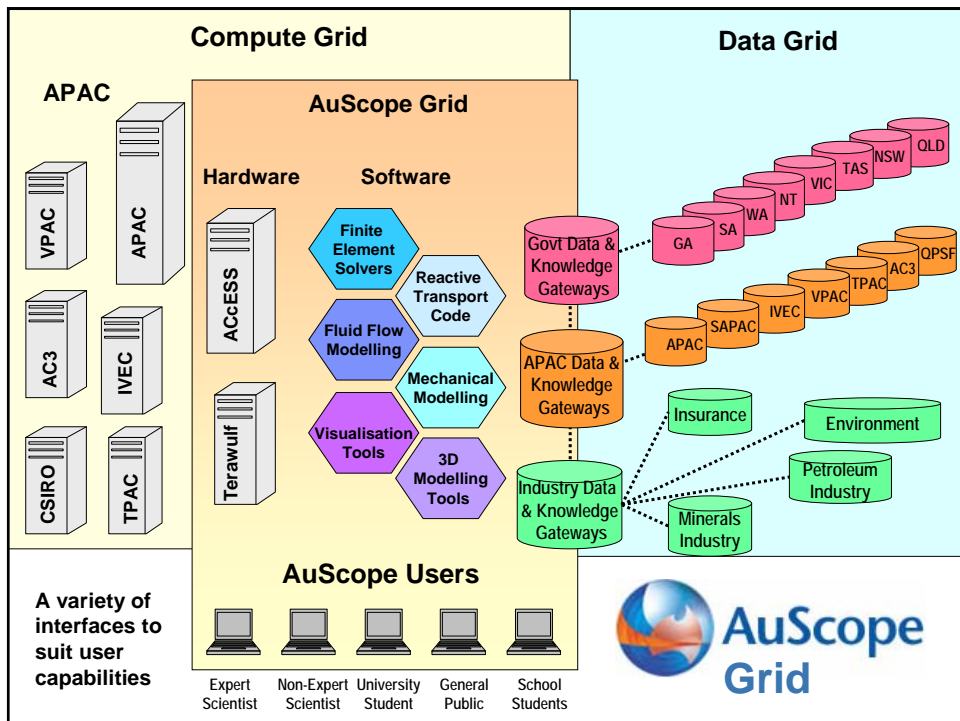
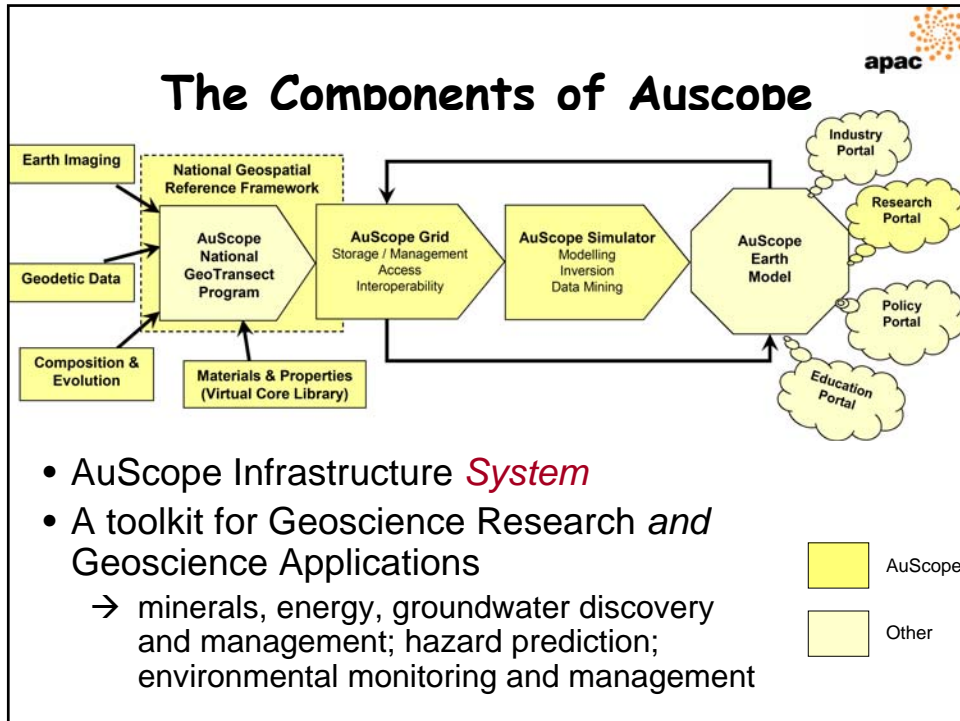
## Current APAC Grid Status

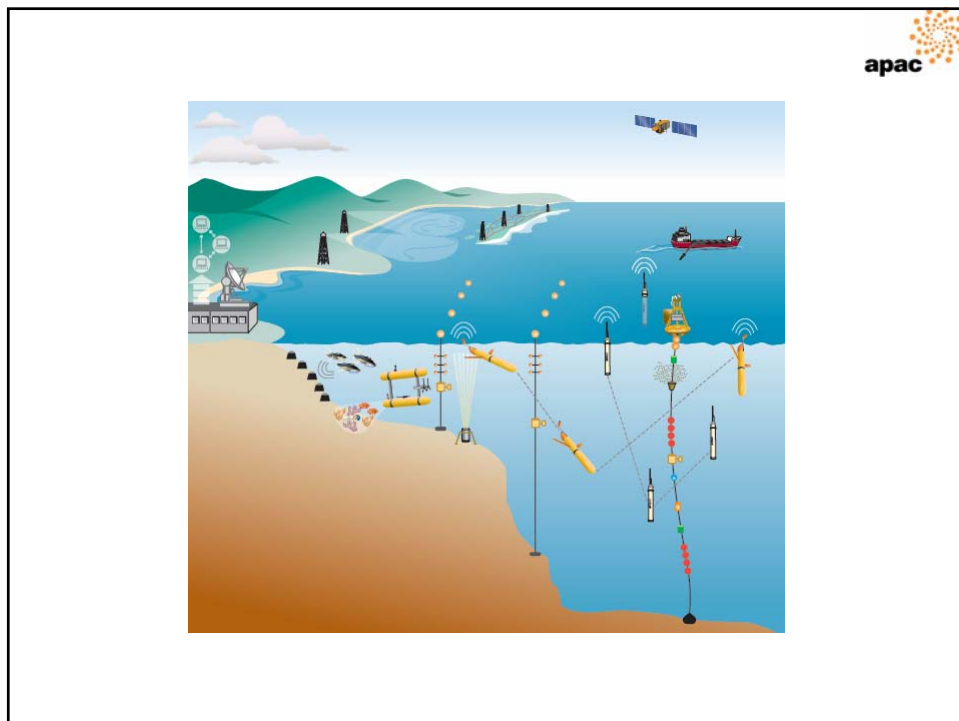
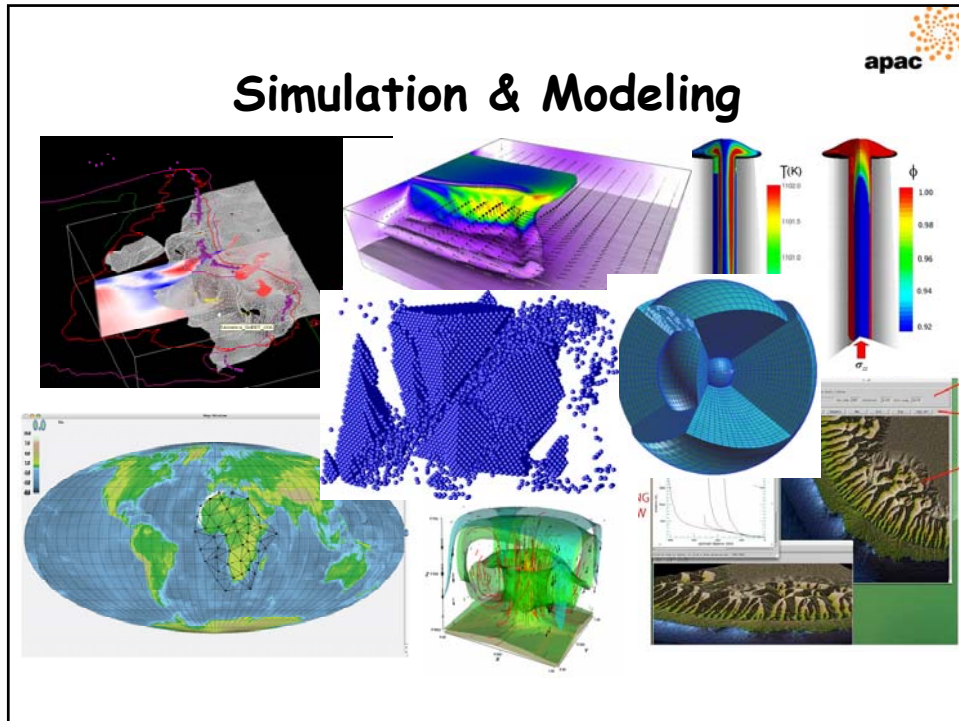
- **Consolidated on VDT as the middleware**
  - Provides GT2, GT4 and useful AAA hooks
- **Information Services**
  - MDS2/4, using MIP to aggregate, deployed at sites
  - GLUE schema inadequate for HPC description
  - <http://www.sapac.edu.au/webmds/>
- **GridSphere is portal environment**
  - Portals harder than expected
- **Data Movement and Management**
  - GridFTP between sites, different communities require different data management software – SRB, SRM, dCache ...
  - This will evolve under NCRIS PfC
- **AAA Services**
  - IGTF-audited X509.3 certificate authority
  - Virtual Organisation Management Services

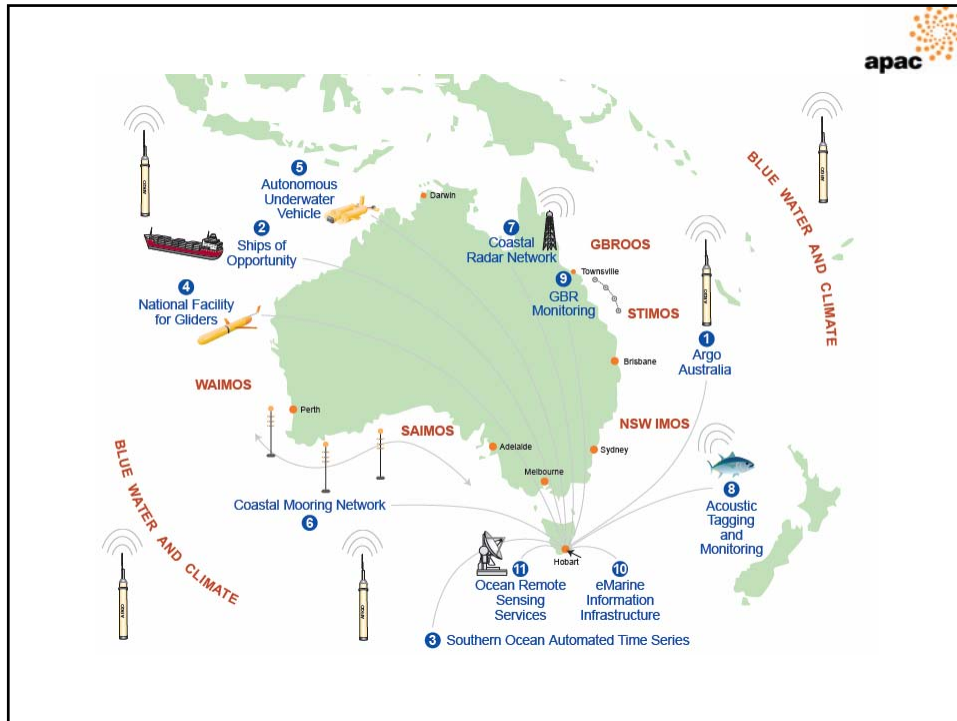


## Applications

- **Geosciences**
  - Lesley Wyborn, Thursday 13:30
- **Integrated Marine Observation System**
  - Craig Johnson, Wednesday 14:30
- **Bioinformatics**

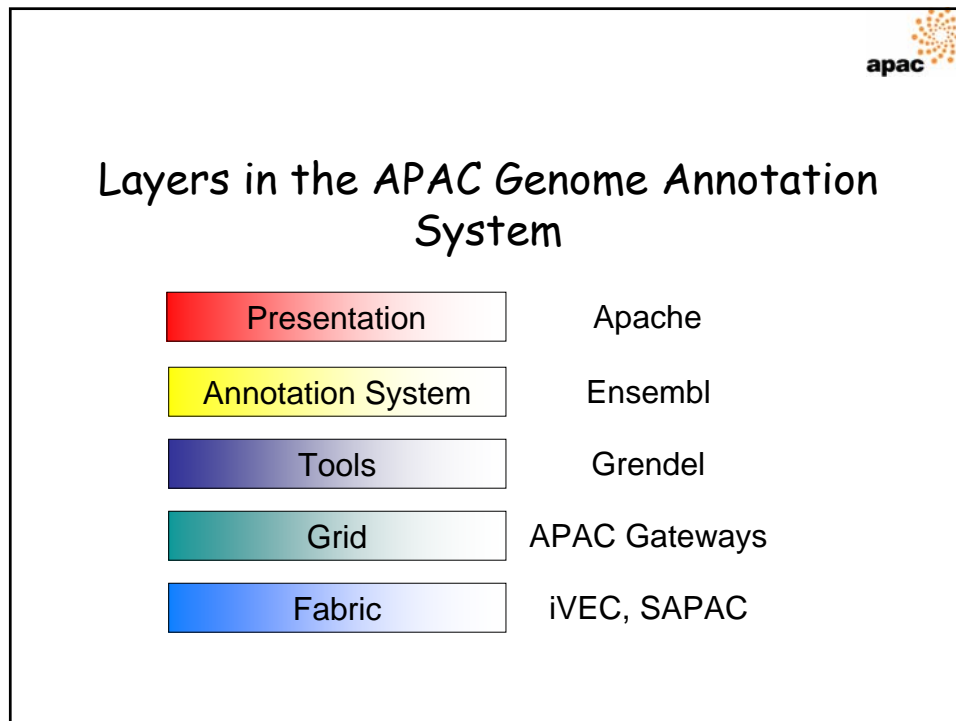
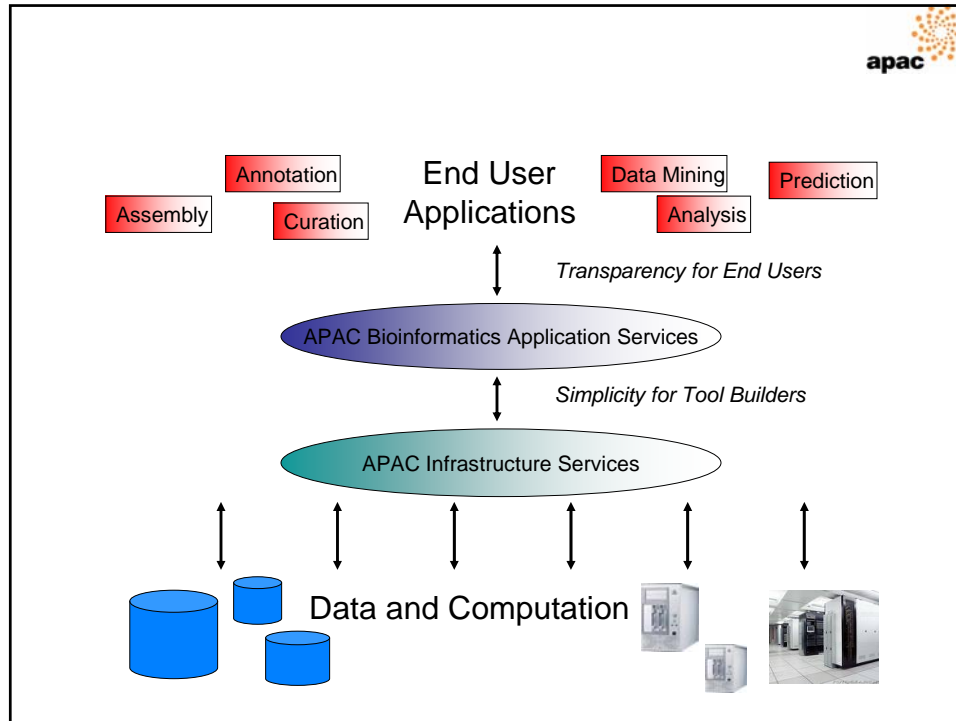


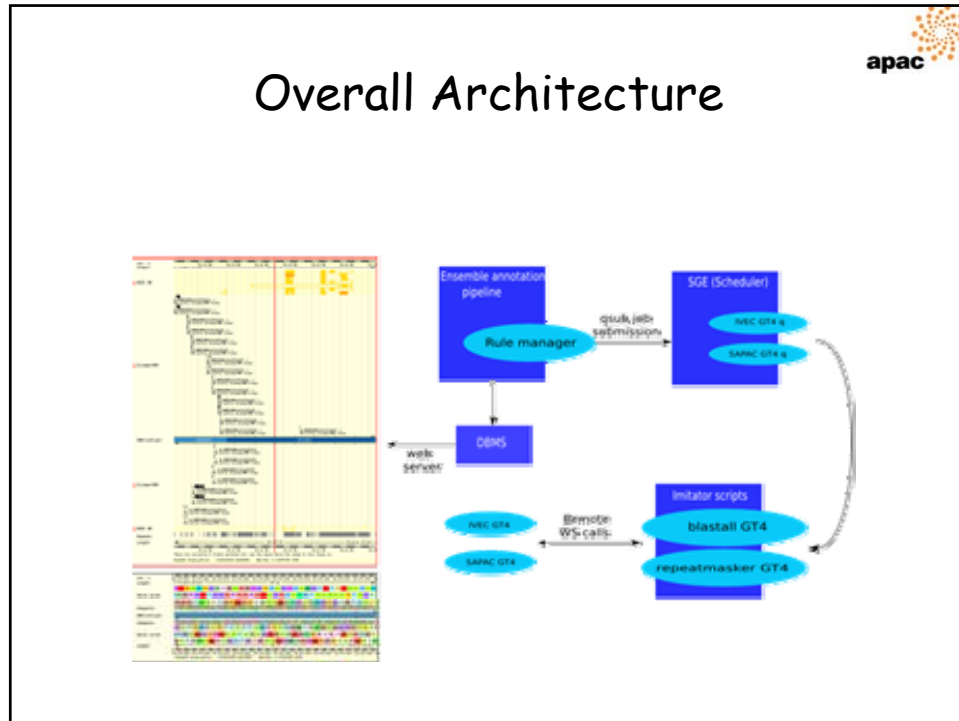




## IMOS - eMII

- eMII will host, manage and archive data produced by the other IMOS facilities.
- eMII will provide the standards, protocols and systems to integrate the data and related information into a number of conformal frameworks, and will provide the tools to access and utilise the data.
- For some kinds of data, eMII will provide data products as web services and web features for processing, integration and visualisation of data.
- It will be possible to integrate data from sources outside IMOS into IMOS data products, and to export IMOS data to international programs.





- apac
- ## Future Strategies
- **TeraGrid vision – Deep, Wide, Open**
  - **Deep**
    - Access to high end resources
  - **Wide**
    - Broad Range of Users
  - **Open**
    - Access to all resources
  - **This is where APAC has headed for a while; NCRIS will increase the move**
    - Interoperability and Collaboration Infrastructure



## Lessons Learned

- **This is all much harder than people thought**
  - Institutional firewall policies – what is your perimeter?
  - The internet is nastier than 10 years ago
- **You need a deployment process otherwise it is not infrastructure**
- **The social aspects of grid development have strengthened the partnership**
- **Grid and web services are in danger of being overly complex – consider the adoption rate of social web technologies as a comparison**
- **There is a tension between broad access and innovation at the high end**



## More Information

- **APAC07**
  - Perth, October 8-12
  - Advanced computing, grid applications and eresearch
  - <http://www.apac.edu.au/apac07>
- **ICI**
  - David Bannon, VPAC
  - Paul Coddington, SAPAC