

# Open Grid Computing Environments (OGCE) Annual Report: June 1, 2005-May 31, 2006

## 1. OGCE Project Overview and Highlights

Highlights of the OGCE project in Year 3 included the following:

- A complete revision of the main portal download enables users to build and deploy the portal in a single step.
- Several additional portlets were developed, including SRB, Condor, and Sakai portlets.
- OGCE software was used to build a number of portals, including the LEAD and RENCIBioportal TeraGrid Science Gateways as well as the TeraGrid User Portal.
- The OGCE website was revised to be more easily navigable and maintainable.

The screenshot shows the OGCE Grid Portal interface. At the top, there's a navigation bar with 'Welcome' and 'Home' links. A login form is on the left with fields for 'User Name' and 'Password', a 'Remember my login' checkbox, and a 'Login' button. Below the login form is a link for 'Forgot your password?'. The main content area is titled 'Welcome to the OGCE Portal' and contains a paragraph describing the portal's purpose. Below this is a section titled 'OGCE Portlets' with a bulleted list of various services and their functionalities. At the bottom of the main content area, there are links for 'Announcements and News', 'Technical Questions', and 'Bug Reports'. The footer includes logos for 'powered by gridsphere', 'NIMI', and 'OGCE Components for Science Gateways'.

**Figure 1** The basic OGCE portal download includes portlets for managing grid credentials, running jobs, manipulating files, monitoring resources, and collaborating with other users. These are integrated into a single build.

For Year 3, one of our primary deliverables was to actively engage and assist the science portal community in building OGCE compatible portals. This effort was highly successful and resulted in a number of fruitful collaborations. Details are given in the deliverables section, but we highlight several below.

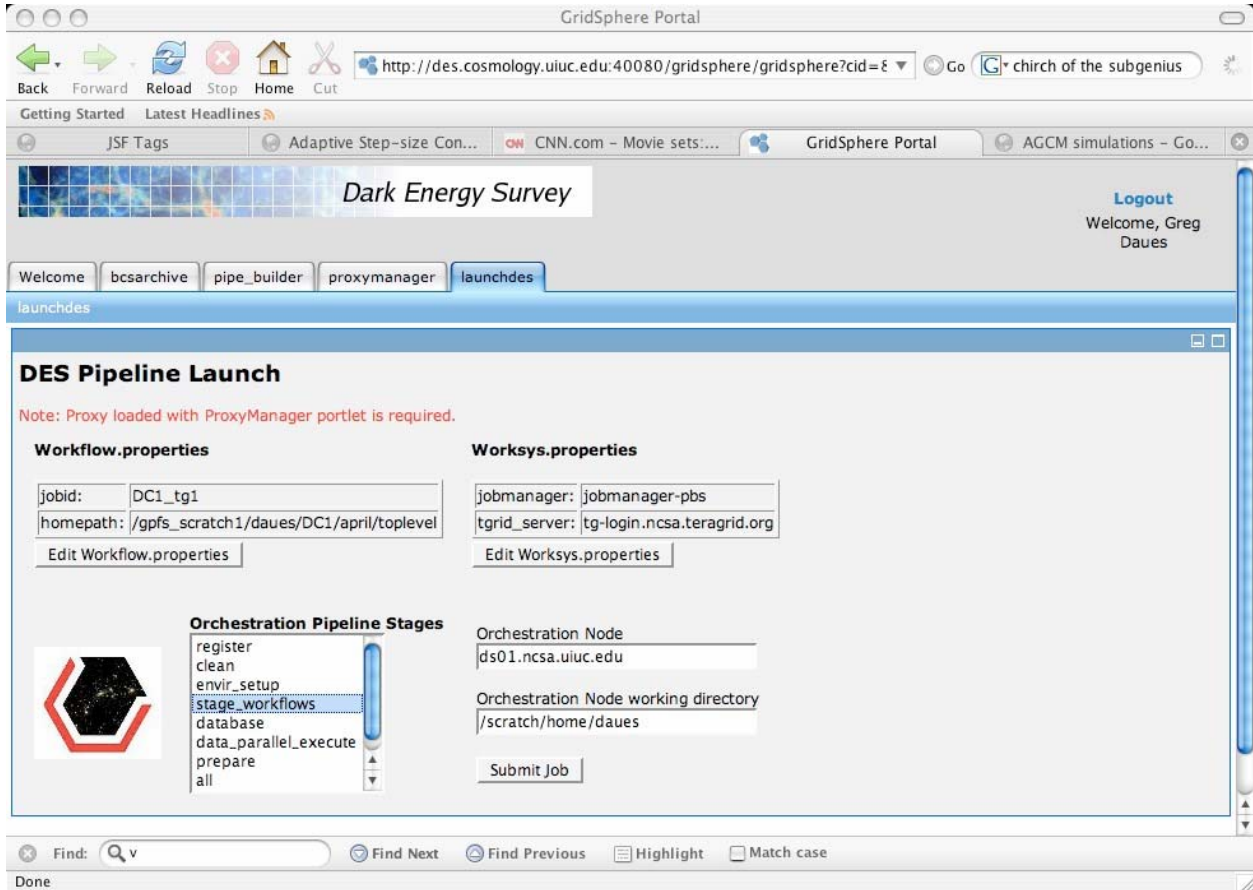


Figure 2 Dark Energy Survey portal, built by Greg Daues (NCSA) using OGCE portlets and NCSA's OGCE Grid Tools.

GridSphere Portal

Back Forward Reload Stop Home Cut <http://tb1.ncsa.uiuc.edu:11080/gridsphere/gridsphe> Go 437/15.5

Getting Started Latest Headlines

GridSphere P... Lyrics of hindi s... rates.html Index (Java Glo... Bollywood Blitz ... Neutron stars

Welcome ncsaeventviewer JSF sample portlets proxymanager-portlet

NCSAEventViewer

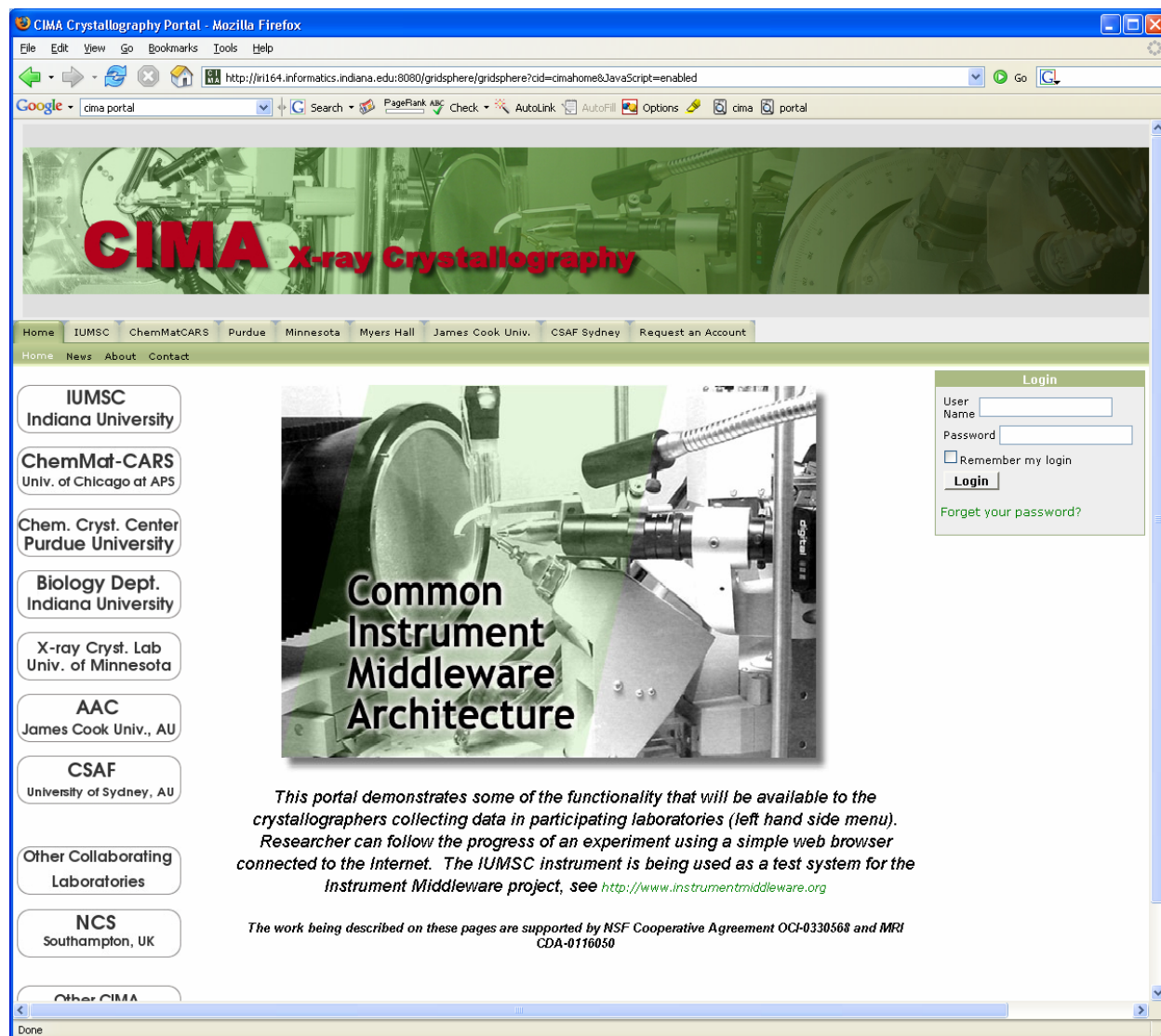
### Job Events

Focus on Ensemble: DC1\_A3 Refresh Ensemble TeraGrid View Return

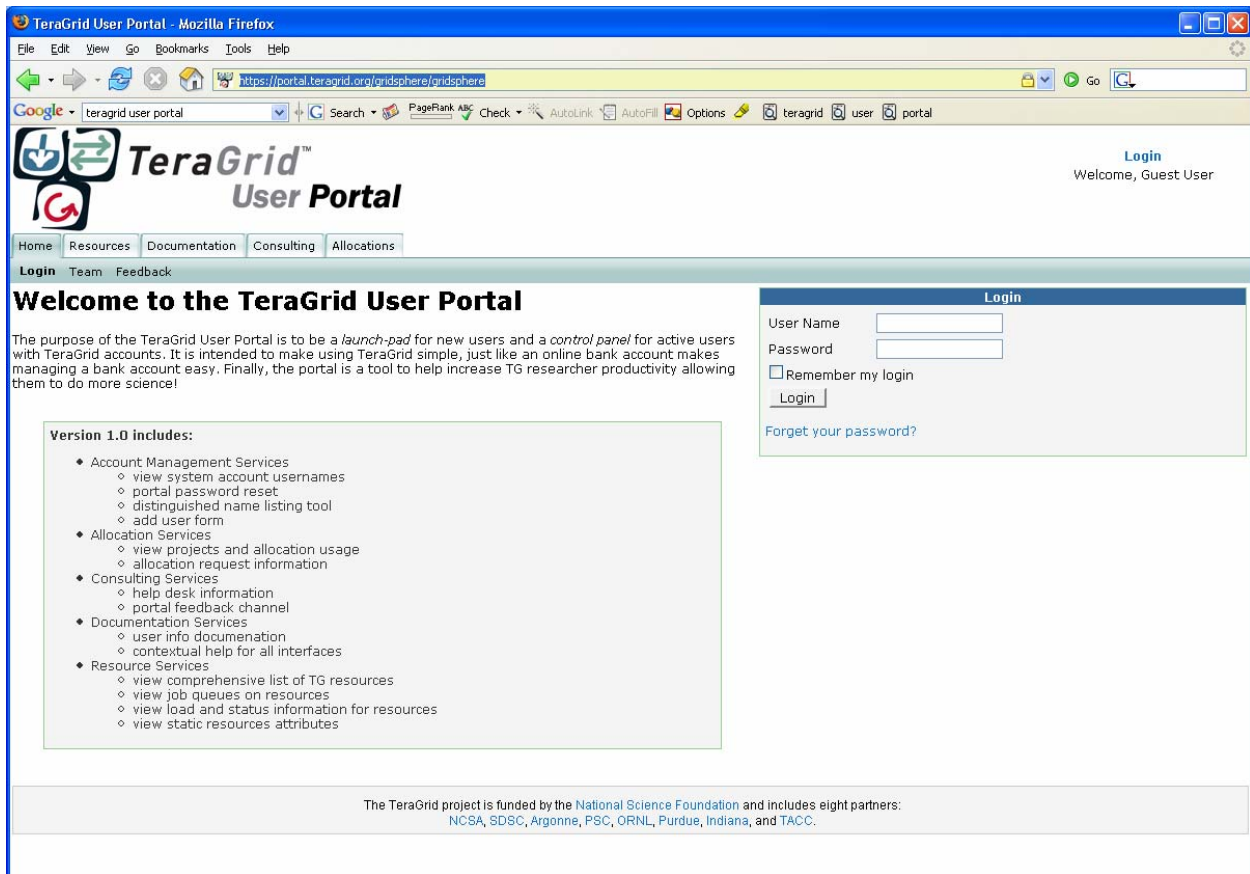
ensembleId	workflowId	nodeId	creationTimestamp
DC1_A3	Main	End component data_parallel_execute on DS01	Sat Feb 18 11:31:42 CST 2006
DC1_A3	012_2006Feb18	End Processing ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:31:03 CST 2006
DC1_A3	012_2006Feb18	End Stage_moveproduct for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:31:03 CST 2006
DC1_A3	012_2006Feb18	End Stage_runadaptive for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:31:03 CST 2006
DC1_A3	012_2006Feb18	End Stage_runcat for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:25:02 CST 2006
DC1_A3	012_2006Feb18	End Stage_astrometry for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:21:43 CST 2006
DC1_A3	012_2006Feb18	End Stage_runimcorrect for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:19:13 CST 2006
DC1_A3	012_2006Feb18	End Stage_createflatfits for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:18:23 CST 2006
DC1_A3	012_2006Feb18	End Stage_createbiasfits for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:16:25 CST 2006
DC1_A3	012_2006Feb18	End Stage_overscan for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:16:12 CST 2006
DC1_A3	09_2006Feb18	End Processing ccd 09 data on tg-c256.ncsa.teragrid.org	Sat Feb 18 11:16:03 CST 2006
DC1_A3	09_2006Feb18	End Stage_moveproduct for ccd 09 data on tg-c256.ncsa.teragrid.org	Sat Feb 18 11:16:03 CST 2006
DC1_A3	09_2006Feb18	End Stage_runadaptive for ccd 09 data on tg-c256.ncsa.teragrid.org	Sat Feb 18 11:16:02 CST 2006
DC1_A3	012_2006Feb18	End Stage_copybpm for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:15:23 CST 2006
DC1_A3	012_2006Feb18	End Stage_moveraw for ccd 12 data on tg-c343.ncsa.teragrid.org	Sat Feb 18 11:15:22 CST 2006
DC1_A3	011_2006Feb18	End Processing ccd 11 data on tg-c033.ncsa.teragrid.org	Sat Feb 18 11:15:11 CST 2006
DC1_A3	011_2006Feb18	End Stage_moveproduct for ccd 11 data on tg-c033.ncsa.teragrid.org	Sat Feb 18 11:15:11 CST 2006

Done

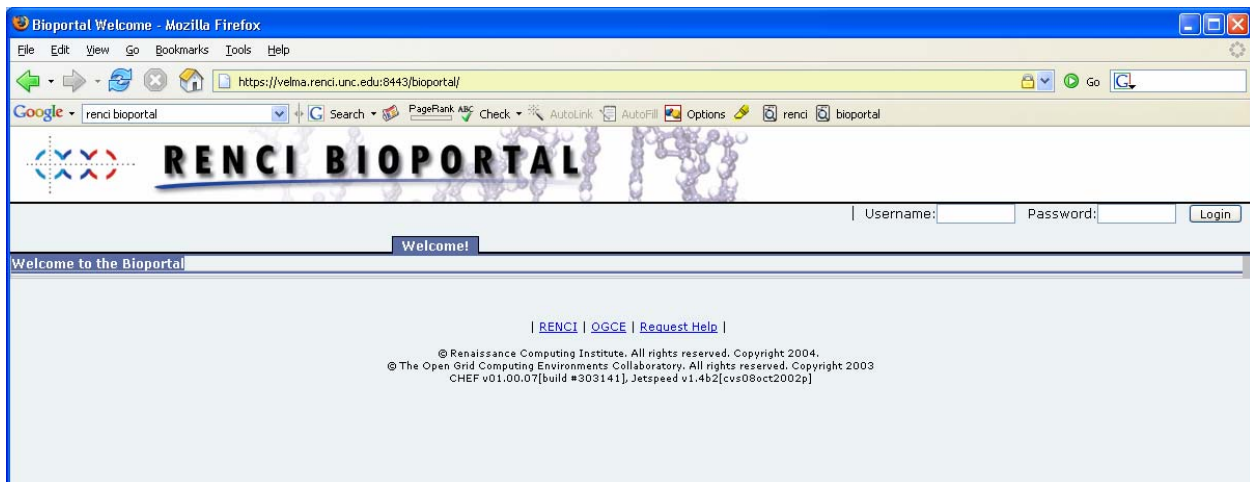
Figure 3 The Large Synoptic Survey Telescope portal, showing job monitoring portlet was built by Greg Daves, NCSA.



**Figure 4** CIMA crystallography portal is being built by Hao Yin and Mehmet Nacar of Indiana University in collaboration with Rick McMullen's NMI-funded CIMA project. The CIMA portal helps crystallographers manage data and monitor experiments remotely.



**Figure 5** The TeraGrid User Portal, built by Eric Robert of TACC, serves the entire TeraGrid user community and helps them manage credentials, monitor allocations, and view dynamic resource information such as machine loads.



**Figure 6** RENCI Bioportal, a TeraGrid Science Gateway developed by the RENCI team at the Renaissance Computing Center uses OGCE software to provide access to more than 100 bioinformatics codes as well as standard data sets.

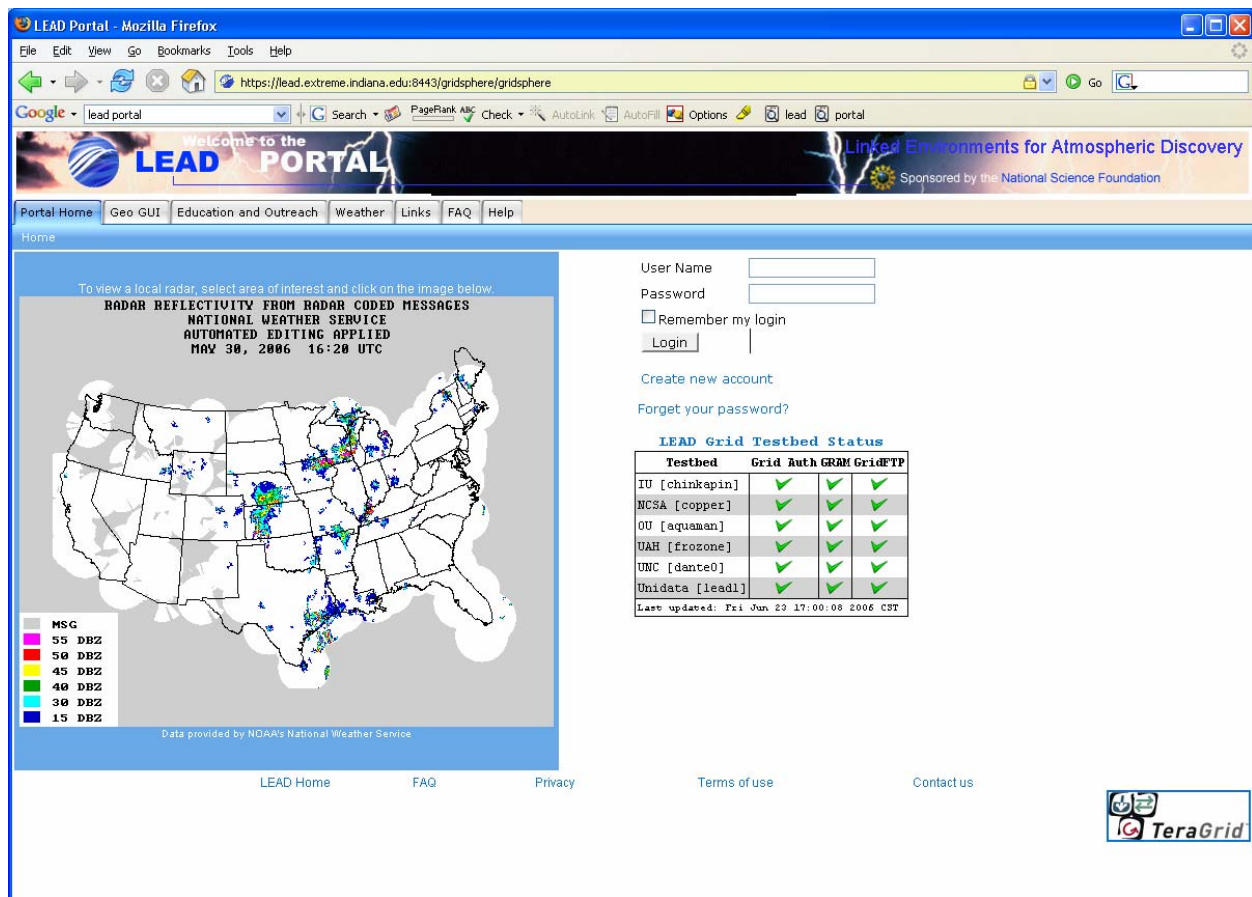


Figure 7 LEAD Portal, a TeraGrid Science Gateway built by Marcus Christie, Suresh Marru, and other members of the Indiana University team using OGCE software.

## 2. Project Organization

The OGCE members hold weekly teleconferences and have frequent meetings at Global Grid Forum and Supercomputing. We maintain a project website, [www.collab-ogce.org](http://www.collab-ogce.org), that links project information and software downloads. We maintain two mailing lists: [internal@ogce.org](mailto:internal@ogce.org) and [discuss@ogce.org](mailto:discuss@ogce.org) for communications with developers and users. Our CVS code base and the mailing lists are maintained by Argonne National Laboratory.

We have recently been approved as a dev.globus proto-project and will reorganize our code repository, software version control system, mailing lists, and project structure to take advantage of these facilities.

## 3. Participants

### 3.1. University of Chicago/Argonne National Laboratory

Participant	Role	Responsibilities
Gregor von Laszewski	Principal Investigator	Management of the portion of the project conducted at University of Chicago. He leads the development of

		the Java CoG Kit and designed significant changes to its core components in order to foster the needs of OGCE. He helped on the outreach to groups within ANL and facilitated the approval of OGCE as part of dev.globus.
Mihael Hategan	Developer	Development of the components to interface the Java CoG Kit with multiple Globus toolkit versions. In all this reduced significantly the amount of time others had to spend because adaptations to new Globus Toolkit versions. Development of a Grid workflow framework that allows the use of multiple Globus Toolkit versions.

### 3.2. Indiana University

Participant	Role	Responsibilities
Marlon Pierce	Principal Investigator	Project management, velocity portlet development, portal build and test framework development.
Dennis Gannon	Co-Investigator	Advanced portal and service design for science application support (see deliverables), TeraGrid and LEAD project liaison, GGF steering committee membership,
Geoffrey Fox	Co-Investigator	Outreach, collaboration technologies, participation in GGF and UK e-Science steering committees.
Beth Plale	Co-Investigator	Data services and portlet development, GGF steering committee membership
Marcus Christie	Developer	Velocity portlet and tool development, unit test development, maven integration.
Sangmi Lee	Developer	LEAD OGSA-DAI user interface development
Mehmet Nacar	Developer	Java Server Faces development, Globus administration, portal testing
Gopi Kandaswamy	Grad Research Asst..	Application Factory Service
Liang Fang	Grad Research Asst.	Security Portlets
Subashini Periyasami	Grad Research Asst..	LEAD

Hao YIN	Developer	CIMA portlet/portal development
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### 3.3. University of Michigan

Participant	Role	Responsibilities
Charles Severance	Principal Investigator	Project management. Coordination between uPortal, Sakai, NEES, and OGCE. High level design and architecture.
Joseph Hardin	Co-investigator	Research applications of Sakai.
Beth Kirschner	Developer	Liaison to the NEES project for OGCE. Primary developer and lead for Sakai WSRP activity. Primary lead for internationalizing Sakai.

### 3.4. NCSA/University of Illinois

Participant	Role	Responsibilities
Jay Alameda	Principal Investigator	Project management, TeraGrid liaison, LEAD liaison, CORE NCSA liaison
Joe Futrelle	Co-Investigator	Project management, Tupelo development, science community engagement, NEES engagement. Tupelo is a generalization of the NEESGrid metadata system.
Joel Plutchak	Developer	Tupelo development
Shawn Hampton	Developer	Developer and maintainer of Trebuchet desktop file management tool, desktop development frameworks, service architecture
Albert L. Rossi	Developer	Developer and maintainer of Open GCE Runtime Engine (OGRE), service architecture, maven, NCSA tools and NCSA notification systems
Greg Daues	Developer	Science community engagement, portlet-OGRE integration, portlet development

### 3.5. San Diego State University

Participant	Role	Responsibilities
Mary Thomas	Principal Investigator	Project Management; developer of Portlets, and WSRF services; taught grid computing classes; portlet architecture research (AJAX)



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### 3.6. Texas Advanced Computing Center

Participant	Role	Responsibilities
Jay Boisseau	Co-investigator	Project Management
Eric Roberts	Developer	Portlet development, portal security development, TeraGrid User Portal lead/liaison, maven plugin development, JMeter performance tests; GridPort project manager, tomcat performance configurations
Akhil Seth	Developer	Velocity and JSP Portlet development, Maven packaging; SRB portlet work
Maytal Dahan	Developer	Velocity and JSP Portlet development, maven plugin development, performance and quality testing, GridPort project developer, TeraGrid portal developer

## 4. Collaborations

Our Year 3 activities and deliverables included direct support for collaborating groups. These are extensively described in section 5.1 below. In addition to these direct collaborations, we provide support and maintain collaboration with several portal groups around the world through our mailing lists. A sample list is available through <http://www.collab-ogce.org/ogce2/ogce-portals.html>.

## 5. Activities and Findings

### 5.1. Supporting Collaborative Communities

Activity	Description
NMI CIMA Portal Development and Support	The OGCE interacts very closely with the NSF NMI funded CIMA project to develop the CIMA Crystallography portal. This portal was designed and built by M. Nacar, H. Yin, and M. Pierce (all from IU) in direct collaboration with the CIMA team. This collaboration has led to the current production version of the CIMA crystallography portal and its packaging for distribution at CIMA collaboration sites. We have also submitted a joint paper on this project to GRID 2006.
VLAB Portal Support	The OGCE team is helping to develop the VLAB portal to support the NSF ITR-funded Virtual Laboratory for Earth and Planetary Materials. This effort is led by M. Pierce and includes the development of Grid Faces tag libraries by M. Nacar to simplify Grid portlet development. This effort was described in our joint submission to the GCE 2005 Workshop; see "Conference Publications" below for bibliographic

	information. VLAB has recently been added to the TeraGrid Science Gateways.
LEAD	The OGCE has provided the foundation for the LEAD Portal that is being deployed as part of the “Linked Environments for Atmospheric Discovery – an NSF large ITR. This project is building tools that are designed to enable adaptive, real-time prediction of Tornados and Hurricanes and a platform for experimental research in atmospheric science.
Teragrid	The OGCE project has provided portal frameworks and tools that are used extensively throughout the Teragrid Gateway project. This includes the LEAD gateway, the Teragrid User Portal, the RENCIBioportal and the Texas Flood modeling gateway.

## 5.2. Deliverables

### 5.2.1. Project-Wide Software Deliverables

We worked this year to develop higher level programming interfaces for grid portal development. Our tools of choice are based on Java Server Faces (JSF), JSF/JSP tag libraries, and Java Beans. All of these tools wrap the Java COG Kit. Java Server Faces was chosen, among other reasons, for its clean separation of backing code from the Servlet API.

Group	Grid Server Faces (GSF) Deliverable	Completion %
Indiana, Chicago	Integration of CoG Karajan XML markups into GSF to support workflow descriptions.	90%: We developed JSF TaskGraph libraries and sample user interfaces. These wrap the CoG’s taskgraph workflow system. We have integrated this with the VLAB and CIMA portal projects for field testing and are examining its use for the LSST/Dark Energy portal work. We will package this for general release before the close of Year 3.
Indiana	Abstract data models for MyLEAD/OGSA-DAI and GridFTP	75%: GridFTP abstractions are included in the TaskGraph libraries. We developed prototype MyLEAD/OGSA-DAI models.
SDSU	GridPort 4 portlets: SRB, GPIR developed using abstract data models and portlet display components. AJAX investigations.	SRB v1 90% complete, still need to add meta data; all portlets use AJAX technologies - ongoing; GPIR portlet redesign to use WSRF 30% complete.
TACC	GridPort 4 portlets: GPIR, GRAM Job Submission, Comprehensive File Transfer, Condor Job Submission. Use of reusable	All Portlet functionality is 100% complete, adding automatic testing capabilities for each GridPort

	interface components throughout these portlets.	portlet is ongoing and expansion of maven targets for simple install and deployment is ongoing as well.
NCSA	Tupelo tag libraries for inclusion in task graph libraries.	This deliverable is delayed due to substantial architectural change for Tupelo 2.0 (which is no longer a grid service, but rather a toolkit for managing data across heterogeneous services, with standard service front-ends). As this work matures, exactly what tag libraries need to be built will become clearer.
Chicago	Globus Toolkit integration and testing	70% complete. The Globus Toolkit is steadily evolving and has changed several times its protocols and APIs. We have provided abstractions that make is much more simple to use Grid infrastructure for portal developers.
UM	To the extent possible move Sakai tools from Velocity to JSF. Work with uPortal to insure strong support for the JSF-JSR-168 connector.	The activity and effort to port Sakai tools from Velocity to JSF was altered to focus on WSRP efforts. The Sakai Velocity tools currently have better support for WSRP than the JSF tools. WSRP support for Sakai was included as a provisional capability in the Sakai 2.1 release in December 2005. The provisional WSRP support needs further work before it is production ready. Part of the problem is the poor cross-vendor interoperability of WSRP and lack of WSRP support for the current primary OGCE portal (GridSphere). Because of these we have focused more effort on the Sakai JSR-168 portlets which work well across many portal containers.

### 5.2.2. Project Wide Technical Outreach Deliverables

Our major deliverable in Year 3 was based on outreach and support for various collaborating portal communities. This is summarized below (table taken from Year 2 annual report).

Grid	Project Lead	OGCE	Deliverable	OGCE	Completion %
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Portal Project		Developer(s)		Feedback	
TeraGrid User Portal	Charlie Catlett, ANL (catlett@mcs.anl.gov)	TACC: Eric Roberts, Maytal Dahan (Other non-OGCE funded: Jay Boisseau, Patrick Hurley)	Use OGCE as base install, meet TeraGrid security requirements.	OGCE inherits TeraGrid security framework and user tools, including portal single sign-on and potentially PURSe.	100%: Portal is available at <a href="http://portal.teragrid.org">http://portal.teragrid.org</a>
TeraGrid LEAD Portal Gateway	Kelvin Droegemeier, University of Oklahoma (kkd@ou.edu)	Indiana: Dennis Gannon, Beth Plale, Marcus Christie, Sangmi Lee	Metadata directory service; workflow and experiment builder portlets; case-based reasoning portlets.	OGCE inherits LEAD advanced services for science application and data management.	100% for portal. Application factory services, workflow tools and metadata management tools are currently being packaged for OGCE release.
SCEC Portal	Reagan Moore, SDSC (moore@sdsc.edu)	SDSU: Mary Thomas, Ray Regno	SRB portlet integration to support the digital libraries project.	Field tested SRB portlets given back to other developers like the European Data Grid.	100%. SRB portlets were contributed back to OGCE and are in the current release.
TeraGrid TGviz Portal Development	Mike Papka, Joseph Insley, Argonne National Labs (papka@mcs.anl.gov)	Chicago: Gregor von Laszewski	Assist in the use of the OGCE portal technology.	OGCE gains valuable deployment experience by supporting this group. Portlets for integration with native applications.	
NMI CIMA	Rick McMullen,	Indiana: Marlon	Develop core Grid	OGCE inherits	100%: CIMA portal converted

Project	Indiana University	Pierce, Mehmet Nacar	infrastructure and Geographical Information System portlets and services to support the NMI Sensors Project. This will leverage Year 2 deliverables.	Sensor project's advanced authorization schemes and gets customers for its GIS portlets.	to JSR 168 framework by OGCE developers and is in deployment. CIMA-OGCE collaborators also have deployed the CIMA portal for Australian university collaborators.
VLAB	Renata Wentzcovitch (wentzcov@ce.ms.umn.edu)	Indiana: Marlon Pierce, Mehmet Nacar	Develop portlet services to manage molecular dynamics simulations.	The VLAB project has close connections with European Data Grid members. We can test our workflow and SRB portlets on new applications.	100%: The VLAB portal is currently running at <a href="http://kamet.ucs.indiana.edu:8080">http://kamet.ucs.indiana.edu:8080</a> . Portlets were built using Grid Server Faces libraries developed by Nacar. Computational resources include both TeraGrid and non-TeraGrid resources.
TeraGrid Flood Modeling Gateway	Bill Barth, bbarth@tacc.utexas.edu	TACC: Maytal Dahan	Develop portal interface to Flood Modeling application backend using OGCE portal technology	OGCE inherits interfaces and tools.	100%: Initial prototype is complete and has been previewed by users for further evaluation and requirements gathering
TIGRE User Portal	TACC, Texas A&M University, Texas Tech,	TACC: Maytal Dahan	Use OGCE as base install, meet TIGRE	OGCE inherits grid application interfaces	100%: The TIGRE portal is available from <a href="http://tigreportal">http://tigreportal</a>

	Rice, University of Houston		security requirements.	and tools	<a href="http://hipcat.net">hipcat.net</a>
LSST and Dark Energy Portals		NCSA: Jay Alameda and Greg Daues	Uses OGCE grid tools developed at NCSA	OGCE tools tested in production environment	Ongoing collaboration, prototype completed
MAEViz Portal		NCSA: Joe Futrelle	Uses NCSA Tupelo services.	Portlet tag libraries for accessing Tupelo services	Ongoing collaboration.
ReDReSS (Resource Discovery for Researchers in e-Social Science)	Dr. Robery Crouchley (r.crouchley@lancs.ac.uk)	Umich: Charles Severance	Provide support for integrating Sakai and uPortal as well as technical guidance on tools being developed for the researchers.	Work Complete	<a href="http://esc.dl.ac.uk/Sakai/">http://esc.dl.ac.uk/Sakai/</a>  <a href="http://redress.lancs.ac.uk/">http://redress.lancs.ac.uk/</a>
NanoHub	Dr. Krishna Madhavan (cm@purdue.edu)	Umich: Joseph Hardin, Charles Severance	Provide support to integrate Sakai into the nanohub's Mambo-based portal.	Work complete.	<a href="http://www.nanohub.org/">http://www.nanohub.org/</a>
NEESit	Dr. Yael "Lelli" Van Den Einde (lellivde@sdsc.edu)	UMich: Beth Kirshner	Port NEESGrid software from CHEF to Sakai. Investigate the application of OGCE technologies for NEESit	The OGCE work was completed and is available to the NEES community. The NEESit team chose to rebuild the NEES software infrastructure without using portal	<a href="http://it.nees.org/">http://it.nees.org/</a>

				technology.	
DOE Blue Gene	Susan Coughlan	Gregor von Laszewski	Experimental interfaces to the Cobalt Queuing system	We are evaluating the possibility of designing portable Queue Monitoring portlets for Cobalt	Completed: 5%

### 5.2.3. University of Chicago Deliverables

Description	Completion %
Develop a service to access Karajan Workflows	We have delivered a prototype using gridmap technology. Completed 80%
Develop a portlet to access the Karajan Workflow	Integration with myproxy needs to be completed. Completed 0%.
Investigate the possibility to integrate the GUSS portlets into the OGCE release	Due to a redesign GUSS this activity has been assessed no longer necessary. However, we did complete the activity to 100%. It has been transitioned to dev.globus and Lee Liming is now extending our original work
Work together with the UC TeraGrid group to assist in reusing OGCE technology	As part of the overall team we have communicated with several members of the team and as collective success TG has adopted OGCE.
Maintain the Java CoG Kit and enhance it for upcoming changes to the Globus Toolkit.	This work took most of our time as again many changes took place in the Globus toolkit. We prevented that the whole team needed to modify the software on several places. Instead the modifications were captured by us and through the reuse almost no changes were necessary. Outstanding tasks are a) integration with RLS b) integration with MDS. The MDS was not available till recently in production form. It also played a minor role in this project as GPIR was available to us. Completed 80%
Develop a testing framework for the Java CoG Kit.	We have developed a testing Framework for job submission and gridftp. It is to 100% complete and included as part of the Java CoG Kit Karajan workflow. However it needs

	to be deployed and tested on production grids such as TG and VOMS. This task has not yet started.
Release a new version of the Java CoG Kit for OGCE with maven integration.	We have released a new version of the Java CoG Kit that includes jar files that can be picked up from maven based installers. 100% completed. As part of this development, we are evaluating if a transition to an entire maven based install process would be of benefit for the Java CoG Kit. This task has not yet been started, as the solution provided by us proved sufficient for the OGCE project.
<b>Additional Deliverables</b>	
Maintenance of Source code repositories	100% completed

#### 5.2.4. Indiana Deliverables

Description	Completion %
Investigate portal security using key chains.	
Assist TACC with investigation of PURSE for credential registration.	Completed. PURSe portlets were developed and released through OGCE. TACC investigation completed but system was not used in production user portal.
Investigate more portal services and lightweight containers for display services, content management.	100% We implemented client tag libraries for Indiana University's WS-Context as a lightweight metadata management system. This was performed in collaboration with the NSF-funded VLAB collaboration.
Maintenance and enhancement of existing components: GlobalMMCS clients, and GIS client portlets and services.	50% GIS portlets were integrated into QuakeSim Earthquake portal; GlobalMMCS server side undergoing complete revision so associated portlet development is on hold.
Application factory service for wrapping legacy code as a web service	100%. Used in the LEAD portal and adopted for use by the Renci Bioportal. Basis for PhD thesis by Gopi Kandaswamy (defended June 2006)
Capability manager – a web service framework for authorization based on a capability token system	100%. Used in the LEAD portal. Basis for Ph.D. thesis by Liang Fang (defended May 2006)
Geo Search Portlet – a portlet that allows query formation based geographic regions selected by the user from a map.	100% Used as one of the input modes on the LEAD portal.
MyLEAD metadata directory portlet – a metadata directory browser.	90% Alpha test in progress.
Experiment Builder Portlet – a tool to configure	90% Alpha test in progress.



the inputs to a workflow and store experimental metadata in MyLEAD	
Workflow composer – an applet/webstart application that allows users to graphically compose workflows for execution with a BPEL-based workflow engine	70% Alpha test to begin in Aug.
<b>Additional Deliverables</b>	
PURSe portlet development	100%: This was completed and the release is linked through the OGCE web site.
OGCE Web Site revision	100%: This was completed by TACC and IU.
OGCE software build system revision	100%: This was completed by TACC and IU.
Portlet and tag library development	100%: We developed portlet and tab library interfaces for interacting with WS-Context services for metadata management.

### 5.2.5. University of Michigan Deliverables

Description	Completion %
Work with the rest of the OGCE team to produce an OGCE release in Year 3 which includes Sakai Collaboration tools out of the box. There is a great deal of effort involved in this deliverable as it involves adding WSRP and then JSR-168 capabilities to Sakai and then performing the uPortal integration so that Sakai tools naturally appear as uPortal channels.	This was completed. The JSR-168 portlets are part of the OCSE2 release and also part of the Sakai out of the box release as of Sakai 2.1 in December 2005. These portlets work with uPortal, GridSphere, and other JSR-168 portlets. WSRP Producer support is available in Sakai 2.1 as well. The JSR-168 Sakai portlets are in use at a number of sites - because of interoperability problems, WSRP deployment and use has not happened to date.
<b>Additional Deliverables</b>	
Participate in the JSR-286 Expert Group	Charles Severance is a member of the JSR-286 portlet specification version 2.0 group. This group is meeting throughout 2006 and hopes to deliver the specification sometime on 2007. The 286 specifications will significantly improve the portlet interface and be highly coordinated with the WSRP 2.0 effort as well.
Internationalize Sakai	This has been an ongoing effort since early in 2005. Sakai is now available in seven languages with more languages coming soon. The primary activity has been to coordinate the localization activity and make changes to Sakai to better support internationalization. As an example, Sakai in the current release now allows each user to have a different language. Prior versions of Sakai only

	supported one language for an entire Sakai site.
Use the NMI Testbed to Test the Sakai Builds	This is 25% complete. Initial work was completed by the builds are not yet automated.
Liaison to the Fedora User Community	This is ongoing activity led by Beth Kirschner. The goal is to exchange data between Fedora and Sakai. To date, this has resulted in some prototype software and attending the Sakai and Fedora User's meetings and directing Birds of a Feather Sessions.
Liaison to the uPortal / JA-Sig community	Charles Severance is now a member of the Sakai Foundation board of directors that meets regularly with the JS-Sig board of directors to coordinate cross-project activity. We have attended uPortal developer meetings and conferences as well to maintain the relationship.

### 5.2.6. NCSA Deliverables

Description	Completion %
Tupelo 1.1 release -- September 30, 2005. New features will include full RDF-OWL import/export, optimized Oracle support.	100% This is available through <a href="http://www.collab-ogce.org">www.collab-ogce.org</a> and from <a href="http://dlt.ncsa.uiuc.edu/wiki/index.php/Main_Page">http://dlt.ncsa.uiuc.edu/wiki/index.php/Main_Page</a> . Tupelo 2.0 is undergoing a major redesign.
Will port Tupelo from OGSi 3.2.1 to WSRF or other GSI-supporting Web Services framework.	Not applicable. Tupelo 2.0 is no longer a grid service.
JSF-based Tupelo administration portlet	Not applicable. Plans for an administration portlet have been dropped.
Tupelo-based archiving support for molecular dynamics applications in collaboration with Scott Parker/NCSA and the NANOGROMACS project.	With the change in architecture for Tupelo 2.0, this deliverable has been deferred and will be revisited as to its future applicability.
Job Broker – developed in collaboration with LEAD ITR Further refinement of desktop components and remote OGRE portlets	50% We have a prototype service and desktop components available at <a href="http://torcida.ncsa.uiuc.edu:8080/confluence/dashboard.action">http://torcida.ncsa.uiuc.edu:8080/confluence/dashboard.action</a>

Further refinement of data-service integration, in support of advanced applications (in collaboration with LEAD and with Scott Parker)	50% We have adopted an enterprise service bus, ActiveMQ, as the hub for our data/event/logging systems, using RDF Triples as the payload for the JMS messages. This facilitates further integration with advanced data services such as Tupelo2 and MyLead, as well as opens opportunities to interact with other messaging systems (e.g., WS-Eventing systems)
<b>Additional Deliverables</b>	
NCSA hosting RENCIBioportal	100% NCSA and RENCIBioportal collaborated to install an NCSA version of the RENCIBioportal software. <a href="http://bioportal.ncsa.uiuc.edu">http://bioportal.ncsa.uiuc.edu</a>

### 5.2.7. San Diego State University Deliverables

Description	Completion %
GridPort4 development, including GP portal bundle (w/TACC)	100%. GridPort 4.1 release was completed including SRB portlet integration, Note: In April, 2006, the GridPort and OGCE frameworks were merged into a single toolkit. This had some impact on deliverables, and is addressed below.
Automating portal configurations using Web portal interface (w/TACC)	GridPort and OGCE frameworks have been merged, and this project is no longer needed
Portals: SCEC, Fusion Data Grid Portal	The SCEC portal is 100% completed and in daily operation. The Fusion portal demonstration was 100% completed and turned over to the Fusion Grid project for development. Note: the FG project ended in 2006, and is undergoing review for extension.
Portlet Interfaces: SRB/Data, Geophysics viz/sensor.	The SRB portlets are 100% complete, including AJAX technologies, and interfaces to WSRF based services. The Geophysics portal was never funded.
Technology Investigations: AJAX/CSS, WSRF/GT4, Performance	AJAX for SRB portlets – 100% complete. Continuing to work with WSRF services.
<b>Additional Deliverables</b>	
Python portal frameworks	SDSU investigated both the Zope and the TurboGears portal frameworks as interfaces to the WSRF based PyGlobus Toolkit. However, neither of these frameworks was easily modified for grid portals.
SDSU Flame Grid, Bio Grid, Ocean Modeling projects	Working with SDSU researchers to develop WSRF services and portal interfaces to these research projects. These efforts will continue through 2007.

### 5.2.8. Texas Advanced Computing Center Deliverables

Description	Completion %
GP4 development, including GP portal bundle (w/SDSU)	100%: GridPort 4.1 is currently release and has been downloaded by a variety of users. The bundle includes various job submission, file management, GPIR and SRB portlets and has a demo portal and quick start download for simple install and configuration.
Automating portal configurations using maven (w/SDSU)	100%: A GridPort maven plugin has been developed to automate the configuration and installation of the portlets into a fully functional demo portal.
Portals: TeraGrid, TIGRE, SURA, and TACC	100%: The TeraGrid, TIGRE, SURA and TACC portal are all in production and based on GridPort technology.
Portlet interfaces: general bioinformatics, remote visualization	50%: Developed alpha quality remote visualization portlet interface that interfaces with the TeraGrid visualization resource Maverick and is part of the Flood Modeling Gateway prototype
Technology Investigations: Advanced Maven capabilities, performance, WSRF/GT4	33%: Utilized many different performance enhancement techniques for the TeraGrid User Portal including load balancing of multiple Tomcat web servers, database connection pooling, and load testing with JMeter.
<b>Additional Deliverables</b>	
Assisted international collaborators with development of portlet interfaces to computational chemistry applications	100%: helped with design and architecture of Gaussian and NWChem portlets for submitting jobs and visualizing output. Collaborators used GridPort 4 as basic portal for development.

### 5.2.9. Community Service and Outreach Deliverables

Description	Completion %
Organize and lead the restarted Grid Computing Environments (GCE) group in the GGF. We will lead meetings at GGF 14-16.	100%: We organized a GCE meeting at GGF 14. For GCE 15 we organized a portal workshop. Details are available from <a href="http://www.collab-ogce.org/GGF15Workshop/">http://www.collab-ogce.org/GGF15Workshop/</a> . Instead of GGF 16, we organized the GCE 2005 workshop at SC2005.
Continue to participate in GGF at all levels (on steering committees, in related working groups such as SAGA).	100% See outreach for more details. We organized working group meetings and workshops, and participated on the steering committee.

Continue our participation in the TeraGrid Science Gateway projects.	100%: The TeraGrid portal came on line in May 2006. The LEAD portal is one of the 10 initial science gateways, and the VLAB portal was recently added.
Participate actively in Supercomputing 2005. We will give OGCE and related demonstrations at various booths. We will also submit posters and tutorials.	100%: We organized several demos at TACC, IU, NCSA, and Argonne booths. We also organized the GCE 2005 workshop.
Pursue Grid portal tutorial opportunities: we have applied to do a tutorial at Supercomputing	100%: We gave tutorials at GGF 15 and the Tapia conference.
If selected, write a book on Grid Portal development. Gannon and Pierce have submitted a proposal to Elsevier that involves members of the OGCE and others in the community.	100%: The book was accepted for publication. Editors Gannon & Pierce have completed the outline and have collected rough drafts of all chapters. Most PI's and senior personnel from OGCE are contributing authors.
Write and submit articles to appropriate peer-reviewed Grid computing journals.	100%: Our description of the OGCE project was accepted for publication in the special "Science Gateways" issue of <i>Concurrency and Computation: Practice and Experience</i> . Other publications are described below.
Continue to build grid program at SDSU by teaching follow-on grid computing class in Spring 2006.	This class was delayed due to funding and time limitations, but has been rescheduled for Spring 2007.
<b>Additional Deliverables</b>	
I533 Seminar Course for Indiana University School of Informatics	Pierce, Plale, and Fox gave lectures in this series. Topics included Grid technology, Portals and Portlets, Web Services, and data management services, and e-science.

## 6. Products, Software, and Websites

### 6.1. OGCE2 Portal

The OGCE2 series of software releases is based on the JSR 168 portlet standard and is distinguished from our OGCE1 series in Year 1.

#### 6.1.1. Version 1.0 Release

We released JSR 168 versions of our Grid portal suite, including GPIR, GridFTP, Job Submission, and Proxy Management. These portlets used the portal-compatible Java CoG 4.x series to provide support for Globus Toolkit version 2.4 and 4.0 releases. Versions 1.0.0, 1.0.1, and 1.0.2 were released during Year 2. Additional information is available from <http://www.collab-ogce.org/ogce2/ogce2-1.0-download.html>.

### **6.1.2. Version 2.0 Release**

Led by the TACC and Indiana teams, we completed a major revision of our installation and packaging system. The current OGCE2 2.0 release includes all software (OGCE portlets, GridPort services, and third party tools such as Sakai and GridSphere) needed to set up a Grid portal and Science Gateway in a single installation package.

In addition to the core Globus Toolkit portlets we have developed in OGCE2 1.0, the 2.0 release also contains several new portlets including

- Storage Resource Broker portlet:
- Condor portlets: these work with Condor 6.7's BirdBath SOAP/WSDL enabled services.
- Sakai bridge portlets: these use Web Services to manage connections between the Sakai portlet and remote Sakai services.

## **6.2. Tupelo Metadata Services Releases**

### **6.2.1. Version 1.1**

Tupelo v1.1 was released on September 30, 2005 (available at <http://dlt.ncsa.uiuc.edu/wiki/index.php/1.1>), and includes OWL export, optimization of Oracle and MySQL, and support for ssh-based data transfers. No further 1.x releases are planned, due to the architectural changes for v2.0

### **6.2.2. Version 2.0 Pre-release**

Tupelo v2.0 pre-release is available as a preview at [http://dlt.ncsa.uiuc.edu/wiki/index.php/Tupelo\\_2](http://dlt.ncsa.uiuc.edu/wiki/index.php/Tupelo_2). Tupelo 2 is no longer a grid service, but rather is a toolkit for managing data across heterogeneous services, with standard service front-ends. Tupelo 2 is implementing the JSR-170 Java Content Management standard. We have a sample JSP application that merges information from 2 URIQA services; these examples will be ported to JSF.

## **6.3. PURSe Portlets Release 1.0**

The PURSe Portlet system works as a client interface to the NMI PURSe Grid credential account management system. These portlets were designed using Java Server Faces as part of our Grid Faces project. Additional information is available here:

<http://www.extreme.indiana.edu/portals/purse-portlets/index.html>.

## **6.4. GPIR 1.2.2 Releases**

The GridPort Information Repository (GPIR) provides portals and other potential clients with their data persistence needs that are catered to portal users. GPIR provides a mechanism to store static data about a grid – such as machine names, CPUs, machine description – and dynamic data such as queue information, load, status – in a readily accessible database with easy to use web service interfaces. Dynamic data such as job queue information is updated via a GPIR web services ingester and static data such as machine name is updated through an administrative web client. The GPIR 1.2.2 release is available to the public and easy to configure, install and download. It contains the GPIR service and a set of custom providers that can be installed on remote resources to help gather the data required for GPIR. Currently, GPIR 1.2.2 is being used

in the TACC User Portal, TeraGrid User Portal, SURA Portal, TIGRE Portal, and other portal that are now in production.

## 6.5. OGCE Web Site Revision

TACC and Indiana team members completed a complete revision of the OGCE website, [www.collab-ogce.org](http://www.collab-ogce.org). The revised site is built with the Maven 1.0.2 XDoc tool. This allows us to easily distribute the task of managing, updating, and controlling revisions to the content of the Web site, which has been checked into the OGCE CVS repository.

## 7. Training and Outreach

Activity	Description
GCE Working Group Meeting at GGF 14, June 26-30, 2005.	OGCE members reorganized the GCE working group meeting for GGF 14. Our primary activity was planning the upcoming GCE Workshop at Supercomputing 2005. See <a href="http://www.gridforum.org/ggf_events_ggf14.htm">http://www.gridforum.org/ggf_events_ggf14.htm</a> for additional information.
Science Gateways Meeting at GGF 14, June 26-30, 2005	Several OGCE members participated in the Science Gateways workshop. These included both presentations by M. Pierce on the OGCE project and presentations by OGCE-supported portals such as LEAD and the North Carolina Biportal effort. Additional information is available from <a href="http://www.gridforum.org/GGF14/ggf_events_next_schedule_Gateways.htm">http://www.gridforum.org/GGF14/ggf_events_next_schedule_Gateways.htm</a> .
Science Portals Workshop at GGF 15, October 3-6, 2005	OGCE members M. Pierce, D. Gannon, C. Severance, and J. Futrelle organized the workshop, "New Technologies for Science Portals." The workshop included 5 presentations and supplemental material. Additional information is available from <a href="http://www.collab-ogce.org/GGF15Workshop/">http://www.collab-ogce.org/GGF15Workshop/</a> .
Richard Tapia Conference, October 19-22 2005	M. Pierce gave a tutorial on portals and portal software in the "Cyberinfrastructure" workshop of the 2005 Tapia Conference. For additional information, see "Presentations" below and <a href="http://www.ncsa.uiuc.edu/Conferences/Tapia2005/workshop_abstracts_and_bios.html">http://www.ncsa.uiuc.edu/Conferences/Tapia2005/workshop_abstracts_and_bios.html</a> .
GCE Workshop at Supercomputing November 18, 2005.	OGCE members M. Thomas and M. Pierce helped organized the first GCE Portals Workshop, and several OGCE members assisted as technical committee members. The workshop included five presentations in the plenary session and sixteen poster presentations. The workshop was attended by over 50 participants. Additional information is available from <a href="http://pipeline0.acel.sdsu.edu/mtgs/gce05/">http://pipeline0.acel.sdsu.edu/mtgs/gce05/</a> .
I533 Indiana University Seminar on Chemical Informatics	M. Pierce gave a series of three lectures on Grid computing, science portals, and Web Services for IU's I533 seminar course. Additional information is available from <a href="http://www.indiana.edu/~cheminfo/I533/533home.html">http://www.indiana.edu/~cheminfo/I533/533home.html</a> .
Teragrid 2006	Participation in the Gateways tutorials at the Teragrid 2006 conference, Indianapolis June 2006, as well as the Teragrid Institute Tutorials
SC06 Workshops Chair	Thomas is serving as the Chair for SC06 Workshops. She is in charge of the program committee and organizing the program schedule for SC.

## 8. Publications

### 8.1. Presentations and Posters (Chronological Order)

- Charles Severance, Sakai Update, Virtual Research Environments Workshop, June 22, 2005 Manchester, UK.
- M. P. Thomas, J. Burruss, L. Cinquini, G. Fox, D. Gannon, L. Gilbert, G. von Laszewski, K. Jackson, D. Middleton, R. Moore, M. Pierce, B. Plale, A. Rajasekar, R. Regno, E. Roberts, D. Schissel, A. Seth, and W. Schroeder Poster on [Grid Portal Architectures for Scientific Applications](#) for SciDAC 2005 [meeting](#) June 26-30 2005 San Francisco.
- Marcus Christie, LEAD Portal: a TeraGrid Gateway and Application Service Architecture, GGF 14 Science Gateways Workshop, June 28 2005, Westin Michigan Avenue, Chicago, Illinois.
- Marlon Pierce [Grids and Portals for VLAB](#) VLAB Workshop, University of Minnesota July 21-23.
- Marlon Pierce [Portals, Portlets, and Clients to Grid Services](#) IRIS Web Services Workshop, Monterey CA, September 21-23.
- Marlon Pierce [Using AJAX](#) at [GGF 15 Portals Workshop](#), October 3-6 2005, Boston, MA.
- Marlon Pierce [A Portal Architecture Review](#) at [GGF 15 Portals Workshop](#), October 3-6 2005, Boston, MA.
- Marlon Pierce [Integrating Geographical Information Systems and Grid Applications](#) at [GGF 15 GIS Grid Workshop](#), October 3-6 2005, Boston, MA.
- Charles Severance, Using the Sakai Collaborative Toolkit in eScience Applications at GGF 15 Portals Workshop, October 3-6 2005.
- Suresh Marru, Grid Computing for Real World Applications, Oklahoma Supercomputing Symposium 2005, October 5th 2005, University of Oklahoma at Norman.
- Marlon Pierce [Building Web Portals as Science Gateways](#) Richard Tapia Conference, October 19-22 2005, Albuquerque, NM.
- Dennis Gannon, "Predicting Tornados with Data Driven Workflows: Building a Service Oriented Grid Architecture for Mesoscale Meteorology Research", co-authored with Beth Plale, Microsoft e-Science workshop, Oct. 2005.
- Jay Alameda, "Web Services Experiences in the Linked Environments for Atmospheric Discovery (LEAD) ITR Project", panel presentation/discussion for panel "State of the Art in Web Services for Ocean Science", OOSTech2005 "Web Services for Interoperable Ocean Science", October 24-26, 2005.
- OGCE Collaboration posters for SC05 November 12-18 2005 Seattle
  - [OGCE Architecture: Portlets and Services for Science Gateways](#)
  - [OGCE Tools Support Collaboration, Data Management, and Application Development](#)
  - [OGCE Portal Applications for Grid Computing I](#)
  - [OGCE Portal Applications for Grid Computing II](#)
- Dennis Gannon, Keynote Presentation, "Lessons Learned While Building Grids: a View of Some Research Challenges" co-authored with Beth Plale. International Grid Workshop 2005, held in conjunction with SC2005, Seattle, Nov. 2005.



- Mehmet Nacar, Mehmet Aktas, Marlon Pierce, Zhenyu Lu, Gordon Erlebacher, Dan Kigelman, Evan F. Bollig, Cesar De Silva, Benny Sowell, and David A. Yuen [VLab: Collaborative Grid Services and Portals to Support Computational Material Science](#) at [GCE'05 Workshop](#) on Grid Computing. Seattle, WA. November 18 2005.
- Jay Alameda, Shawn Hampton, Brian Jewett, Albert Rossi, Bob Wilhelmson. Ensemble Broker Service Oriented Architecture for LEAD at 22<sup>nd</sup> International Conference on Interactive Information Processing Systems for Meteorology, Oceanography, and Hydrology, American Meteorological Society 2006 Annual Meeting, Atlanta, Georgia. January 28-Feb 2, 2006.
- Marlon Pierce [Building Web Portals as Science Gateways](#) at [I533 Seminar](#) in Chemical Informatics: Molecular Informatics, the Data Grid, and an Introduction to eScience [March 2 2006](#). Pierce also gave lectures on Grid computing and Web Services.
- Mehmet Nacar [JSF Custom Grid Tags](#) March 2006 VLAB Meeting, Florida State University.
- Charles Severance, Collaborative eScience: Evolving Approaches, Rutgers Internet2 Day, New Brunswick, NJ - April 4, 2006
- Marcus Christie, TeraGrid Science Gateways Tutorial; Using the LEAD Portal, Accelerating Research with Grid Computing, A Workshop for Researchers at Montana State University & Lariat-West Partner Institutions, April 14, 2006, Montana State University, Bozeman, Montana
- Dennis Gannon, Keynote Presentation, "Opportunities and Challenges for Future Generation Grid Research", the Annual Symposium on Advanced Computing Systems and Infrastructures, Osaka, Japan, May 2006.
- Jay Alameda, Kate Ericson, "TeraGrid Roaming", at TeraGrid Institute Tutorial, TeraGrid 2006, Indianapolis, Indiana, June 12-15, 2006.
- Albert L. Rossi, Shawn Hampton, Emily Wu, Darren Adams, Jay Alameda, "NCSA Trebuchet: A Powerful File Management Interface for TeraGrid", TeraGrid 2006, Indianapolis, Indiana, June 12-15, 2006.
- Jay Alameda, Greg Daues, Shawn Hampton, Brian Jewett, Scott Parker, Albert Rossi, Bob Wilhelmson, "Brokering Metaworkflows", TeraGrid 2006, Indianapolis, Indiana, June 12-15, 2006.
- Jay Alameda, "Disaster Planning and Reliable Software", Technology Presentation at NCSA 2006 Private Sector Program Annual Meeting, June 19-21, 2006.

## 8.2. Books and Book Chapters

- Taylor, E. Deelman, D. Gannon, M. Shields, "Workflows for eScience: Adaptive Workflows for Mesoscale Meteorology", Springer Verlag. To appear Dec. 2006.
- D. Gannon, B. Plale, S. Marru, G. Kandaswamy, Y. Simmhan, and S. Shirasuna, Dynamic, Adaptive Workflows for Mesoscale Meteorology, To Appear in "Workflows for eScience: Scientific Workflows for Grids", Chapter 10,

- P. Kumar, J. C. Alameda, P. Bajcsy, M. Folk, M. Markus, “Hydroinformatics: Data Integrative Approaches in Computation, Analysis, and Modeling”, Taylor and Francis, 2006.
- Work Coordination for Grid Computing in to be published, Gregor von Laszewski, Mihael Hategan, and Deepti Kodeboyina, Argonne National Laboratory, Argonne IL, 60430, USA gregor@mcs.anl.gov, 2006.  
<http://www.mcs.anl.gov/~gregor/papers/vonLaszewski-work-coordination.pdf>.
- Java CoG Kit Workflow in to be published, Gregor von Laszewski, Mihael Hategan, and Deepti Kodeboyina, Argonne National Laboratory, Argonne IL, 60430, USA gregor@mcs.anl.gov, 2006. <http://www.mcs.anl.gov/~gregor/papers/vonLaszewski-workflow-book.pdf>.

OGCE members D. Gannon and M. Pierce are currently editing a book on Grid Portals to be published by Elsevier. This book will include chapters from both OGCE members and collaborators. The working outline is given below.

1. An Brief Introduction to Grids– (Gannon & Pierce)
  - a. What constitutes a Grid? What are the core technologies?
  - b. A close examination of the role of a Grid portal from the end-user’s perspective.
  - c. An overview of the rest of this section and rest of the book.
2. A Portal for Earthquake Engineers: the NEESGrid Portal (Charles Severance and Tomasz Haupt )
3. Atmospheric Sciences and a Portal for Predicting Tornadoes: the LEAD Project Portal. (Marcus Christie)
4. A Gateway for Users to Access the Countries Largest Supercomputer Grid: the Teragrid User Portal (Eric Roberts)
5. A Portal for Geophysics: GEON (Choonhan Youn)
6. BioPortals (Dan Reed & co. )
7. Simulating Earthquakes: the QuakeSim portal (Geoffrey Fox and Pierce)
8. BIRN Portal (Jason Navotny, Geoffrey Grethe, Mark James, Steven Peltier)
9. Telescience Portal (Jason Navotny, Geoffrey Grethe, Mark James, Steven Peltier)
10. Common Features: a review of common architectural components of these portals and the need for interoperability and reusability (Gannon)
11. Portlets Standards Overview: reusable/interoperable components for Grid portals (Pierce)
12. The core portal architecture: JSR-168 based portals (Pierce and Jason Novotny, Michael Russell)
  - a. What is a Portlet
  - b. Portlet Containers
13. Deploying a Basic Portal
 

A close look at what is involved in deploying two of the standard JSR-168 open source containers.

  - a. Gridsphere (Jason Novotny)

- b. uPortal (Pierce or Marcus Christie)
- 14. Writing a Portlet (Pierce)
- 15. Sharing Information Between Portlets (Pierce)
- 16. Programming intro with Java Server Faces (JSF) (Pierce)
- 17. Other solutions: the Web Services for Remote Portlets (WSRP) standard, IFrame Portlets, and support for legacy and non-Java components (Charles Severance)
- 18. The Grid Basics and Grid Portlet Requirements (Gannon)
- 19. Accessing the Globus Grid: Java COG (Gregor von Laszewski)
- 20. Adding Security to a Grid Portal (Liang Fang and Marcus Christie)
  - a. Authentication with MyProxy
  - b. Authorization Portlets
- 21. Programming with the Grid Faces Libraries (Pierce)
- 22. Grid Portlets in GridSphere (Navotny, Russell, Wehrens)
- 23. Portlet Interfaces to Remote Application (Gopi Kandaswamy)
  - a. Dynamically loaded portlet clients
- 24. A Pure Service Container (Pierce)
- 25. Services for Geographic Information Systems (Pierce)
- 26. Sakai-Style: Collaboration/Shared Data Portlets (Charles Severance)
- 27. Portlets for the Storage Resource Broker (Mary Thomas)
- 28. Managing the User's Grid Information Space (Beth Plale)
- 29. Managing Workflow & Monitoring Events (Gannon)
- 30. Incorporating AV collaboration (Pierce & Geoffrey Fox)
- 31. Incorporating Graphical Tools (Thomaz Haupt & Charles Severance)
- 32. GridPort4 (John Boisseau, Eric Roberts, Maytal Dahan, Thomislav Urban, Mary Thomas)
- 33. User Portals (John Boisseau, Eric Roberts)
- 34. NanoHub: a different approach to portal design. (Sebastien Goasguen)
- 35. Teragrid Science Gateways (Charlie Catlett, Nancy Wilkins-Diehr, Sebastien Goasguen)
- 35. Shortcomings of the Current Standards and Future Portal Architectures
- 36. Semantic grid technology

### 8.3. Conference Publications (In chronological order)

- M. P. Thomas, J. Burruss, L. Cinquini, G. Fox, D. Gannon, L. Gilbert, G. von Laszewski, K. Jackson, D. Middleton, R. Moore, M. Pierce, B. Plale, A. Rajasekar, R. Regno, E. Roberts, D. Schissel, A. Seth, and W. Schroeder [Grid Portal Architectures for Scientific Applications](#) Proceedings of SciDAC 2005 [meeting](#) June 26-30 2005 San Francisco.
- A Repository Service for Grid Workflow Components. Gregor von Laszewski and Deepti Kodeboyina. In International Conference on Autonomic and Autonomous Systems International Conference on Networking and Services. IEEE, 23-28 October 2005. <http://www.mcs.anl.gov/~gregor/papers/vonLaszewski-workflow-repository.pdf>.
- Mehmet Nacar, Mehmet Aktas, Marlon Pierce, Zhenyu Lu, Gordon Erlebacher, Dan Kigelman, Evan F. Bollig, Cesar De Silva, Benny Sowell, and David A. Yuen [VLab: Collaborative Grid Services and Portals to Support Computational Material Science GCE'05 Workshop](#) on Grid Portals.at SC05 Seattle, WA. November 18 2005.
- Mehmet A. Nacar, Mehmet S. Aktas, Marlon Pierce, Zhenyu Lu and Gordon Erlebacher, Dan Kigelman, Evan F. Bollig, Cesar De Silva, Benny Sowell, and David A. Yuen [VLab:](#)

[Collaborative Grid Services and Portals to Support Computational Material Science](#) Dec 30, 2005 Special Issue on Grid Portals based on SC05 [GCE'05 Workshop](#), Concurrency and Computation: Practice and Experience.

- Ahmet Fatih Mustacoglu, Wenjun Wu, and Geoffrey Fox [Internet Calendaring and Scheduling Core Object Specification \(iCalendar\) Compatible Collaborative Calendar-Server \(CCS\) Web Services](#) IEEE 2006 International Symposium on Collaborative Technologies and Systems CTS 2006 [conference](#) Las Vegas May 14-17 2006.
- Beth Plale, Dennis Gannon, Daniel A. Reed, Sara J. Graves, Kelvin Droegemeier, Bob Wilhelmson, Mohan Ramamurthy: Towards Dynamically Adaptive Weather Analysis and Forecasting in LEAD. International Conference on Computational Science (2) 2005: 624-631
- Yogesh Simmhan, Beth Plale, Dennis Gannon: A survey of data provenance in e-science. SIGMOD Record 34(3): 31-36 (2005)
- Sangmi Lee Pallickara, Beth Plale, Liang Fang, and Dennis Gannon, "End-to-End Trustworthy Data Access in Data-Oriented Scientific Computing", CCGrid 2006, Singapore, May, 2006.
- Y. L. Simmhan, B. Plale, D. Gannon, and S. Marru, Performance Evaluation of the Karma Provenance Framework for Scientific Workflows, To Appear in Lecture Notes in Computer Science, 2006 & International Provenance and Annotation Workshop (IPAW), 2006.
- Yogesh Simmhan, Beth Plale, Dennis Gannon: Towards a Quality Model for Effective Data Selection in Collaboratories. ICDE Workshops 2006: 72
- Wei Lu, Kenneth Chiu, Aleksander Slominski, and Dennis Gannon, "A Streaming Validation Model for SOAP Digital Signature" The 14th IEEE International Symposium on High Performance Distributed Computing (HPDC-14), 2005.
- Beth Plale, Dennis Gannon, Daniel A. Reed, Sara J. Graves, Kelvin Droegemeier,
- Bob Wilhelmson, Mohan Ramamurthy, "Towards Dynamically Adaptive Weather Analysis and Forecasting in LEAD".
- International Conference on Computational Science (2) 2005: 624-631
- L. Fang and D. Gannon, "XPOLA: An Extensible Capability-based
- Authorization Infrastructure for Grids", 4th Annual PKI R&D Workshop:
- Multiple Paths to Trust, NIST Gaithersburg, MD April 19-21, 2005
- Dennis Gannon, Beth Plale, Marcus Christie, Liang Fang, Yi Huang, Scott Jensen, Gopi Kandaswamy, Suresh Marru, Sangmi Lee Pallickara, Satoshi Shirasuna, Yogesh Simmhan, Aleksander Slominski, Yiming Sun, Service Oriented Architectures for Science Gateways on Grid Systems. ICSOC 2005: 21-32
- Sangmi Lee Pallickara, Beth Plale, Scott Jensen, Yiming Sun, Monitoring Access to Stateful Resources in Grid Environments. IEEE SCC 2005: 343-346
- Gopi Kandaswamy, and Dennis Gannon. A Mechanism for Creating Scientific Application Services On-demand from Workflows. Workshop on Web Services-based Grid Applications, to appear Aug 2006
- Yi Huang, Aleksander Slominski, Chathura Herath, and Dennis Gannon WS-Messenger: A Web Services based Messaging System for Service-Oriented Grid Computing. IEEE International Symposium on Cluster Computing and the Grid, Singapore, to appear May 2006

- Performance Evaluation of the Karma Provenance Framework for Scientific Workflows. Y.L. Simmhan, B. Plale, D. Gannon, & S. Marru, International
- Provenance and Annotation Workshop (IPAW), 2006
- A Framework for Collecting Provenance in Data-Centric Scientific Workflows.
- Y.L. Simmhan, B. Plale & D. Gannon. Accepted for the International Conference on Web Services (ICWS), to appear 2006.
- Srinath Perera, Dennis Gannon, Enabling Web Service Extensions for Scientific Workflows, The Workshop on Workflows in Support of Large-Scale Science, to appear Paris June, 2006.
- Wei Lu, Kenneth Chiu, and Dennis Gannon. Building a generic soap framework over binary xml. In The 15th IEEE International Symposium on High Performance Distributed Computing (HPDC-15), to appear June 2006.
- Eric Roberts, Jay Boisseau, Maytal Dahan, TeraGrid User Portal: An Integrated Interface for TeraGrid User Information & Services, Accepted for the TeraGrid Conference 2006.
- Hao Yin, Donald F. McMullen, Mehmet A. Nacar, Marlon Pierce<sup>1</sup>, Kianosh Huffman, Geoffrey Fox<sup>1</sup>, Yu Ma, "Providing Portlet-Based Client Access to CIMA-Enabled Crystallographic Instruments, Sensors, and Data." Submitted to GRID 2006.

#### 8.4. Journal Publications and Technical Reports

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## 9. Proposed Extension Deliverables

The OGCE project has consistently met its deliverables and has also established numerous direct collaborations with portal application developers. We plan in a no-cost extension to continue work in the following areas.

### 9.1. Direct Collaboration and Support for Portal Developers

We will continue our successful outreach program to directly assist portal development groups listed below.

Activity	Description
CIMA Portal	We will assist the CIMA team as they add Globus-based job submission, monitoring, and file management services.
VLAB Portal	We will provide core Grid portal development support for VLAB, which manages computational chemistry and material science workflows.
CICC Portal	We will develop this NIH-funded project for combining databases and data mining applications.
LEAD Portal	A portal for meteorology researchers and students. Beta test release as part of Teragrid Gateways project in august 2006.
Renci Bioportal	A portal for life sciences being built using OGCE technology by UNC Renci institute.
Flame Grid Portal	Portal to computational services for computing combustion products and flame propagation (SDSU)
GCOM Portal	General Curvilinear Ocean Modelling (GCOM) Portal: will interface to ocean modeling system for oceans, bays, and closed water/lakes (SDSU)
MetaGenome Portal	Metagenomics Bioinformatics Portal to BLAST services running on the TeraGrid (SDSU)
TeraGrid User Portal	A portal the provides account management, resource monitoring, and documentation services for TeraGrid users.
GGF-GIN-DATA	Integration of a testing framework for GridFTP
ReDReSS	Continue support of ReDReSS portal team at Lancaster University (UMICH).
National Grid Service (NGS) Portal	Work with the Daresbury team developing their portal (UMICH).
TIGRE User Portal	A portal that is a gateway to TIGRE grid users and provides resource monitoring, user documentation, and consulting

## 9.2. Grid Portal Software Development

The OGCE collaboration relies on the adoption of the JSR 168 standard for portlets as one of its foundations. This standard is currently undergoing significant revision, and we expect the follow-on JSR 286 standard and reference implementations to be available in early 2007. We will need to upgrade our current portlet suite to take advantage of these new standards.

The following table summarizes our planned software deliverables.

Software	Description
GridFaces Tab Library Extensions	The Java Server Faces-based Grid Faces library is currently deployed to support the VLAB and CIMA portals. The tag library approach is extensible, and we see the need to develop more extensive
MyLEAD metadata catalog integration with Globus DRS	Integration of the metadata catalog with the latest version of the Globus Data Replication Services to provide virtualization of data product storage on grid systems.
Generic experiment builder portlet, Workflow composer and GPEL engine	A final release of the experiment builder tools, including the graphical workflow composer and Grid BPEL engine derived from the tools that have been prototyped for use in the LEAD portal. To be demonstrated in a chemical informatics/ drug discovery project.
Science Portlet Integration	Much of the OGCE effort in the next year will be in the role of supporting science application projects as they adopt and integrate OGCE/NMI software into their projects. Where appropriate, OGCE will generalize and integrate portlets into OGCE from these application areas.
Grid Portlets	Support for RLS and MDS (both were just become recently stable and available).

## 9.3. Science Portal Community Leadership

We will follow on the very successful GCE 2005 workshop with GCE 2006, to be held in Tampa in conjunction with Supercomputing 2006. We have already begun organization of this meeting; additional information is available here: <http://wiki.cogkit.org/index.php/GCE06>.

### 9.3.1. Summary of Deliverables

- Organize GCE 2006 Workshop
- Organize other community outreach activities at GGF 18

## 9.4. Project Code Organization Revisions

We are currently negotiating with the Globus team to be one of the first external “incubator” projects for the new dev.globus community software site (see <http://dev.globus.org/wiki/Welcome>). This participation should benefit the OGCE project’s migration toward an open community code repository, as it will be much easier to give code repository write access in the dev.globus system.

We will also make two significant technical updates to our code’s build system and source code version control. First, the current OGCE release’s build system is based on Apache Maven 1.0.2.

This has been superseded by Maven 2, which provides potentially powerful distributed build tools that would benefit our project (see <http://communitygrids.blogspot.com> for our exploratory notes). Second, OGCE source code is maintained using a CVS repository at Argonne National Laboratory. We will migrate our current system (as we move to dev.globus) away from CVS and to SVN for source code maintenance. SVN has many improvements over its CVS ancestor, including its ability to hook together multiple, semi-independent repositories. This should greatly simplify our integration with projects such as GridSphere and Sakai.

#### **9.4.1. Summary of Deliverables**

- Become a dev.globus incubator project.
- Replace the current Maven 1.0.2 build system with Maven 2.
- Replace the current CVS source code version control software with SVN.

#### **9.5. Sakai Related Deliverables**

We will continue to evolve the JSR-168 Sakai portlets and enhance the WSRP integration. Since we already have "beta-quality" WSRP support in Sakai, we need to work closely with a team trying to deploy WSRP in production environments. Several Sakai/uPortal sites have indicated an interest in helping this work. We hope to have Sakai WSRP in production at several sites by the end of 2006.

We will add Sakai the NMI build/test facilities at University of Wisconsin by the end of 2007.

#### **9.6. Tupelo 2 Related Deliverables**

We will continue development of Tupelo2, and plan to make a prototype release as part of the no-cost extension. We hope also to have some experience with communities to report on, as well as suggested service interfaces and use patterns, as part of the prototype release.

#### **9.7. Ensemble Broker Related Deliverables**

We will refine the prototype into the form of a first release as part of the no-cost extension. This release will include the broker and related services, as well as the Eclipse RCP-based Siegf graphical user interface front-end to the broker. We will also refine our work with the ActiveMQ system and integrate access points to Tupelo2 and myLEAD, as software maturity permits.