

AstroGrid: Initial Deployment of the UK's Virtual Observatory

Nicholas A. Walton

*Institute of Astronomy, University of Cambridge, Madingley Road,
Cambridge, CB3 0HA, UK*

Andrew Lawrence

*Institute for Astronomy, University of Edinburgh, Royal Observatory,
Blackford Hill, Edinburgh, EH9 3HJ, UK*

Tony Linde

*Department of Physics & Astronomy, University of Leicester, University
Road, Leicester, LE1 7RH, UK*

Abstract.

AstroGrid, a UK eScience project with collaborating groups drawn from the major UK data archive centres, is creating the UK's virtual observatory.

AstroGrid has now completed its requirements capture and design stages, and has begun to release software capabilities on a three monthly cycle. It is using the iterative process, with eight iterations, with each successive iteration release building a working system comprising increasing capabilities.

AstroGrid's first functional release with its 'Iteration 2' product, and the capabilities and functionality that this provides, is described. AstroGrid's technical input into joint products in conjunction with the European Astrophysical Virtual Observatory, and the Australian VO, is discussed.

The component based AstroGrid architecture and how external projects may be able to deploy components of interest in constructing their 'VO' - for instance the use of MySpace to provide secure intermediate 'grid' user storage areas, is discussed.

1. Introduction

AstroGrid¹ is a UK eScience project with collaborating groups drawn from the major UK data archive centres, is creating the UK's first virtual observatory. Together with the other major world-wide virtual observatory projects (see the

¹<http://www.astrogrid.org/>

International Virtual Observatory Alliance²), AstroGrid is creating a set of cooperating and interoperable software systems that will: allow users to interrogate multiple data centres in a seamless and transparent way; provide powerful new analysis and visualisation tools; and give data centres and providers a standard framework for publishing and delivering services using their data.

AstroGrid is developing a standardised framework to allow creative diversity, which will:

- to improve the quality, efficiency, ease, speed, and cost-effectiveness of on-line astronomical research
- to make comparison and integration of data from diverse sources seamless and transparent
- to remove data analysis barriers to interdisciplinary research
- to make science involving manipulation of large datasets as easy and as powerful as possible.

2. The AstroGrid Architecture

In its first year, AstroGrid produced a detailed Phase-A report³, setting out the science requirements for the project, and outlining the general architecture and software components that would be produced during the two year 'build phase' of the project. The current AstroGrid architecture, is diagrammatically shown in Figure 1.

It should be noted that AstroGrid is being constructed in a modular fashion. Thus, various modules, such as MySpace, could be deployed by other projects, in a standalone manner, or in combination with other AstroGrid modules, such as the Registry module. AstroGrid is in active discussion with other global VO projects as to how they might be able to benefit from use of part or all of the AstroGrid component framework.

An overview of the architecture can be found on the AstroGrid Wiki site at <http://wiki.astrogrid.org/bin/view/Astrogrid/ArchOverview>. This also shows various deployment scenarios, of how user groups, such as data centres, tools providers, other VO projects, might employ AstroGrid components in their specific situation.

For a more detailed description of a number of the components of AstroGrid, see elsewhere in these proceedings: MySpace (Davenhall *et al.* 2004), Registry (Auden *et al.* 2004).

3. AstroGrid Development Activities

AstroGrid has now completed its requirements capture and design stages, and has begun to release software capabilities on a, nominally, three monthly cycle. In its two year build phase, AstroGrid is using the iterative process, with eight iterations, typically of three months, with each successive iteration release

²<http://www.ivoa.net>

³<http://wiki.astrogrid.org/bin/view/Astrogrid/PhaseAReport>

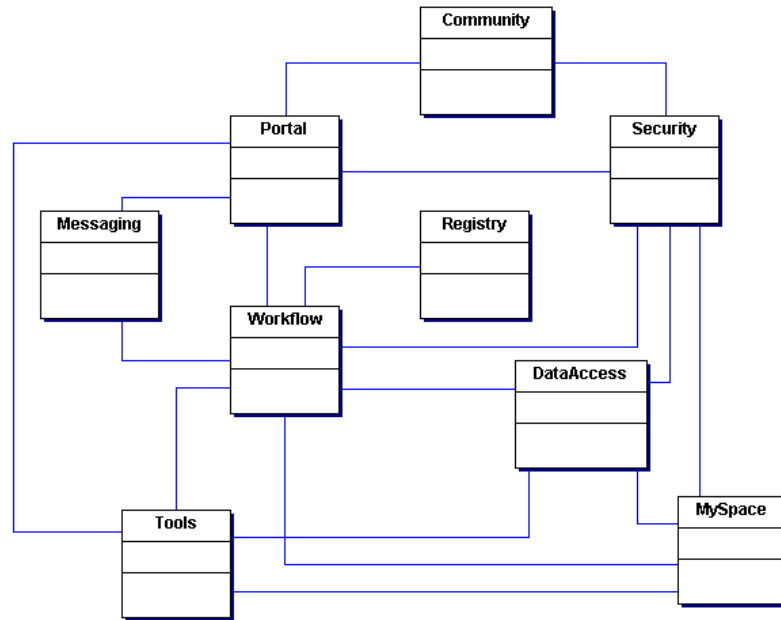


Figure 1. The AstroGrid architecture

building a working system with progressively enhanced functionality. The first iteration was released March 31, 2003, with iteration two being released June 30, 2003. These two iterations laid down the initial component framework.

3.1. The Iteration 2 Release

This iteration included the following components:

- Portal: developed with Cocoon, and including portal pages for Workflow, MySpace Explorer, Data Viewer, with a simple interface to the AstroPass component
- Registry & AstroMQ: implemented with IVOA schema standards, with a registry management portal page
- Data Centre, Dataset Access, Job Control: allows a query of, and data return from a dataset/database
- MySpace: enabling the creation of files in MySpace (not tables), a MySpace registry and data mover component.

3.2. The AstroGrid/ Australian-VO Visualiser

AstroGrid and the Australian Virtual Observatory (Aus-VO) have jointly produced a visualisation system for data cubes that allows real-time control of the user's viewpoint via a "virtual camera". The visualiser software runs on powerful compute clusters. The data inputs are user selected and transferred to the computer process using grid service technologies. This product is fully described in Rixon et al (2004). It is an example of the types of applications that will be made available through the AstroGrid infrastructure..

3.3. AstroGrid and the Astrophysical Virtual Observatory (AVO) 1st Light Demonstrator

In the context of the AVO⁴ 1st Light demonstrator, Quinn *et al.*, 2004, AstroGrid developed the web service wrapper to the SExtractor source extraction application (Bertin & Arnouts, 1996). This enables user initiated re-extractions of image data, a powerful additional capability.

4. AstroGrid Beta Testing

With the recent deployment of its iteration 3 release, AstroGrid has embarked on a rigorous 'beta-testing' programme. In the early stages, when science functionality is somewhat limited, a small group of interested scientists have been invited to gain hands on experience of the AstroGrid system. Their feedback and input will help the project understand issues such as functionality provision, usability and reliability. As further iteration releases are rolled out, it is anticipated that the 'beta-test' community will enlarge, as the system begins to meet the needs of a wider range of research programmes. Information concerning the Beta test programme is available at:

<http://wiki.astrogrid.org/bin/view/Astrogrid/BetaTesting>

5. The AstroGrid Future

By the end of 2004 AstroGrid will have constructed a fully functional prototype VO system, linking together major data centres in the UK, and providing seamless access to high value data sets such as that being generated from the UKIRT infrared camera through the UKIDSS⁵ survey. In order to ensure that the AstroGrid system is hardened into a robust production system, further funding is being agreed through end 2007, to support the necessary functional enhancements to the system.

References

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⁴<http://www.euro-vo.org>

⁵<http://www.ukidss.org>