

IVOA Small Projects Meeting

26-28 Nov 2003,
Beijing

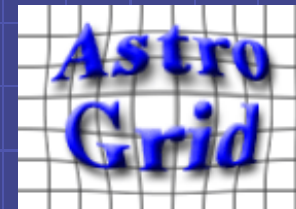


The AstroGrid Project

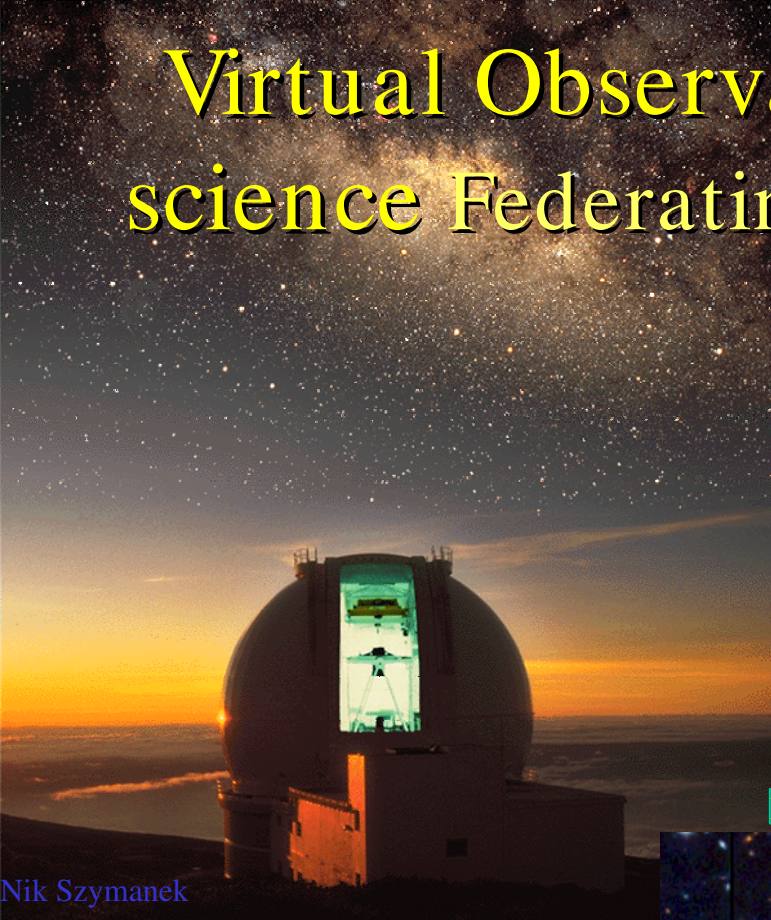
The AstroGrid project aims to produce a working datagrid for key selected databases, with associated data-mining facilities, by late 2004. It is part of the world-wide drive towards the concept of a Virtual Observatory (VO), and can be seen as the UK contribution to this vision.

It is a wide ranging project in that it covers astronomy, solar physics, and space plasma (solar terrestrial) physics, and covers all wavelengths from radio to X-ray. It is also part of a coherent UK e-science programme, with links to projects in particle physics, bio-informatics, and basic grid technology development.

The project is also very focused in its aims to develop something recognisably like a working VO on a short timescale, so that science can start getting done and technological lessons can be learned.



Virtual Observatories: Unlocking new science Federating multi- data: Deep Field

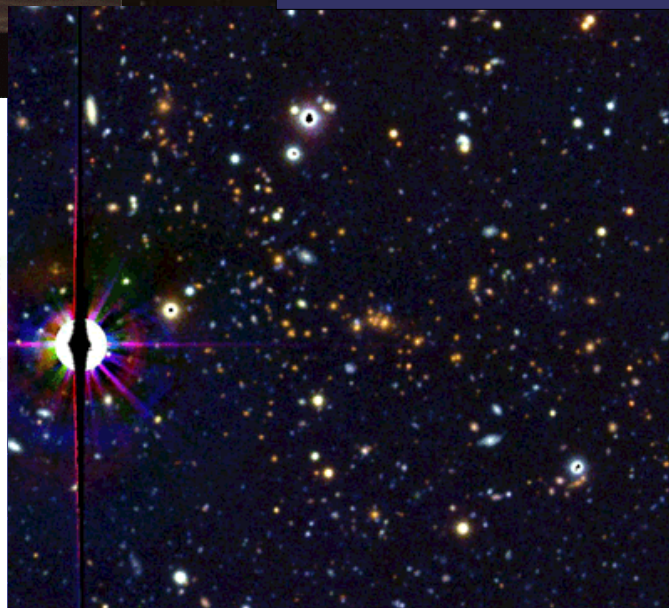
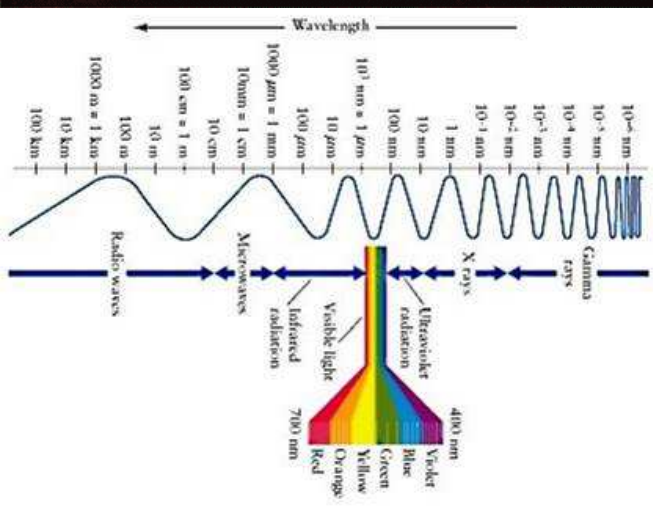


Nik Szymanek

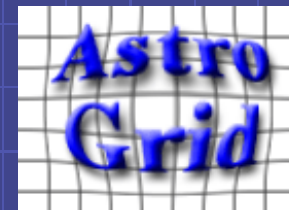


Link the X-ray and Opt/IR to understand energetic galaxies at the edge of the Universe

D. Ducros, E



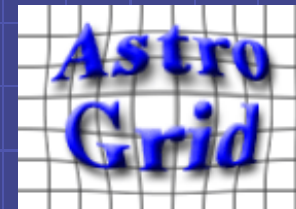
NEP J1716.6+6708: an X-ray cluster at $z=0.81$: Chandra X-ray image (C. Mullis) overlaid on a deep BRI image (D. Clowe & G. Luppino).



Project Goals

- ◆ Develop standards for data, metadata, data exchange and provenance
- ◆ Develop a software infrastructure for data services
- ◆ Establish a physical grid of resources
- ◆ Construct and maintain a Service and Resource Registry
- ◆ Implement a working VO system of real scientific use to astronomers
- ◆ Provide a user interface to that VO system
- ◆ Provide or adapt a set of science user tools to work with the VO

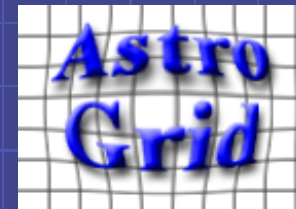
Many of these goals are common to other nations and other disciplines. We will work in collaboration with related projects worldwide to progress these goals.



Data and Computational Grids: The AstroGrid Perspective

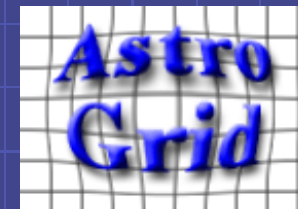
- ◆ AstroGrid is essentially a data and service grid
- ◆ Expect to leverage the power of OGSA/Globus as it emerges
- ◆ Plan for a mixed web service / grid service deployment for a while yet
- ◆ Astronomy has large volumes of data, the size of which is increasing almost exponentially
- ◆ Astronomy has (to date) relatively modest computational requirements
- ◆ Intelligent data management is the key for AstroGrid:
 - Storage
 - Access
 - Most importantly, movement

However, the advantages and opportunities presented by compute grids will not be ignored!

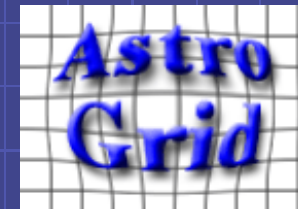
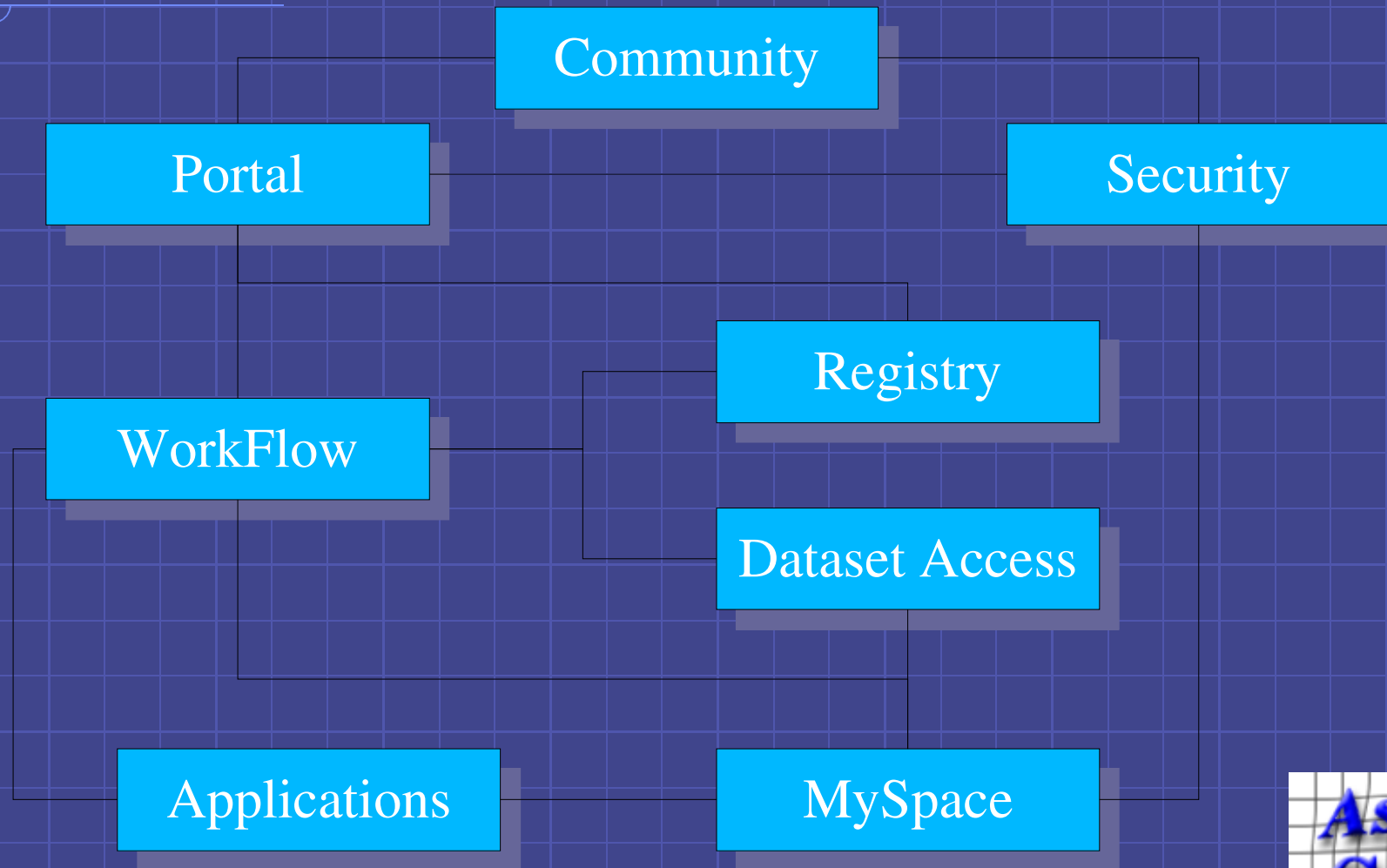


Approach

- ◆ Infrastructure
- ◆ Open
- ◆ Interoperability
- ◆ Component-based
- ◆ Deployment
- ◆ Leading-edge
- ◆ Incremental development

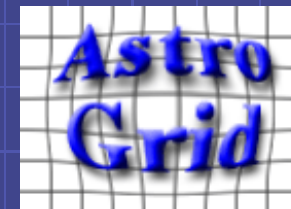


AstroGrid Component Framework



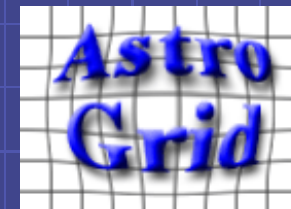
Portal: Login

The screenshot shows a web browser window titled "AstroGrid Portal - Galeon". The address bar contains the URL "http://uml02.astrogrid.org:8080/cocoon/astrogrid/aglogin.html". The page features the "AstroGrid" logo on the left and the main heading "AstroGrid Virtual Observatory Login" in the center. A navigation bar includes links for "Home", "Login", and "Help". The "Login" link is active. Below the navigation bar, a message states: "This portals community branch is star.le.ac.uk". A central text block provides instructions: "For access to this facility please consult the Astrogrid Administrator Administrator for this community is Keith Noddle Administrator's Email for this community is ktn@star.le.ac.uk". A login form contains a "Username:" field with "ktn@star.le.ac.uk" and a "Password:" field with masked characters. A "Login" button is positioned below the form. At the bottom, a link for "Register" is provided for new users. A sidebar on the left lists various site functions: "Browse Registry", "Registry Admin", "Data Query", "Browse MySpace", "Job Manager", "Tools", "Admin", and "Logout". At the bottom left, a logo for the "Member of the IVOA International Virtual Observatory Alliance" is displayed.

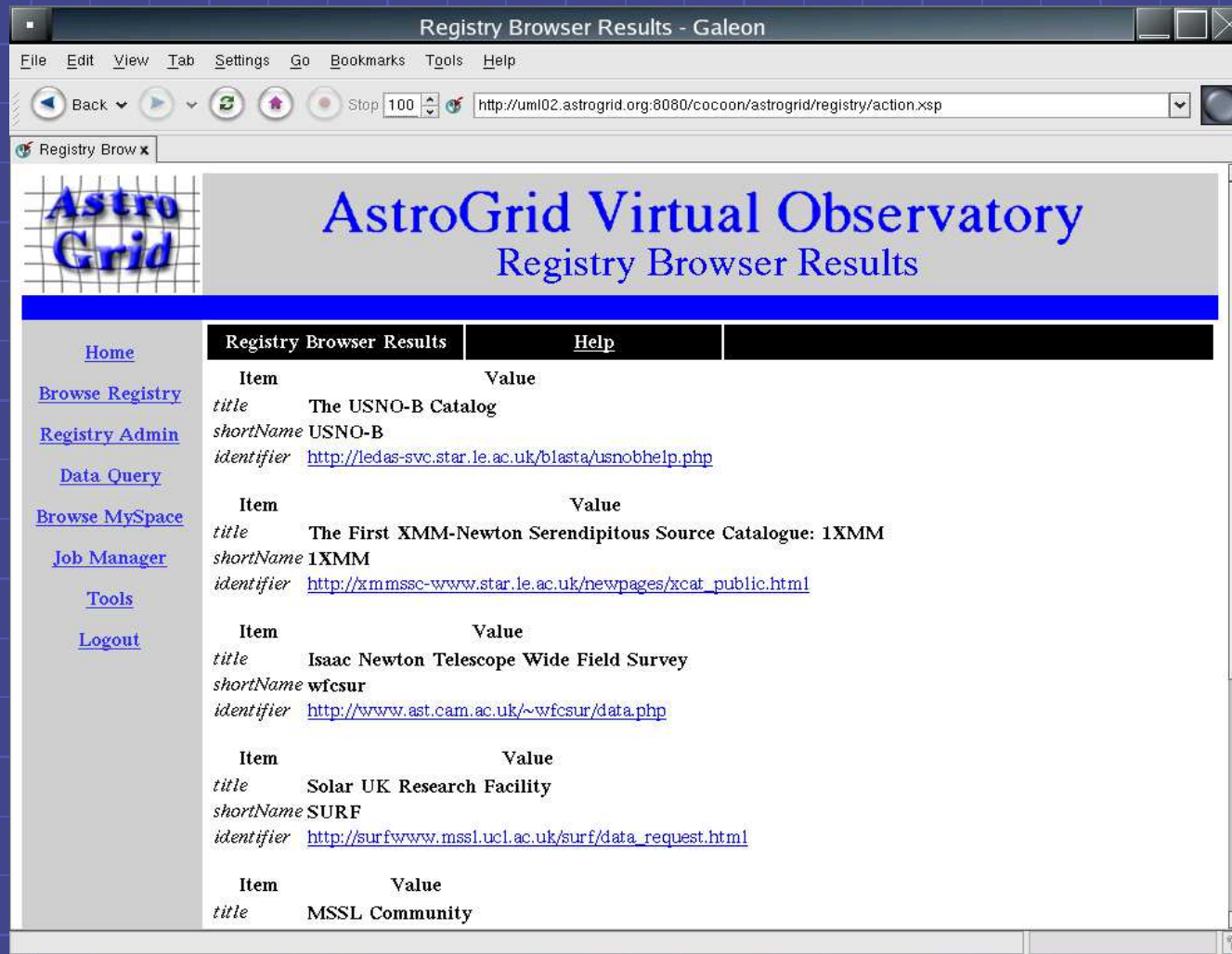


Registry

The screenshot shows a web browser window titled "Registry Browser - Galeon". The address bar contains the URL "http://uml02.astrogrid.org:8080/cocoon/astrogrid/agregistry.html". The page content includes the "AstroGrid" logo, the title "AstroGrid Virtual Observatory Registry Browser", and a navigation menu with links for Home, Browse Registry, Registry Admin, Data Query, Browse MySpace, Job Manager, Tools, and Logout. The main content area is titled "Registry Browser" and contains a section for "Check a Registry Query Type:" with radio buttons for "List All Metadata", "List Identity Metadata", "List Identity and Curation Metadata", "List Identity and Contents Metadata", and "List Identity and Service Metadata Concepts Metadata". Below this is a form for "And enter other query details below:" with fields for "shortName", a dropdown menu set to "EQ", and a text input field set to "all". At the bottom of the form is a label "Enter Web Server:" with a dropdown menu set to "Leicester" and "Submit" and "Reset" buttons. A footer area on the left contains the text "Member of the" above the "IVOA International Virtual Observatory Alliance" logo.

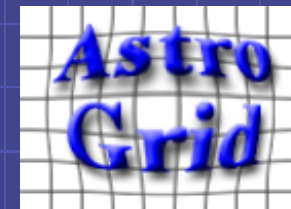


Registry



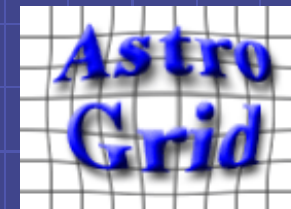
The screenshot shows a web browser window titled "Registry Browser Results - Galeon". The address bar displays the URL "http://uml02.astrogrid.org:8080/cocoon/astrogrid/registry/action.xsp". The page content includes the AstroGrid logo, a navigation menu with links like "Home", "Browse Registry", and "Data Query", and a main table of registry results.

Item	Value
<i>title</i>	The USNO-B Catalog
<i>shortName</i>	USNO-B
<i>identifier</i>	http://ledas-svc.star.le.ac.uk/blasta/usnobhelp.php
<i>title</i>	The First XMM-Newton Serendipitous Source Catalogue: 1XMM
<i>shortName</i>	1XMM
<i>identifier</i>	http://xmssc-www.star.le.ac.uk/newpages/xcat_public.html
<i>title</i>	Isaac Newton Telescope Wide Field Survey
<i>shortName</i>	wfcsur
<i>identifier</i>	http://www.ast.cam.ac.uk/~wfcsur/data.php
<i>title</i>	Solar UK Research Facility
<i>shortName</i>	SURF
<i>identifier</i>	http://surfwww.mssl.ucl.ac.uk/surf/data_request.html
<i>title</i>	MSSL Community

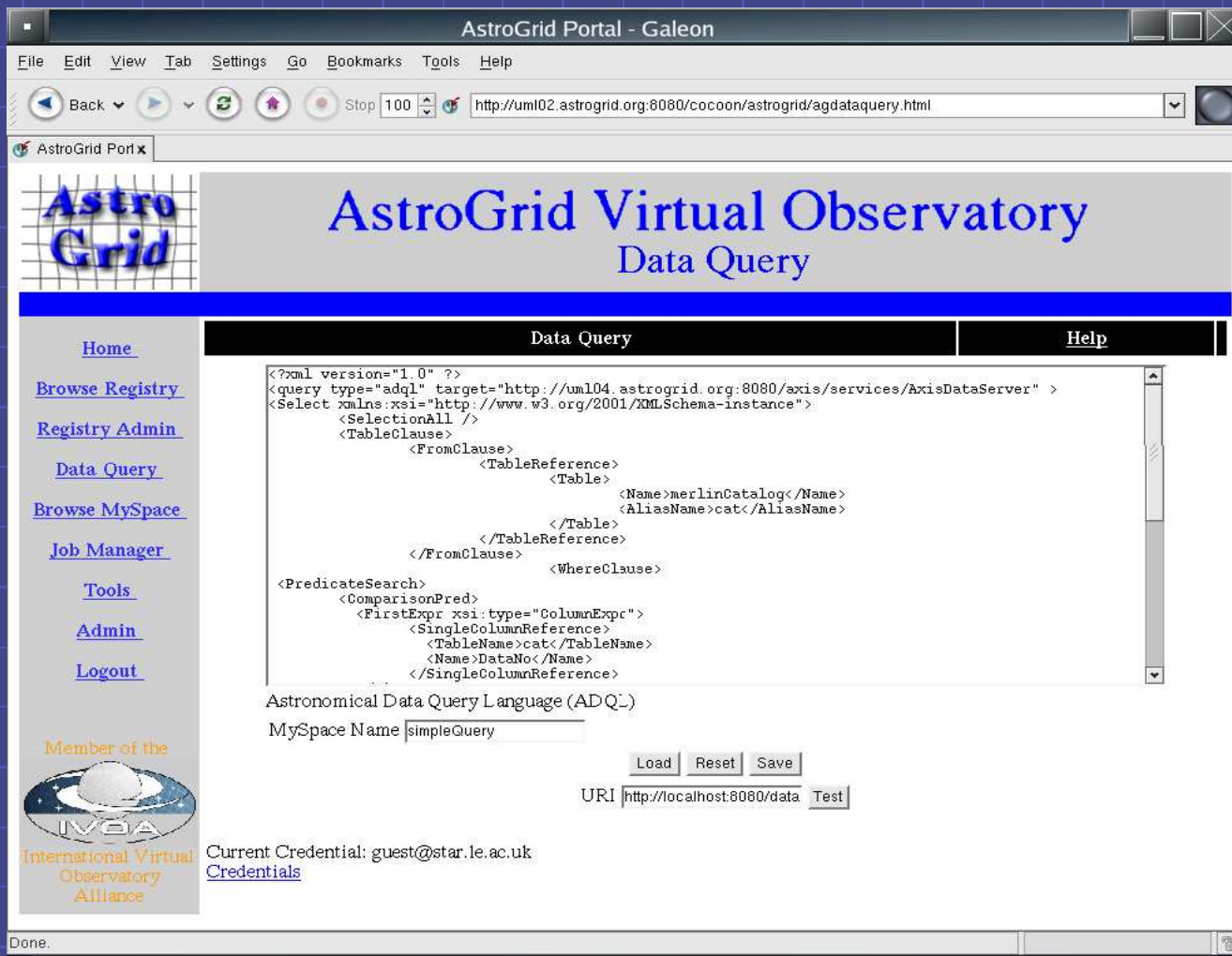


Registry

Item	Value
<i>title</i>	The USNO-B Catalog
<i>shortName</i>	USNO-B
<i>identifier</i>	http://ledas-svc.star.le.ac.uk/blasta/usnobhelp.php
<i>publisher</i>	USNOFS Image and Catalogue Archive operated by the United States Naval Observatory, Flagstaff Station
<i>publisherID</i>	USNOFS
<i>creator</i>	USNOFS PMM project
<i>keyword</i>	Photometry
<i>keyword</i>	Positional_Data
<i>keyword</i>	Proper_Motions
<i>abstract</i>	USNO-B1.0 is an all-sky catalog that presents positions, proper motions, magnitudes in various optical passbands, and star/galaxy estimators for 1,042,618,261 objects derived from 3,643,201,733 separate observations. The data were obtained from scans of 7,435 Schmidt plates taken for the various sky surveys during the last 50 years. USNO-B1.0 is believed to provide all-sky coverage, completeness down to $V = 21$, 0.2 arcsecond astrometric accuracy at J2000, 0.3 magnitude photometric accuracy in up to five colors, and 85% accuracy for distinguishing stars from non-stellar objects.
<i>README</i>	http://vizier.u-strasbg.fr/viz-bin/Cat?I/284
<i>contributor</i>	USNOFS PMM project
<i>date</i>	2002-11-14
<i>version</i>	B1.0
<i>referenceURL</i>	http://www.nofs.navy.mil/data/FchPix/cfhelp.html#cat



Data Query Builder

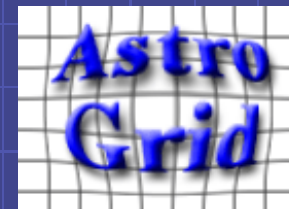


The screenshot shows a web browser window titled "AstroGrid Portal - Galeon" displaying the "AstroGrid Virtual Observatory Data Query" page. The browser's address bar shows the URL "http://uml02.astrogrid.org:8080/cocoon/astrogrid/agdataquery.html". The page features a navigation menu on the left with links for Home, Browse Registry, Registry Admin, Data Query, Browse MySpace, Job Manager, Tools, Admin, and Logout. The main content area is titled "Data Query" and contains an XML query editor. The XML code is as follows:

```
<?xml version="1.0" ?>
<query type="adql" target="http://uml04.astrogrid.org:8080/axis/services/AxisDataServer" >
<Select xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SelectionAll />
  <TableClause>
    <FromClause>
      <TableReference>
        <Table>
          <Name>merlinCatalog</Name>
          <AliasName>cat</AliasName>
        </Table>
      </TableReference>
    </FromClause>
  </TableClause>
  <WhereClause>
    <PredicateSearch>
      <ComparisonPred>
        <FirstExpr xsi:type="ColumnExpr">
          <SingleColumnReference>
            <TableName>cat</TableName>
            <Name>DataNo</Name>
          </SingleColumnReference>

```

Below the XML editor, there is a text input field for "MySpace Name" containing "simpleQuery", and buttons for "Load", "Reset", and "Save". The "URI" field is set to "http://localhost:8080/data" with a "Test" button. The current credential is "guest@star.le.ac.uk". The page also includes a logo for the International Virtual Observatory Alliance (IVOA).



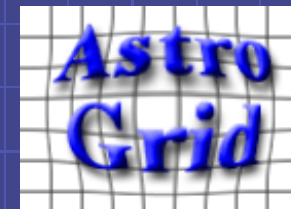
MySpace: Locate saved query

AstroGrid Portal - Myspace

Service name <http://143.210.36.173:8080/axis/services/MySpaceManager> [Close]
Explorer path /ktn
Current item
Selected action
Selected item

simpleQuery

Current Credential: [guest@star.le.ac.uk](#)
[Credentials](#)



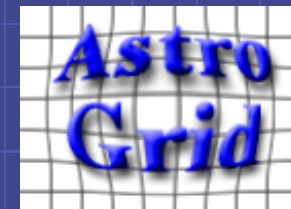
Job Manager: New Job

The screenshot shows a web browser window titled "AstroGrid Portal - Galeon". The address bar contains the URL: `http://uml02.astrogrid.org:8080/cocoon/astrogrid/agjobmonitor.html?action=new`. The page header features the "AstroGrid" logo and the text "AstroGrid Virtual Observatory Job Manager".

The main content area is divided into several sections:

- Navigation:** A horizontal menu with "Job Manager" and "Help" tabs. Below it, a "Design Jobs" section contains buttons for "New", "Submit", "Edit", "Copy", "Delete", and "Send".
- Form Section:** A "Create new workflow" section with the following fields:
 - Workflow Name:
 - Workflow Description:
 - Template: one step sequence, two step flow, two step sequence
- Action:** A "create-workflow" button.

A left sidebar contains navigation links: Home, Browse Registry, Registry Admin, Data Query, Browse MySpace, Job Manager, Tools, Admin, and Logout. At the bottom of the sidebar is a logo for the "Member of the International Virtual Observatory Alliance (IVOA)".



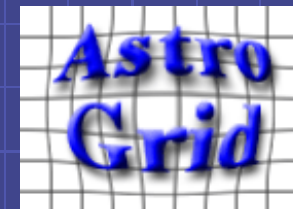
Job Manager: Save Query

The screenshot shows a web browser window titled "AstroGrid Portal - Galeon". The address bar contains the URL: `http://uml02.astrogrid.org:8080/cocoon/astrogrid/agworkflow-administer.html?query-name=simpleQuery`. The page header features the "AstroGrid" logo and the text "AstroGrid Virtual Observatory Job Manager".

On the left side, there is a navigation menu with the following links: [Home](#), [Browse Registry](#), [Registry Admin](#), [Data Query](#), [Browse MySpace](#), [Job Manager](#) (highlighted), [Tools](#), [Admin](#), and [Logout](#). Below the menu is a logo for the "Member of the International Virtual Observatory Alliance (IVOA)".

The main content area is titled "Job Manager" and "Help". It contains two input fields: "Workflow name:" with the value "simpleJob" and "Workflow description:" with the value "Simple one step job". Below these fields is a workflow diagram consisting of a single step labeled "Step" with the text "Query: simpleQuery" next to it. The diagram starts with a black dot at the top, followed by a downward arrow to the step, and another downward arrow ending in a black dot at the bottom.

At the bottom of the main content area, there is a "Create workflow" button, and below that, two buttons: "Save" and "Clear".



MySpace: Find results

AstroGrid Portal - Galeon

File Edit View Tab Settings Go Bookmarks Tools Help

Back Stop 100 http://uml02.astrogrid.org:8080/cocoon/astrogrid/agmyspace.html?AST-VIEW=AST-7

AstroGrid Portal x CommunityIn(x)

AstroGrid AstroGrid Virtual Observatory Myspace

Home Myspace Help

Browse Registry

Registry Admin

Data Query

Browse MySpace -- New view -- AST-7

Job Manager

Tools

Admin

Logout

Member of the International Virtual Observatory Alliance

Service name http://143.210.36.173:8080/axis/services/MySpaceManager [Close]

Explorer path /ktn

Current item

Selected action

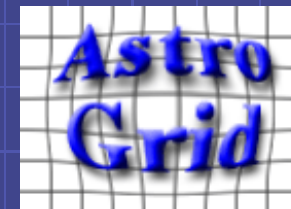
Selected item

AstroGrid

- ktn@leicester
 - serv1 [New folder]
 - serv2 [New folder]
- ktn@star.le.ac.uk
 - serv1 [New folder]
 - TuesdayTestURL3VO.xml [Cut] [Copy] [Rename] [Delete] [ExtendLease] [ChangeOwner]
 - VOSample.xml [Cut] [Copy] [Rename] [Delete] [ExtendLease] [ChangeOwner]
 - query [New folder] [Delete]
 - simpleQuery [Cut] [Copy] [Rename] [Delete] [ExtendLease] [ChangeOwner]
 - test [New folder] [Delete]
 - testFile [Cut] [Copy] [Rename] [Delete] [ExtendLease] [ChangeOwner]
 - votable [New folder] [Delete]
 - ktn.star.le.ac.uk:JES@star.le.ac.uk:113181941:1_results** [Cut] [Copy] [Rename] [Delete] [ExtendLease] [ChangeOwner]
 - workflow [New folder] [Delete]
 - simpleJob [Cut] [Copy] [Rename] [Delete] [ExtendLease] [ChangeOwner]

Current Credential: guest@star.le.ac.uk

Credentials



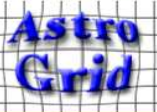
MySpace: View as a table, or...

AstroGrid Portal - Galeon

File Edit View Tab Settings Go Bookmarks Tools Help

Back Stop 100 http://uml02.astrogrid.org:8080/cocoon/astrogrid/agvotable.html?data=http://143.210.36.173:8080/mySpace/#2328

AstroGrid Portal Community/Inl



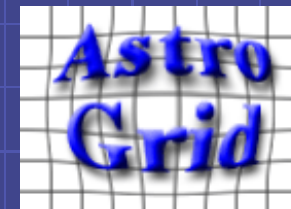
AstroGrid Virtual Observatory MySpace

[Home](#)
[Browse Registry](#)
[Registry Admin](#)
[Data Query](#)
[Browse MySpace](#)
[Job Manager](#)
[Tools](#)
[Admin](#)
[Logout](#)

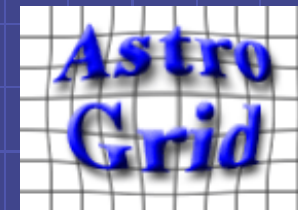
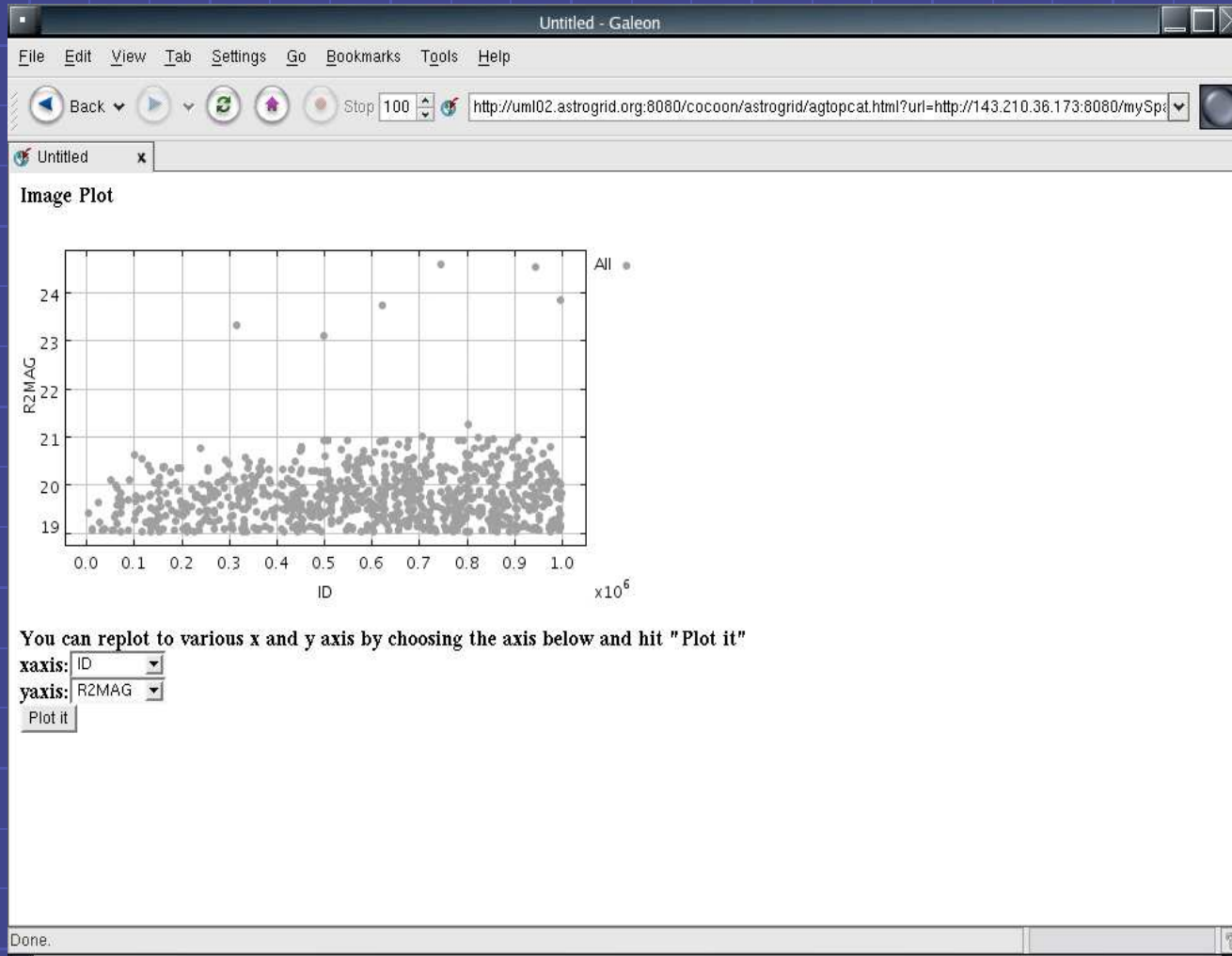
Description

RAh	RAm	RAs	DEsign	DEd	DEm	DEs	Name	Observ	Station	DataID	begDateY	begDateM	begDateD	endDe
3	19	48.1601	+	41	30	42.106	3C84	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
4	9	5.7696	-	12	38	48.141	0406-127	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
4	9	40.7849	-	7	53	39.815	HD26337	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
5	46	8.6628	-	0	10	43.832	HH24	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
5	52	50.1021	+	3	13	27.266	0550+032	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
5	55	30.8056	+	39	48	49.166	0552+398	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
5	55	30.8056	+	39	48	49.166	0552+398	MERLIN	DeCaKnWaDaMkTa	93MARA1658	1993	3	5	1993
8	32	16.0408	+	18	32	12.123	0829+187	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
8	34	54.9034	+	55	34	21.026	0831+557	MERLIN	DeCaKnWaDaMkTa	93MARA1658	1993	3	5	1993
8	40	47.5816	+	13	12	23.398	3C207	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
12	24	52.4219	+	3	30	50.293	1222+037	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
12	29	6.6997	+	2	3	8.598	3C273	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
12	44	49.1879	+	40	48	6.137	1242+410	MERLIN	DeCaKnWaDaMkTa	93MARA1658	1993	3	5	1993
12	46	4.2324	-	7	30	46.574	1243-072	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993
12	56	11.1688	-	5	47	21.695	3C279	MERLIN	DeCaKnDaMkTa	93JANA4993	1993	1	2	1993

Done.



MySpace: View as a graph



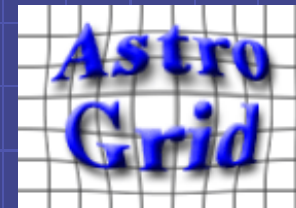
Component-based

- ◆ Plug-n-Play
 - Install
 - Configure
 - Operate
- ◆ Pick-n-Mix
 - Choose components for environment
- ◆ Mix-n-Match
 - Use components from other VO projects

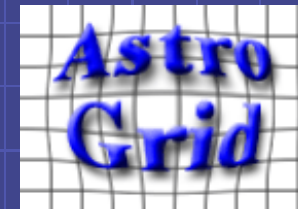
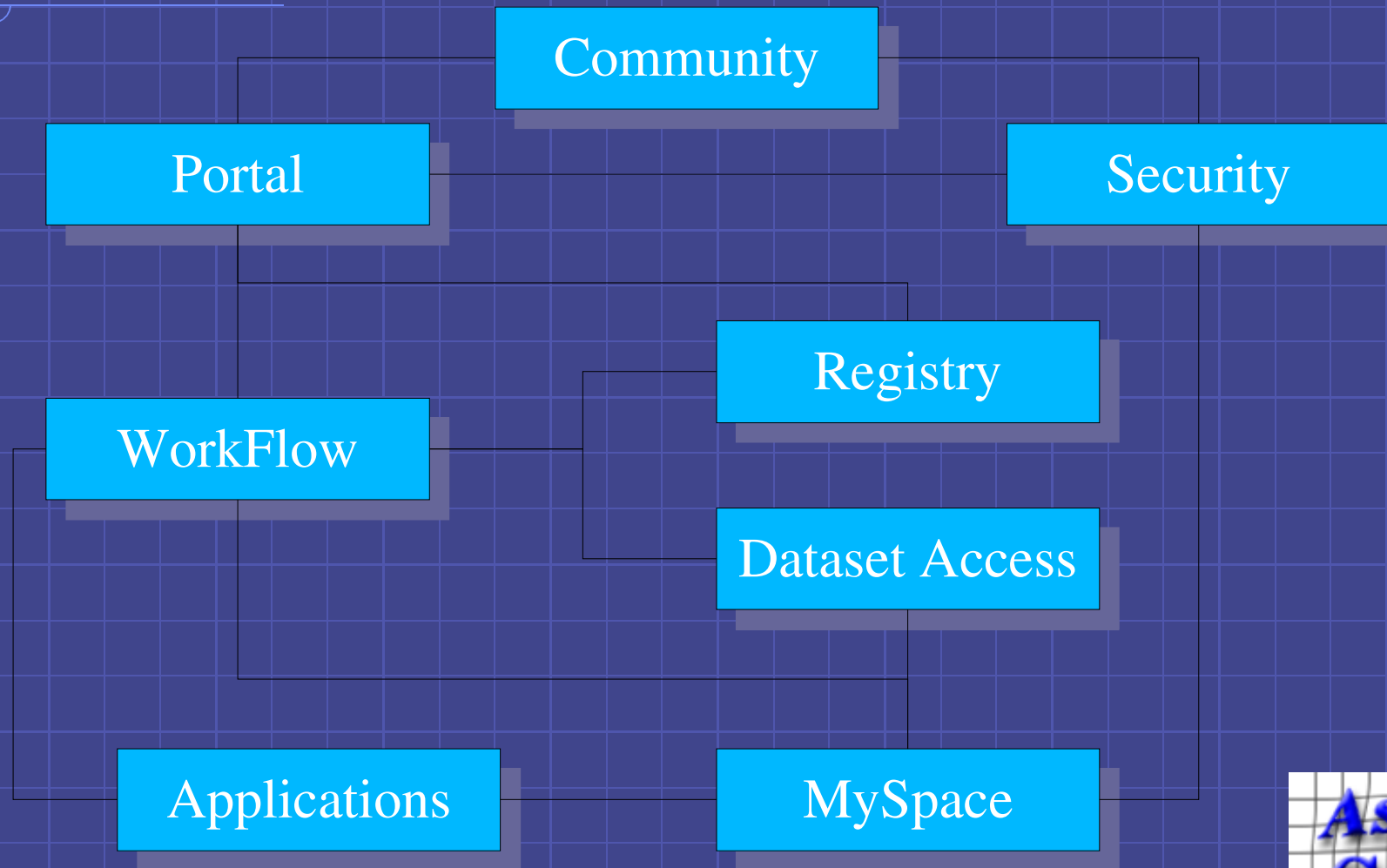
Goal:

Minimum component interaction

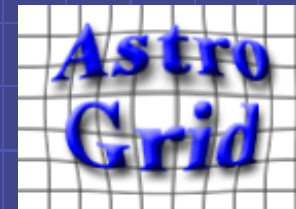
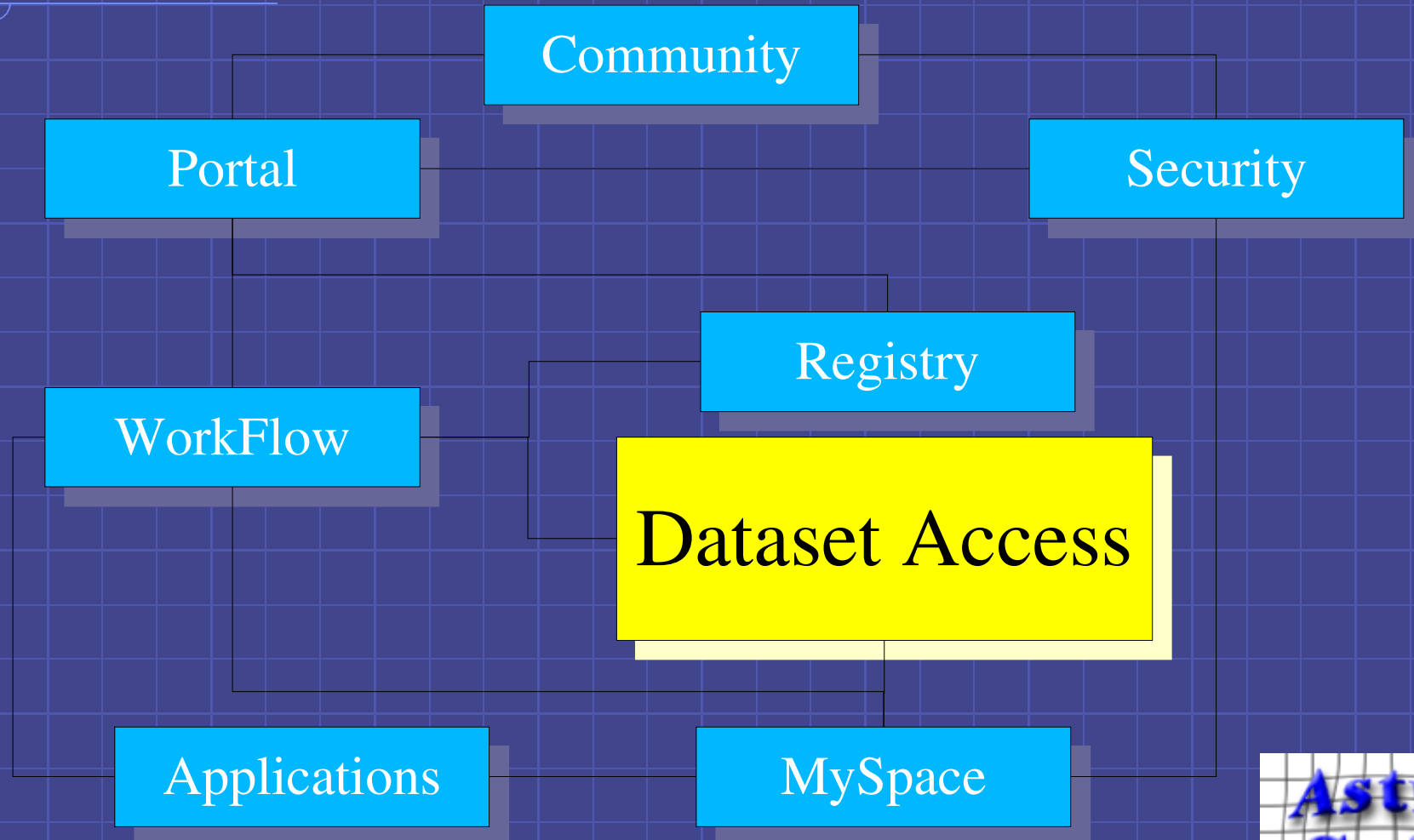
- Asynchronous calls
- Call once only
- Pass maximum info



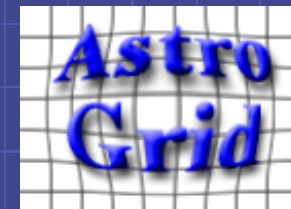
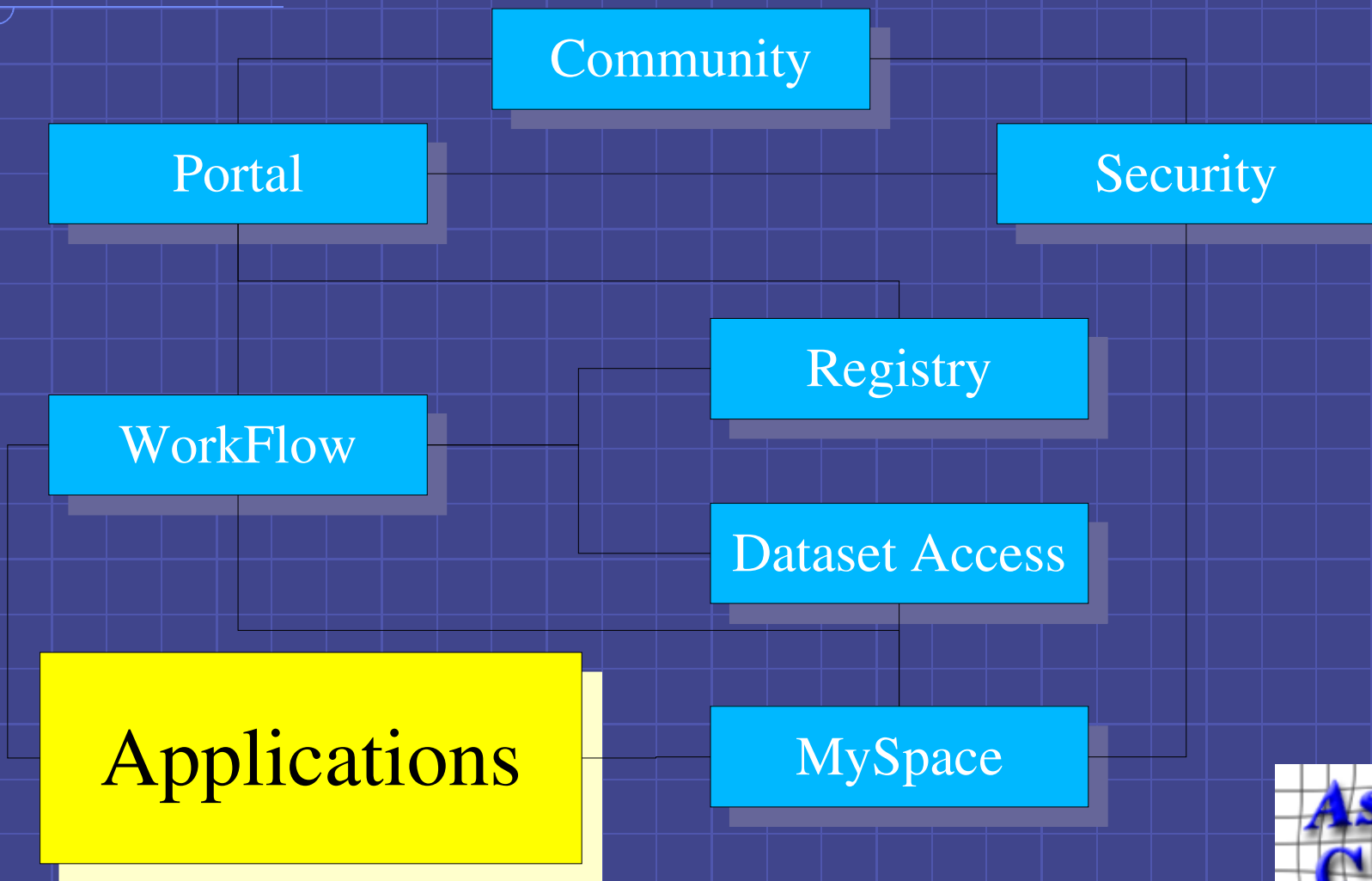
AstroGrid Component Framework



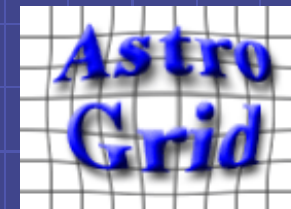
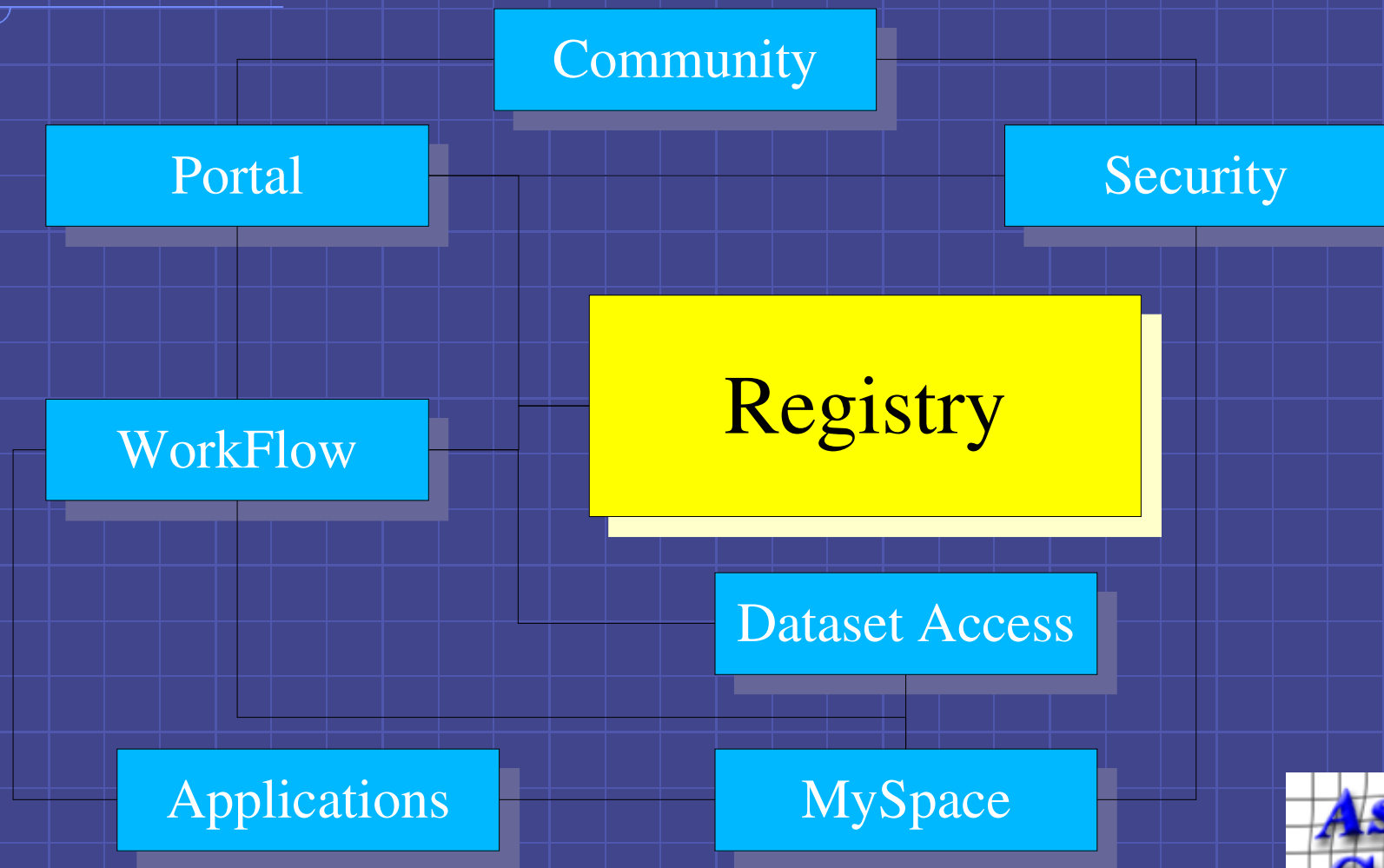
Utilising the AstroGrid Framework



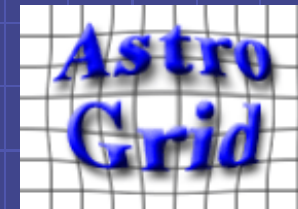
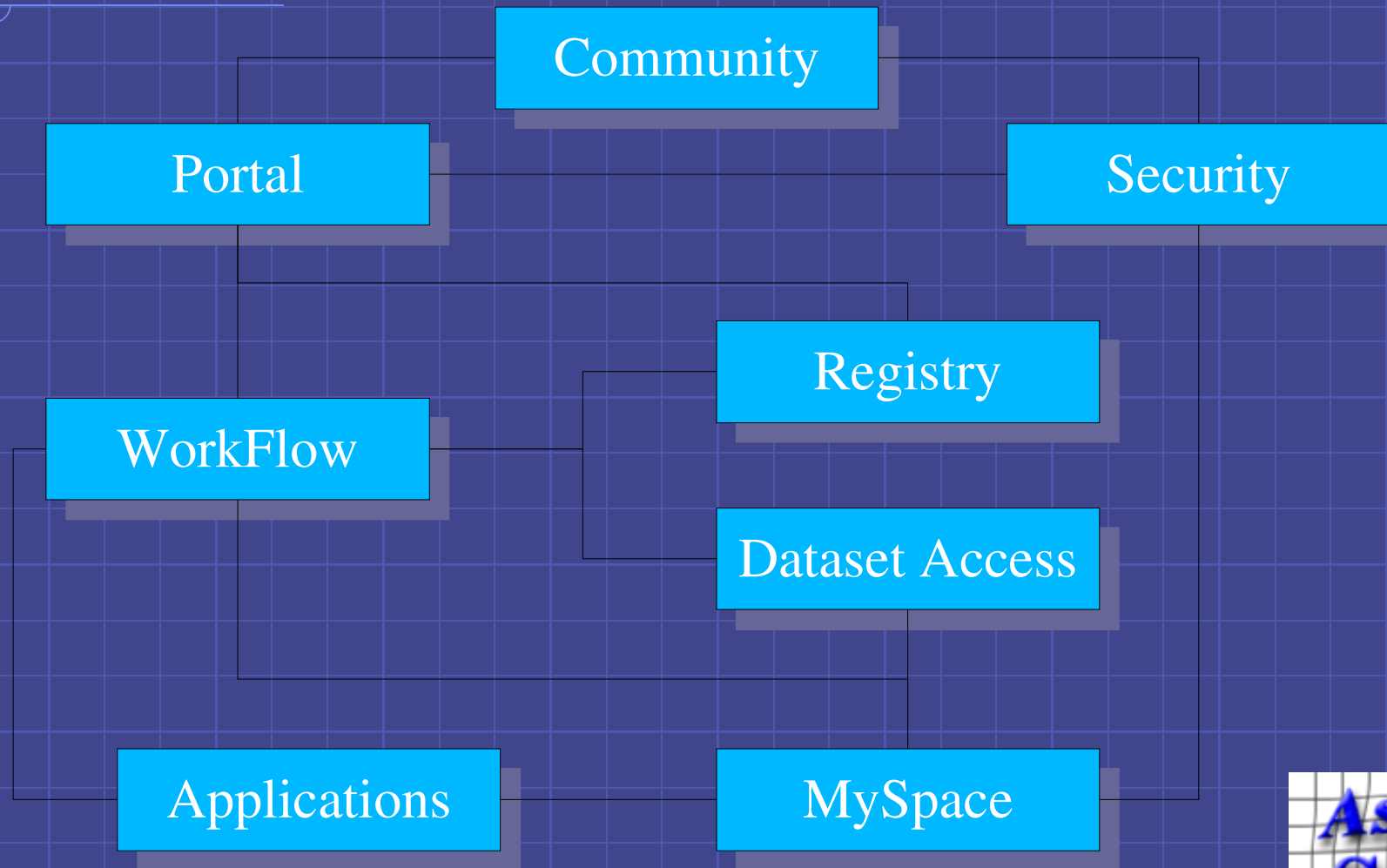
Utilising the AstroGrid Framework



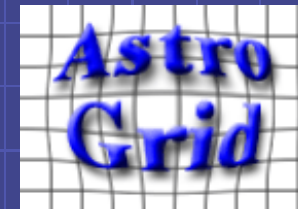
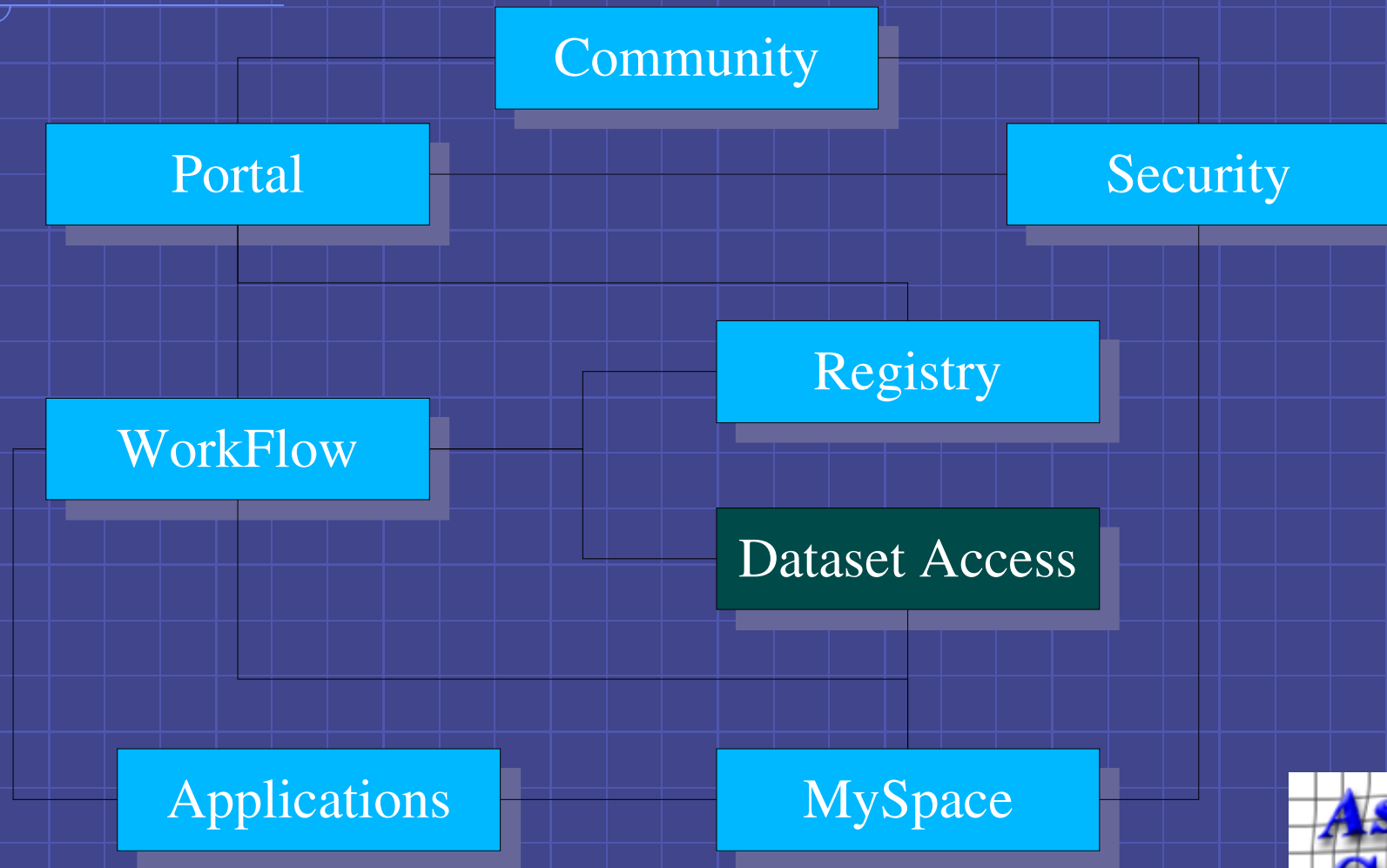
Utilising the AstroGrid Framework



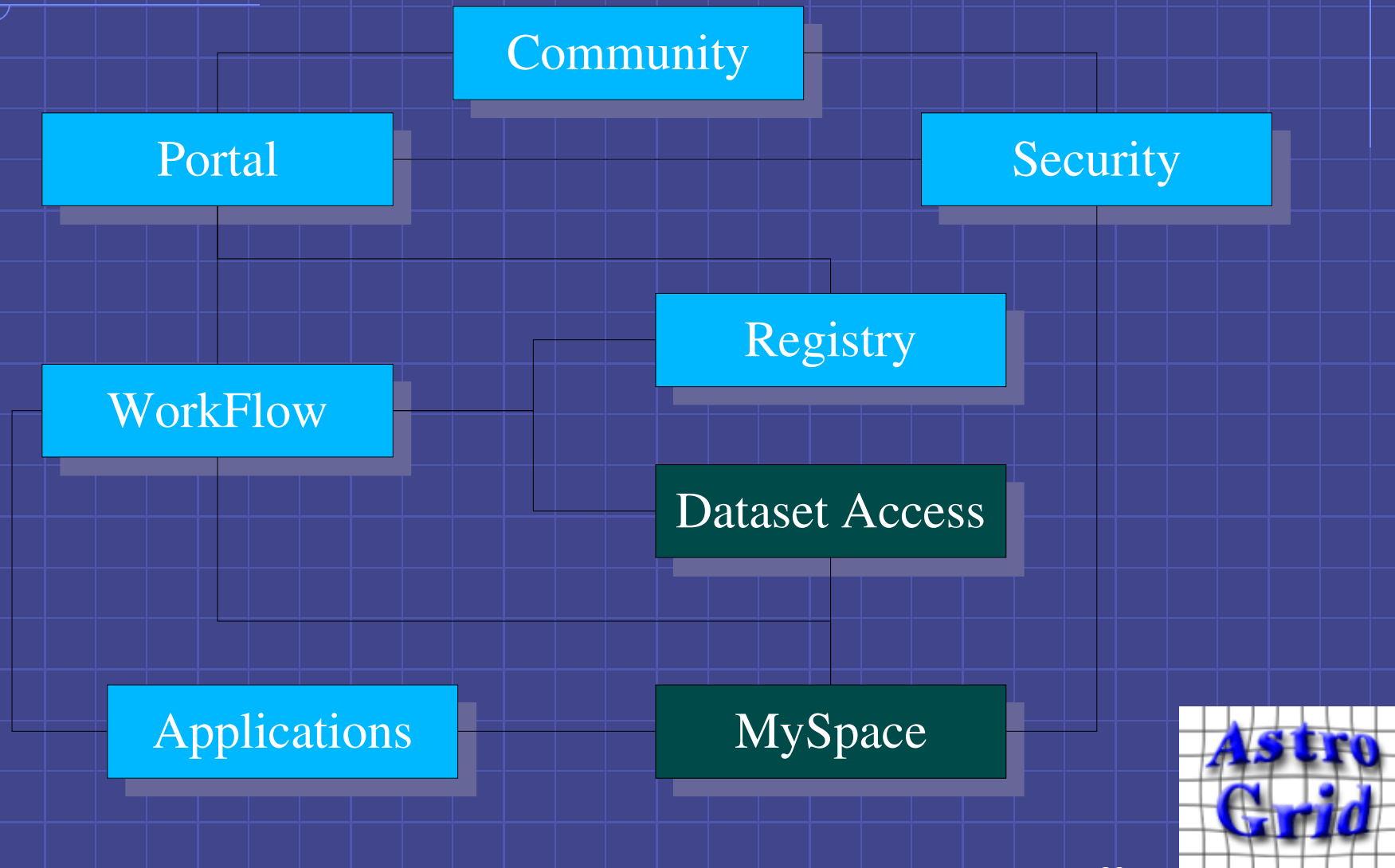
AstroGrid / Globus



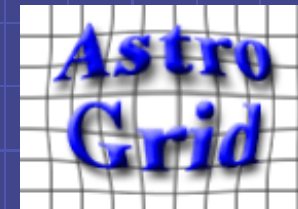
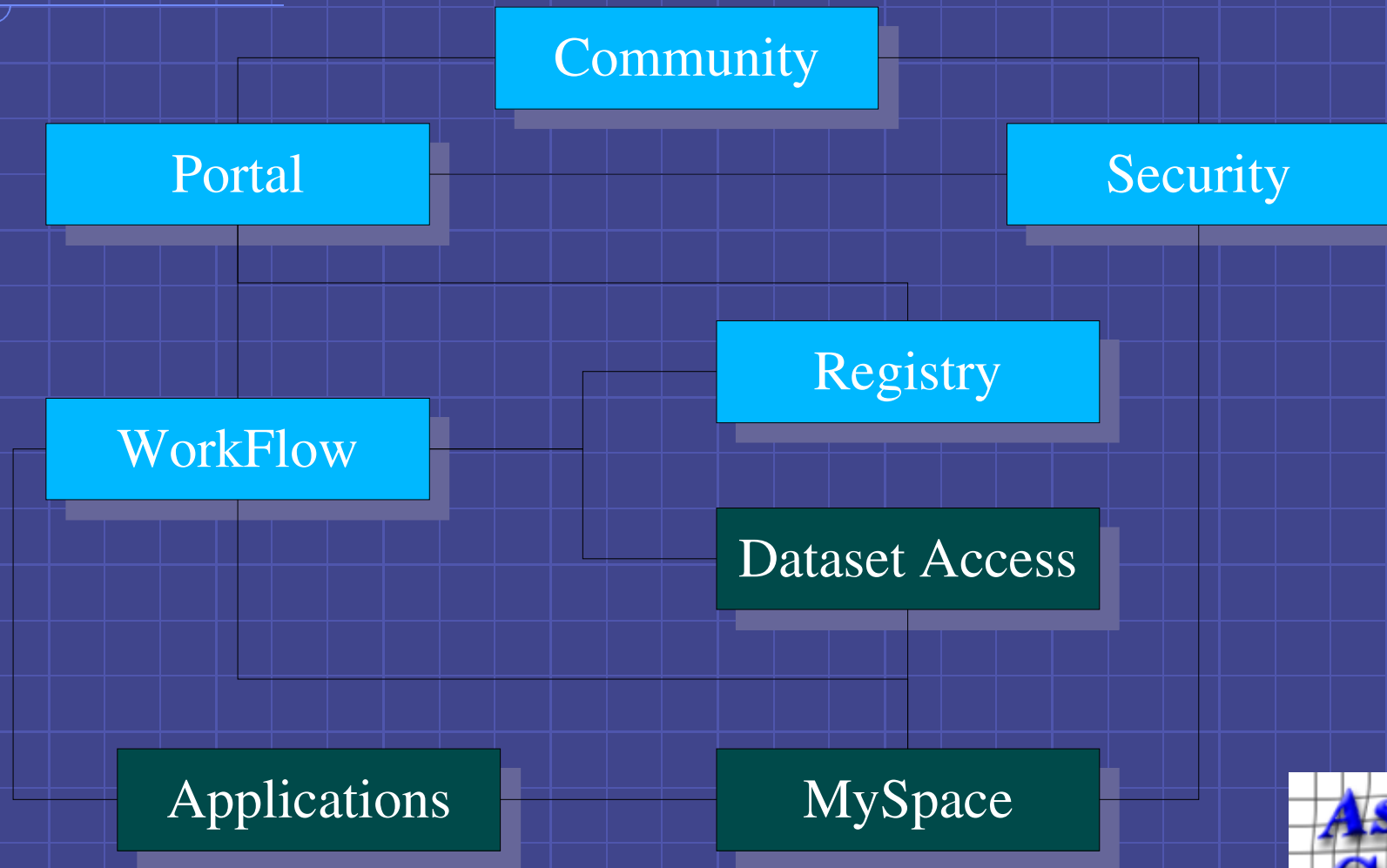
AstroGrid / Globus



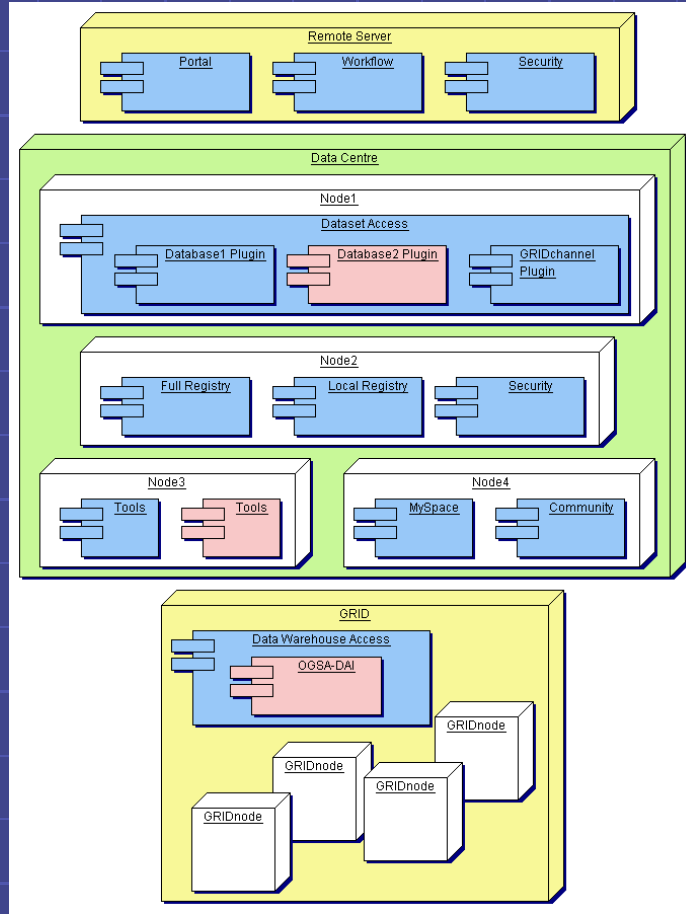
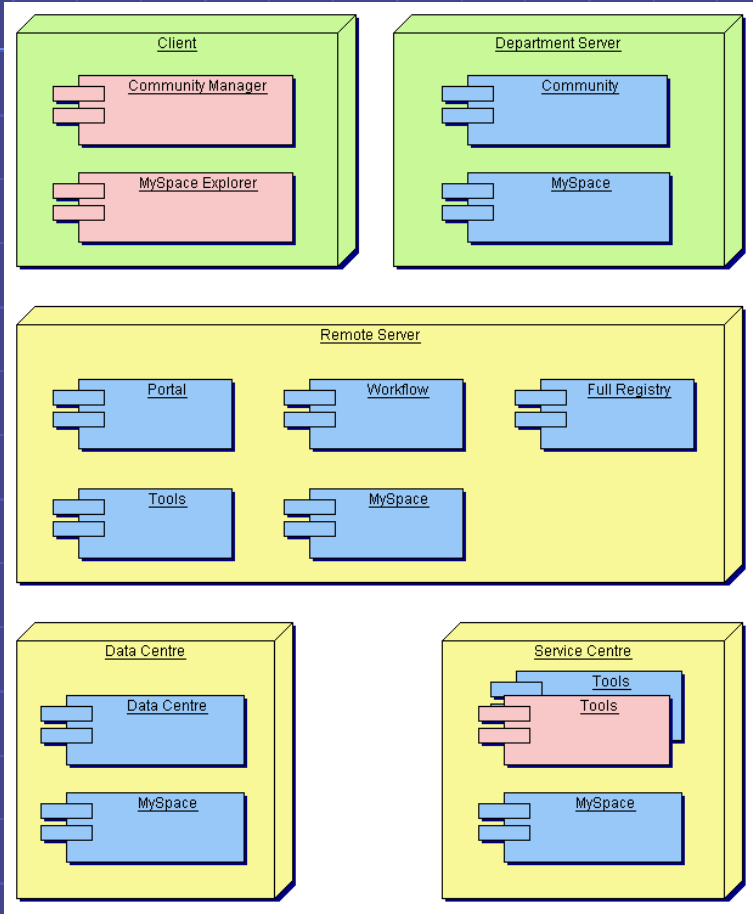
AstroGrid / Globus



AstroGrid / Globus



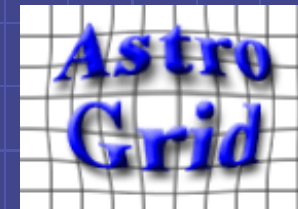
Deployment



Interoperability

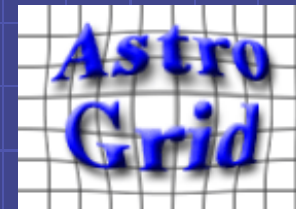
◆ IVOA

- Registry
- Data access
- Access policy
- Authentication & Authorisation
- Workflow
- Component interoperability
- Community
- MySpace (VOSpace)
- Grid-based components



Deliverables: Dec'04

- ◆ Goals
- ◆ Fully working VO infrastructure
 - Deployable anywhere
- ◆ Installations world-wide
 - Complete & Partial
- ◆ See <http://wiki.astrogrid.org/bin/view/Astrogrid/OversightPage>
- ◆ ~20 experienced e-Science developers!



Conclusion

- ◆ AstroGrid is:
 - An infrastructure project
 - Component based
 - Supports a Mix-n-Match paradigm
- ◆ Iteration 3 (of 8) just released
- ◆ AstroGrid can provide some or all of the framework a small VO project might need
- ◆ **AstroGrid is very happy to work with other VO projects to help them contribute to the building of a truly international VO**

