

GridSphere Project

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Outline

- Some words about portals in principle
- Overview of GridSphere
- GridPortlets: Login, viewing resources, job submission, file operation



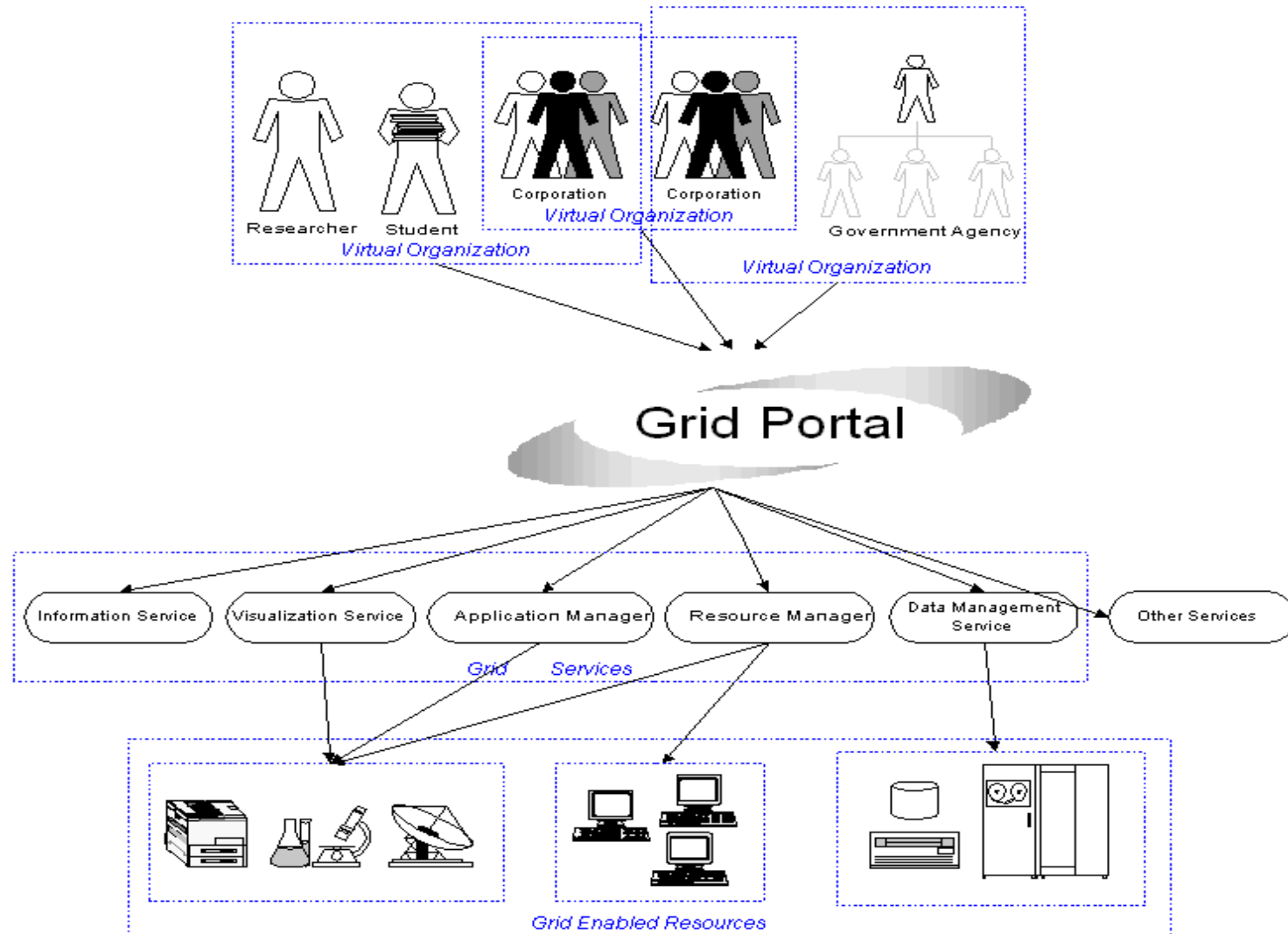
What is a portal ?

- “A portal is a web based application that commonly provides personalization, single sign on, content aggregation from different sources and hosts the presentation layer of Information Systems” (JSR 168)
- Grid/Science Portals build upon the familiar Web portal model, such as Yahoo or Amazon, to deliver the benefits of Grid computing to virtual communities of users, providing a single access point to Grid services and resources.





Bridging Users and Services





Application Portal

- A Portal is only as good as the underlying deployed infrastructure
- Portal development often involves debugging underlying middleware
- Many application portals have been stovepipe solutions that provide a complete solution with very little customization capabilities
 - Separation of presentation and login
 - Generally hard coding of underlying Grid infrastructure details
- Lack of real usability has made it difficult to test and evaluate user interfaces



Application Portal (cont.)

- Scientific portals require much more support for persistence and robust transactions than ordinary eCommerce style portals
- Web application development still remains a tedious task with little in the way of reusable components, forcing developers to constantly “re-invent” the wheel



- Some words about portals in principle

- Overview of GridSphere**

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www.gridsphere.org



News

7/6/2005 [Grid Portlets 1.1](#) is now available for download!

6/13/2005 [Grid Portlets 1.0.3](#) is now available for download!

5/27/2005 [Grid Portal Workshop](#), hosted by [Australian Partnership for Advanced Computing](#), is open for registration.

Welcome to the GridSphere Project!



The GridSphere portal framework provides an open-source portlet based Web portal. GridSphere enables developers to quickly develop and package third-party portlet web applications that can be run and administered within the GridSphere portlet container. Here you will find the GridSphere portal framework available for download and documentation related to the installation and development of portlets using GridSphere.

[Get GridSphere 2.0 now!](#)

The GridSphere Portal Framework offers the following features:





The GridSphere Portal

- Originally funded by the EU GridLab project spanning 3 years since 2002
- Overall goal to build the best open source standards compliant portal designed to meet the needs of the Grid community
- Bringing together best technologies from both web and grid world
- Building a community of users and developers and continuing to add new exciting scenarios





GridSphere Features

- Portlet API passed Sun TCK and is 100% JSR 168 compliant
- Additional Portlet API implementation nearly fully compatible with IBM's WebSphere 4.2. (GridSphere 2.0)
- Support for the easy development and integration of new portlet applications
 - Template project generation and build scripts makes life easier for developers
- Higher-level model for building complex portlets using visual beans and the GridSphere User Interface (UI) tag library
- Flexible XML based portal presentation description can be easily modified to create customized portal layouts
- Built-in support for Role Based Access Control (RBAC) separating users into guests, users, admins and super users
- Sophisticated portlet service model that allows for creation and reusability of new business logic with support for persistence of data





GridSphere Features (II)

- Persistence of data provided using Hibernate OQL for database support
 - Supports many databases including hsqldb, MySQL, Postgres,
- GridSphere core portlets:
 - Login, Logout, Locale settings
 - Profile personalization and Layout customization
 - Administration portlets for creation of users, groups, portlet management and portal layout customization
- Localization support in the Portlet API implementation and portlets support French, English, German, Czech, Polish, Hungarian and Italian, Arabic and Chinese!
- Pluggable authentication modules allows admin to select among supported modules, or develop new ones.





Portal Standards

- JSR 168 Portlet API ratified August 2003
 - Similar to Servlet API in providing reusable web applications
 - Ratified by vendors including BEA, Sun, IBM, Oracle, Plumtree and others...
- WSRP (Web Services for Remote Portlets) ratified by OASIS committee
 - Specifies how web services can be consumed by standards compliant portals
- Java Server Faces (JSR-127) ratified
 - Specifies an event based user interface for web presentation development
- Upcoming JSR 286 (Portlet specification 2.0)
 - GridSphere is part of the Expert Group defining the standard





What makes GridSphere different ?

- Already many other OS portals out there:
 - Jetspeed2, uPortal, StringBeans, Exo, Liferay, Jboss
- A handy template build system using Ant:
 - ant new-project
- Lightweight: no EJB, based on popular, robust libraries e.g. Hibernate for persistence
- Ability to add support for new authentication schemes with pluggable auth modules descriptor
- Visual UI tags and beans makes presentation development much easier
- Support for the Grid!!
 - GridPortlets offered as add-on webapp
 - Provides Library and collection of portlets for Credential management, job execution, data transfer (gridftp)





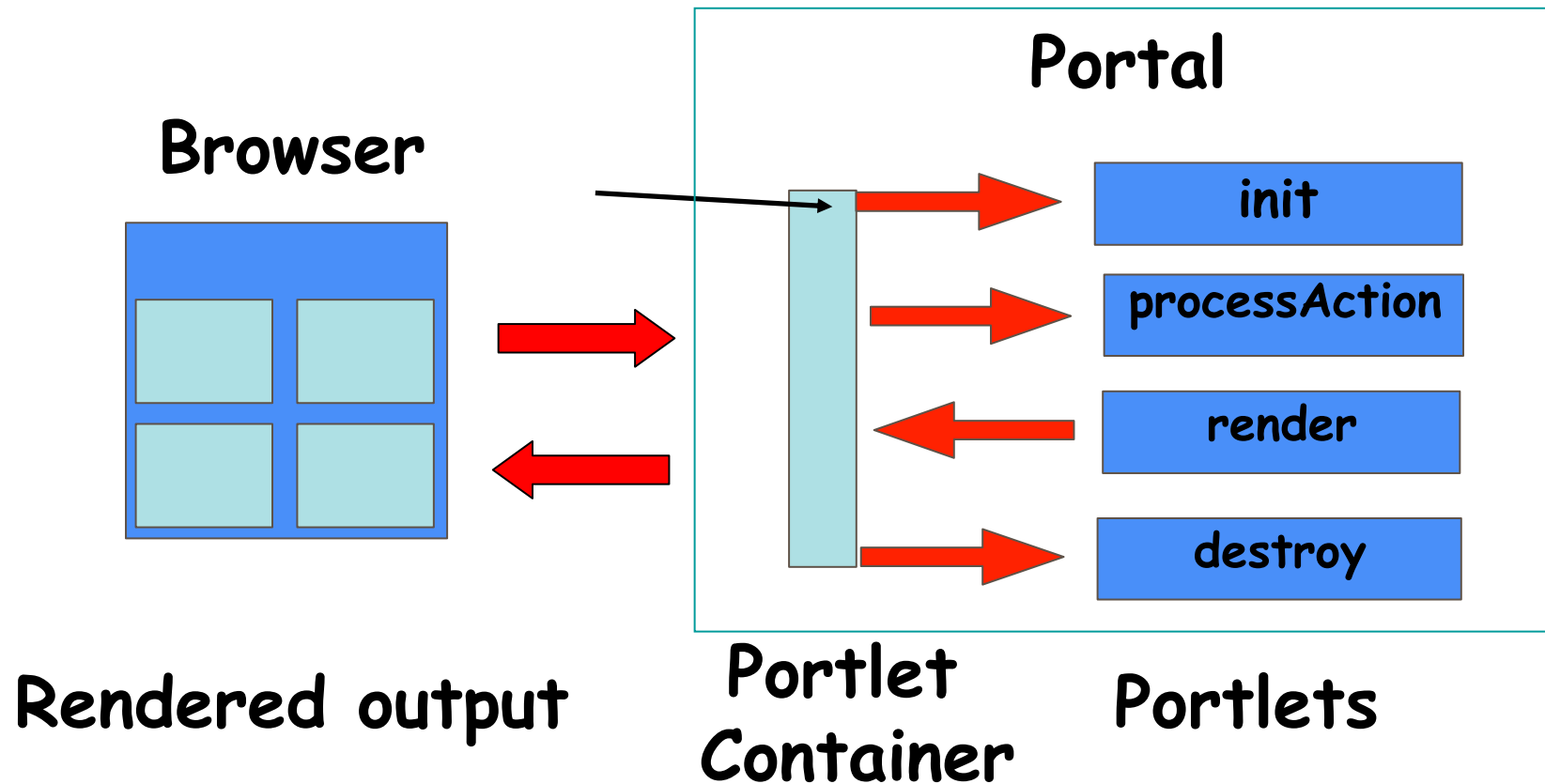
GridSphere Implementation

- The GridSphere portlet container is implemented as a web application and requires a hosting environment such as the Jakarta Tomcat container.
- Many additional libraries are used and deployed to the servlet container during installation



Portlet Life-Cycle

- The GridSphere *portlet container* loads and instantiates portlet classes.





GridSphere Security

- Access control based on 4 defined role priorities within a group:
 - Guest < User < Admin < Super
- A guest is anyone that has not logged in and has access to public website
- An admin has permissions to manage users in the group and edit group layout
- Super is the portal administrator
- A group defines a set of deployed portlets with access restrictions
- Users can be in multiple groups



Core User Portlets

- Login/Logout portlet
 - Enables user to logon/logout
 - Allows user to refresh password if forgotten
 - Configurable option enables new users to request an account
- Locale portlet
 - Simple locale chooser in the portal banner offers support for 7 languages
- User profile portlet
 - Enables users to configure personal information e.g. name, email, locale, preferences
- Layout configuration portlet
 - Enables users to customize their layout by creating new tabs which portlets can be easily added to.



Core Administrative Portlets

- User Manager Portlet
 - Enables admins to create/delete/edit portal users
- Group Manager Portlet
 - Enables admins to add/remove users to/from portlet groups
 - Enables admins to select whether a group is public or private (public means anyone can join, private requires an administrator approval)
- Portlet Manager Portlet
 - Enables admins to start, stop, or redeploy a portlet application
- Layout Manager Portlet
 - Enables admins to edit existing group layouts



New Features

- Integration with Jakarta Portals-bridges project
 - Can now use existing Struts applications in GridSphere!
- Can now add new roles
 - Associated with existing role priorities of Guest, Admin, User and Super
 - Portlet web applications can provide role descriptor
- Added new tracking portlet and tag attributes for monitoring user actions in the portal
 - Can monitor most popular functions and even download statistics in Excel format
- New layout developments using pure CSS and XHTML
- Support for JAAS authentication module



- Some words about portals in principle
- Overview of GridSphere
- **GridPortlets: Login, viewing resources, job submission, file operation**



GridPortlets

My Welcome Admini **Grid**

Settings Layout

? Profile Manager

Edit Settings for root

Last Login Time: **Wednesday, October 20, 2004 2:54:22 PM CEST**

User Name: Locale: English

Full Name:

Email Address: Timezone:

Europe/Berlin
Europe/Bratislava
Europe/Brussels
Europe/Bucharest
Europe/Budapest
Europe/Chisinau

Organization:

Configure group membership

Groups:	Group Description:	Role in Group
<input checked="" type="checkbox"/> gridsphere	Core GridSphere Group	SUPER
<input checked="" type="checkbox"/> gridportlets	Grid Portlets	USER
<input type="checkbox"/> cactuscodeportlets	Cactus Toolkit	USER

Update password

- Need to subscribe to the 'GridPortlets' Group
- Grid Tab will appear and provide the Portlets





Define Credentials

The screenshot shows a web interface for defining a new credential. At the top, there are tabs: 'My', 'Welcome', 'Administration', and 'Grid'. Below these are links: 'Credentials', 'Resources', 'Jobs', and 'Files'. The main heading is 'New Credential'. A message states: 'This credential can be retrieved from **myproxy.gridlab.org**.' The form contains the following fields and options:

Label: *	<input type="text" value="NCSA"/>	(Required: Label to display for credential in portal)
User Name: *	<input type="text" value="owehrens"/>	(Required: -l or --username option to myproxy-init)
Credential Name:	<input type="text" value="ncsa"/>	(Optional: -k or --credname option to myproxy-init)
Passphrase: *	<input type="password" value="....."/>	(Required: Your credential repository password)
Use Portal Credential:	<input checked="" type="checkbox"/>	(Leave checked to use the portal credential when retrieving your credential)
Single Sign-On:	<input checked="" type="checkbox"/>	(Leave checked to sign-on to the portal with this credential)

At the bottom are 'Apply' and 'Cancel' buttons.

- Users can retrieve credentials from a MyProxy credential repository
- Can enable their credentials for "single sign on" to computing resources at login time



New Credential

My Welcome Administration **Grid**

Credentials Resources Jobs Files

? View Credential

List Credentials Refresh View Edit Credential Delete Credential

Credential Info

Use Portal Credential: ☒
Single Sign-On: ☒
Certificate: /C=US/O=National Center for Supercomputing Applications/CN=Oliver Wehrens
User Name: owehrens
Credential Name: ncsa
Credential Label: NCSA

Passphrase: Retrieve Credential

Credential Status

Credential Status: Active
Time Remaining: 2 hours 14 minutes 55 seconds
Date Created: Wednesday, October 20, 2004 3:40:41 PM CEST
Last Retrieved: Wednesday, October 20, 2004 3:40:41 PM CEST





Resources

- Resources available to users from the portal can be edited online or via XML File

Resource Browser Portlet				
Refresh List				
Resource	Hostname	Platform	CPUs	System
Portal	localhost			
GridLab Central	mds.gridlab.org			
GridLab MyProxy	myproxy.gridlab.org			
→ Peyote	peyote.aei.mpg.de	i686 Intel(R) Xeon(TM) CPU 2	4	Linux 2.4.25
Helix	helix.bcvclsu.edu	i686 Intel(R) XEON(TM) CPU 2	4	Linux 2.4.20-20.7smp
Venus	venus.gridcenter.or.kr			
Skirit	skirit.ics.muni.cz			
FS0	fs0.das2.cs.vu.nl	i686 Pentium III (Coppermine)	2	Linux 2.4.20-24.7smp
N0	n0.hpcc.sztaki.hu	i686 Pentium III (Katmai)	2	Linux 2.4.26
Rage1	rage1.man.poznan.pl	i686 Intel(R) Pentium(R) III CPU family 1400MHz	2	Linux 2.4.20-8smp
Litchi	litchi.zib.de	i686 Intel(R) XEON(TM) CPU 2	4	Linux 2.4.20-8smp
Onyx3	onyx3.zib.de	IP35 R14000	20	IRIX64 6.5
Sierra0	sierra0.unile.it	alpha EV6/7 (21264A)	4	OSF1 V5.1
Packcs	packcs-e0.scai.fraunhofer.de	i686 Pentium III (Coppermine)	2	Linux 2.4.19-64GB-SMP
HitCross	hitcross.lrz-muenchen.de	i686 Intel(R) Pentium(R) III CPU family 1266MHz	2	Linux 2.4.25



Resources II

- Information of each resource can be updated via MDS and/or iGrid

Resource Browser Portlet

<< Resource List Refresh View

Peyote

Hostname	peyote.aei.mpg.de	CPU Count	4
Description	Front-end to the AEI Peyote Cluster	CPU Cache	512 X 12kb
Platform	i686	CPU Speed	2799Mhz
CPU Vendor	GenuineIntel	CPU Load 1 min	176
CPU Version	15.2.7	CPU Load 5 min	171
CPU Model	Intel(R) Xeon(TM) CPU 2	CPU Load 15 min	196
CPU Features	fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe cid	Memory Size	4038MB
OS Name	Linux	Memory Free	3389MB
OS Release	2.4.25	Virtual Memory Size	1027MB
		Virtual Memory Free	376MB

Resource Profile Services View

Service	Protocol	Port	Service Path
GRIS		2135	
Globus Gatekeeper		2119	
Grid Ftp		2811	





Starting a Job

? Job Submission Portlet

<<Previous Next>> Cancel

Select the type of job you would like to submit and the service you would like to use to submit the job.

Job Setup

Type of job to submit	Job submission service
Generic Application Cactus Simulation	Globus Resource Management System GridLab Resource Management System

- A Wizard guides the user to the JobSubmission process
- Supports different types of jobs, either generic or user specific jobtypes which can be installed by an Administrator
- JobSubmissionsServices supported in the moment are Globus and Gridlab GRMS but it is extendable to others



Defining a Job

My Welcome Administration **Grid**

Credentials Resources Jobs Files

? Job Submission Portlet

<<Previous Next>> Cancel

Step 1. Specify the application you would like to execute. This job will be submitted using the **Globus Resource Management System**.

Application Details

Description	<input type="text" value="Simple ls"/>	Directory	<input type="text"/> <input type="button" value="Browse"/>
Executable	<input type="text" value="/bin/lis"/> <input type="button" value="Browse"/>	Stdout	<input type="text"/> <input type="button" value="Browse"/>
Arguments	<input type="text" value="single"/> Type of executable	Stderr	<input type="text"/> <input type="button" value="Browse"/>
Environment	<input type="text"/>	Stage-In Files	<input type="text"/>
		Stage-Out Files	<input type="text"/>

■ Define a simple 'ls' on a resource



Defining a Job II

Job Submission Portlet

<<Previous Next>> Cancel

Step 2. Specify your resource requirements for this job. This job will be submitted using the **Globus Resource Management System**.

Resource Requirements

Number Of CPUs

Minimum Memory

peyote.aei.mpg.de
helix.bcvclsu.edu
venus.gridcenter.or.kr
skirit.ics.muni.cz
fs0.das2.cs.vu.nl
n0.hpcc.sztaki.hu
rage1.man.poznan.pl
litchi.zib.de
onyx3.zib.de
sierra0.unile.it
packcs-e0.scai.fraunhofer.de
hitcross.lrz-muenchen.de

Refresh View

The following job queues are available on **peyote.aei.mpg.de**.

	Scheduler	Queue	Node Count	Max Memory	Job Wait	Max Jobs	Max Time	Max CPU Time
<input type="radio"/>	fork	default	4	0MB		0	0	0
<input type="radio"/>	pbs	debug	4	0MB		0	0	0
<input type="radio"/>	pbs	dque	4	0MB		0	0	0
<input type="radio"/>	pbs	gridlab	4	0MB		0	0	0

- Select the machine to run on
- Choose number of processors and jobqueues



Submitting the Job

? Job Submission Portlet

<<Previous Submit Cancel

Step 3. Confirm and submit your job specification. This job will be submitted using the **Globus Resource Management System**.

Application Details

Description	<input type="text" value="Simple ls"/>	Directory	<input type="text"/>
Executable	<input type="text" value="file:///bin/ls"/>	Stdout	<input type="text"/>
<input type="button" value="single"/> Type of executable		Stderr	<input type="text"/>
Arguments	<input type="text"/>		
Environment	<input type="text"/>		
	Stage-In Files	<input type="text"/>	
	Stage-Out Files	<input type="text"/>	

Resource Requirements

<input type="text" value="peyote.aei.mpg.de"/> helix.bcvclsu.edu venus.gridcenter.or.kr skirit.ics.muni.cz fs0.das2.cs.vu.nl n0.hpcc.sztaki.hu rage1.man.poznan.pl litchi.zib.de onyx3.zib.de sierra0.unile.it packcs-e0.scai.fraunhofer.de	Job Scheduler	<input type="text" value="<Default Value>"/>
	Job Queue	<input type="text"/>
	Minimum CPUs	<input type="text"/>
	Minimum Memory	<input type="text"/>

Review Job Specification





Job completed

? Job Submission Portlet

<<List Jobs Refresh View New Job Copy Job Delete Job

Generic Application

Job Id	https://peyote.aei.mpg.de:23683/23477/1098280064/	Job Resource	peyote.aei.mpg.de	Date Submitted	Wednesday, October 20, 2004 3:47:45 PM CEST
Job Description	Simple Is	Job Scheduler		Last Changed	Wednesday, October 20, 2004 3:47:50 PM CEST
Job Status	Job completed with message success			Date Ended	Wednesday, October 20, 2004 3:47:50 PM CEST

Job Profile

Job Output View

Job Output

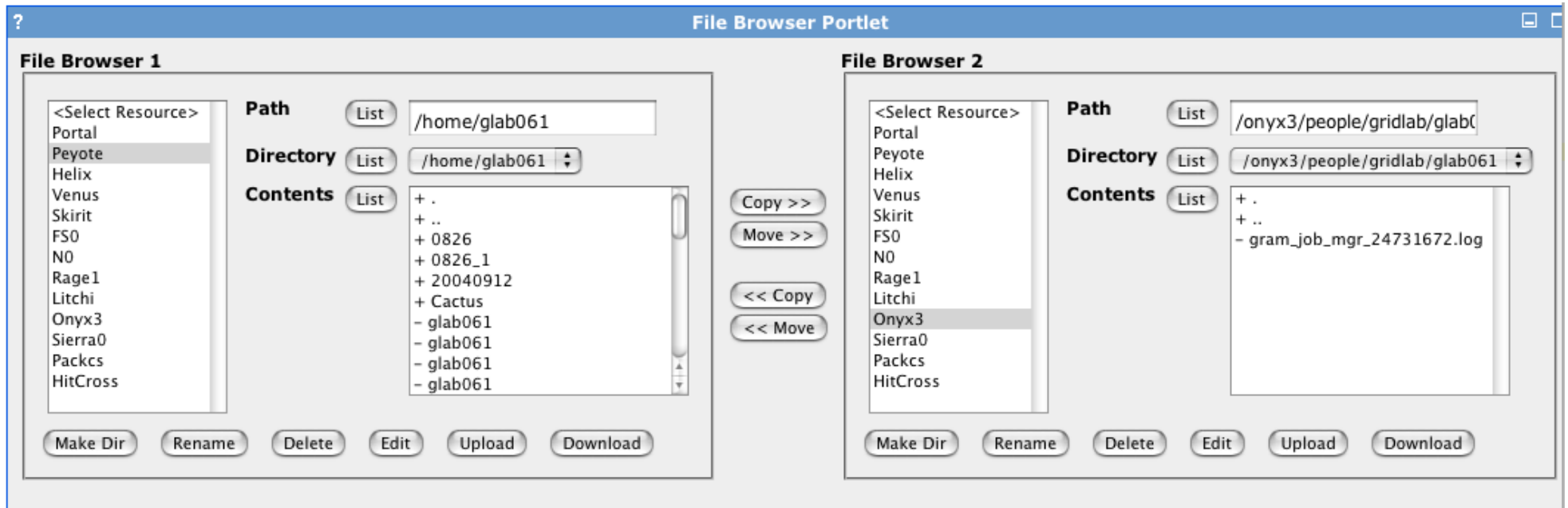
```
0826
0826_1
20040912
Cactus
Demo2
-----
```

- Job did run and is completed
- Showing information about the job and Job output





File Browser Portlet



- Users can browse files on remote computing resources in a manner similar to how they might browse files on their desktop. We have made it relatively simple to create new directories, transfer and delete files all with simple HTML interfaces



Grid Functionality

- Credential Retrieval & Management
 - Support for retrieval & storing with MyProxy with Java CoG 1.1
- Resource Registry & Management
 - Resources can be described in XML and online
- Resource Information Gathering
 - Partial resource discovery and update with MDS2
 - Full resource discovery and update with iGrid 3.1b (from GridLab)
- Job Submission & Migration
 - GRAM job submission with Java CoG 1.1
 - Job submission and migration with Grid Resource Management System (GRMS) 1.9
- Physical File Browsing
 - Support for GridFTP with Java CoG 1.1
- Logical File Management
 - Support for GridLab Logical File Management System (GLFMS) 1.0





GridSphere 3.0

- Scheduled for release in Fall/Winter 2006
- Planned features (might change/incomplete)
 - License (Apache)
 - API changes (Namespace refactoring)
 - Customization changes
 - New portlets
 - Improved CSS Support
 - Improved documentation
 - Layout changes
 - WSRP
- GridPortlets 2.0/Vine
 - Is in alpha stage right now
 - September/October timeframe beta release





JSR 286 - New Portlet Spec

- GridSphere is part of the Expert Group JSR 286
- The first public draft is available (<http://www.jcp.org/en/jsr/detail?id=286>)
- The final specification is expected to be done in March 2007
- We will work to get GridSphere JSR 286 compliant
- Early versions might be in SVN by the time the first public release is out (depending on the policy of the JCP)





Current Funding

- Core developers now have their own teams
- **Jason Novotny** leading the BIRN portal team at SDSU, USA
- **Michael Russell** leading the Portal Efforts at PSNC in Poland (including HPC Europa, OMII and others)
- **Oliver Wehrens** supervising the development of portals within the german national D-Grid initiative, also member of the portal team at Center for Computation and Technology (CCT), Louisiana State University, USA





Community

- 250+ subscribers to the mailinglist
- Many Project around the world adopted it
 - HPC Europa, D-Grid, P-Grade, BIRN, Telescience, Australian Virtual Observatory, UK E-Science ...
- Help from many countries
 - e.g. we got localization in chinese, arabic and japanese and code contributions for GT 4
- Lots of workshop/talks
 - UK E-Science workshops, APAC workshop Gold Coast, GGF Brussels/Seoul , Supercomputing, Portal workshops in Baton Rouge, Edinburgh and San Diego ...
 - Next workshop: November Grid Computing Environments 2006 at Supercomputing Tampa USA





Source Code

- Website: <http://www.gridsphere.org>
 - Includes documentation, news, partners
- Subversion: <http://svn.gridsphere.org>
 - All code is now in subversion, free access
 - SVN development at <http://fisheye.gridsphere.org>
- Bugtracker: <http://bugs.gridsphere.org>
 - Jira bugtracking system
 - Continuous Integration <http://build.gridsphere.org>
- Mailinglists
 - <http://lists.gridsphere.org/pipermail/gridsphere-dev/>
 - <http://lists.gridsphere.org/pipermail/gridsphere-users/>
 - Forums: <http://forums.gridsphere.org/>

