AstroGrid
http://www.astrogrid.org

- The Project
- The Virtual Observatory
- Technical Progress
the project

- Consortium of seven UK institutions
- PPARC/EU funded e-science project 2001-2004
- Partner in European AVO project
- Founding member of IVOA

(International Virtual Observatory Alliance)
goals

- working system of daily use to scientists
- infrastructural toolkit for data services
- service and resource registry
- physical resource grid for key UK data centres
- exemplar user interface
- set of datamining tools
status

- Phase A study completed Dec 2002
- six months into two year Phase B
- team of 26 people (23.4 FTEs)
- spent 1.5M (40% of budget)
- 10,000 lines of code
- working s/w released on schedule
Virtual Observatory : Science Drivers

- multi-archive science
- rare object science
- large database computations
- empowerment

...can all be done now
...aim is to make it easy
multi-\(\lambda\) views of a Supernova Remnant

- Shocks seen in the X-ray
- Dust seen in the IR
- Heavy elements seen in the optical
- Relativistic electrons seen in the radio
needles in a haystack

Hambly et al 2001

- faint moving object is a cool white dwarf
- may be solution to the dark matter problem
- but hard to find: one in a million
- even harder across multiple archives
the Virtual Observatory concept

- Aim to make all archives speak the same language
  - all searchable and analysable by the same tools
  - all data sources accessible through a uniform interface
  - all data held in distributed databases that appear as one
  - archives form the Digital Sky
  - advanced new analysis and visualisation tools
  - eventual interface to real observatories
the future : data services

• VO : geometry
  – not a warehouse; not a hierarchy; not P2P
  – small set of service centres + large popn of end-users

• VO : content
  – not software monolith : framework + standards
  – back and front ends : data services and user tools
yesterday
Today, applications can make SOAP/XML requests to web services, which can then access SQL databases. This allows for standard formats and native data to be exchanged between the application and the database.
day after tomorrow

anything

application

job

standard semantics

results

ontology

Registry

Workflow

GLUE

AstroPass

MySpace

agents

pooled resource

grid service

grid service

grid service

grid service

grid service

grid service
Progress: standards

- IVOA process modelled on IETF
- **table data**
  - V1.0 standard (VOTable) in daily use
- **binary arrays**
  - proposed standard (SIA)
- **resource and service metadata**
  - V0.8 standard (RSM)
  - no standard for provenance yet
- **semantics**
  - Strasbourg UCDs taken as working standard
  - draft replacement standard under debate
Progress: data exchange

• 2003: building with web services
  – dozens of SOAP/WSDL services in operation
  – not just for data access: infrastructure built on web services

• 2004: re-engineer with OGSA services
  – experimental grid services deployed so far
  – demo-ed with client in Sydney, data in Manchester, visualisation algorithm in Melbourne.
Progress: Registry

• prototype Registry working
• populated with real metadata by hand
  – only a few services so far
• defined by XSD, queried via XQUERY
  – DB2 database soon
• automatic harvesting next
Progress: single sign-on

- AstroPass based on Globus CAS
- preliminary design so far
- first implementation end of 2003
Progress : MySpace

• transparent virtual file space
  – intermediate results storage for end-users
  – shared system space for participating data centres
  – collaborative space : end-user file sharing

• works via XML registry and web services

• working version of MySpace Manager
  – to be installed at each data centre

• working version of MySpace Explorer
  – user view and partial control of filestore

• transfer by HTTP; soon by GridFTP
Progress: Job/Work Flow

- DBMS - VOTable interfaces
- internal message queue system: AstroMQ
- workflow construction tool: not yet
  - looking at Triana
Progress: science tools

• wrapping, adapting, sharing...
• Image viewing: Aladin (Strasbourg)
• Source extraction: ACE (AstroGrid)
• results plotting: VO普LOT (India)
Delivered by June 2003

- key international standards
- basic engine room components
- preliminary interface and contents
- public software demonstrations
- OGSI experiments
Planned for Jan 2004

- engine room continued
- larger range of data contents
- scientist useable system
  - feedback from community beta testers
- further international demos