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# GridConnections

News and Information for the Global Grid Forum Community

## Web Services Resource Framework: Impact on OGSA and the Grid Computing Roadmap

By Dr. David F. Snelling, Fujitsu Laboratories of Europe

You may have heard lately that “OGSI is dead; long live WSRF!” But other than an Enigma-Machine-like mapping of the letters, what does this mean? What do the OGSA and the Grid computing roadmaps look like now? And what is this all about anyway? The short history goes like this. After 18 months of work on the Open Grid Services Architecture (OGSA), GGF released a technical specification, the Open Grid Services Infrastructure (OGSI) that allows for implementation of OGSA services, which some have referred to as ‘Grid Services.’ OGSI built upon the W3C’s Web Services Definition Language (WSDL), which put GGF’s Grid Services work into the same arena as commercial Web Services. In January 2004, a number of Web and Grid computing specialists announced a set of draft proposed specifications intended to supersede the Open Grid Services Infrastructure (OGSI) proposed recommendation for the lowest layer of the Open Grid Services Architecture (OGSA) specification. This “re-factoring” of OGSI resulted in a set of

Web Services specifications, allowing OGSA to “ride” directly upon commercial web services. The reasons for re-factoring OGSI into WSRF range from serious issues with the use of XML scheme to matters of taste. The paper, “Modeling Stateful Resources with Web Services”, discusses some of these issues in more detail at [www.globus.org/wsrf/ModelingState.pdf](http://www.globus.org/wsrf/ModelingState.pdf). The current technical ground swell appears to be that WSRF is a better starting point with respect to obtaining wider community acceptance as well as rapid development of usable tools and Grid applications.

So what does this mean? What about the road ahead? Clearly any project team that invested heavily in OGSI-based development faces a few bumps in the road. However, the conceptual basis of WSRF will be very familiar to those working with OGSI and the design patterns should all be reusable. Those working with higher-level services within Grid

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THE GLOBAL GRID FORUM (GGF) IS A COMMUNITY-INITIATED FORUM OF THOUSANDS OF INDIVIDUALS FROM INDUSTRY AND RESEARCH LEADING THE GLOBAL STANDARDIZATION EFFORT FOR GRID COMPUTING. GGF’S PRIMARY OBJECTIVES ARE TO ACCELERATE THE CREATION, DEPLOYMENT AND IMPLEMENTATION OF GRID TECHNOLOGIES AND APPLICATIONS VIA ‘BEST PRACTICES’—TECHNICAL SPECIFICATIONS, USER EXPERIENCES AND IMPLEMENTATION GUIDELINES.



## GGF10

in March 2004 marks two years since GGF began working on the Open Grid Services Architecture, or OGSA. GGF's OGSA architecture provides us with the beginnings of a true roadmap for how one might construct an integrated Grid system, how the individual specifications can fit together, and what is missing. *It's very hard to achieve consensus on architecture, even in small groups within the same company. How about 500 individuals from 57 companies, over 100 different organizations, coming from 40 countries?* That is the scale of participation in GGF's OGSA-related activities. Agreement at this scale on an architecture and an initial specification at the core of that architecture means something fundamental is happening!

The emergence of this architecture signals both a critical mass around a core set of concepts and a coherent strategy – a lens with which we can focus the efforts of the community. In 2004 we will leverage this critical mass and coherence to develop several levels of “roadmaps” for Grid computing.

From the early days of GGF we have taken a consensus-building approach designed to harness the enthusiasm of a growing community of people and organizations. The work of GGF requires personal trust between representatives of competing companies and organizations. You cannot buy it, you cannot fake it, and you cannot create it with a website or a conference. Trust is built over time and in a community. The consensus around OGSA is just one illustration of how the GGF community has brought commercial, academ-

ic, and scientific interests together to produce tremendous value to Grid users and vendors worldwide.

Earlier this year we saw another promising illustration as to GGF's impact on not only the Grid community but on commercial computing in a broader sense. Following the publication of the Open Grid Services Infrastructure (OGSI) specification last Fall a number of groups brought the OGSI specification into discussion with the Web Services community. The result was a re-factoring of the OGSI specification into a set of Web Services specifications – the Web Services Resource Framework (WSRF). Grid and Web Services proponents are now working together to standardize these specifications through an OASIS technical committee (TC). We expect to work closely with OASIS, utilizing our OSGI working group as a forum and liaison function to the OASIS TC. Both GGF and OASIS leadership are enthused about the potential for working together much more closely as we move into 2004.

Following our publication of the OGSI specification last Fall we also published the GridFTP specification (extensions to the FTP protocol) and our Distributed Resource Management Application API (DRMAA) specification is expected to complete its final public comment period in April 2004. Both of these specifications already have multiple implementations in both research and commercial software platforms.

This year we look forward to continuing to march toward specifications, in particular those that are key components to the Open Grid Services Architecture. We are also quite excited about emerging and deepening partnerships with colleagues in OASIS, DMTF, IETF, W3C and elsewhere.

Charlie Catlett  
GGF Chairman  
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# Sponsor Spotlight



## DataSynapse: Providing An On Demand Application Infrastructure

DataSynapse, Inc. is the fastest-growing provider of grid computing software for commercial applications today. Its award winning on demand application infrastructure software, GridServer™, provides organizations with a flexible operating environment to manage a complex and diverse mix of applications and infrastructure across the enterprise. The GridServer solution virtualizes application services and the resources on which they are executed, enabling organizations to address issues of application scale, performance and uptime, while reducing the cost of computing.

DataSynapse clients consistently document significant improvements in transaction and processing speed, application resiliency, overall capacity and utilization and time-to-build/time-to-deploy business-critical applications.

According to Tony Bishop, Chief Business Architect, "GridServer enables organizations to leverage existing system capacity to access computing power as needed, resulting in reduced IT costs and improved quality of service levels. By decoupling applications from dedicated servers to operate within a virtual environment, compute resources can be shared throughout the enterprise to increase system utilization to over 90 percent."

Together with Intel, DataSynapse sponsors the Guaranteed Distributing Computing (GDC) Council, which provides a forum for technology executives to dialogue and explore trends, challenges and opportunities surrounding grid computing and standards. Formed in 2002, GDC has now expanded to Europe and across vertical sectors. The group meets quarterly. DataSynapse is a proud sponsor of the Global Grid Forum. Together, we're working to promote the commercial adoption of grid technology.



## A Leader in Grid Space: The Pittsburgh Supercomputing Center

In working and research groups and this year as host for SC2004, the Pittsburgh Supercomputing Center (PSC) is one of the key GGF organizations whose leadership is helping to forge the technologies of distributed computing and communications infrastructure.

PSC deployed the first NSF terascale system—known to users as LeMieux—in 2001, and in 2002 joined the NSF-sponsored TeraGrid as a lead-computing site. Last year, PSC implemented a fiber-optic "lambda" to the TeraGrid, paving the way for LeMieux—a 3,000 processor, six-teraflop HP AlphaServer workhorse (providing 61 percent of NSF PACI computing)—to become a TeraGrid resource.

In April, LeMieux, along with Rachel, LeMieux's 128-processor HP GS1280 SMP sibling, will become TeraGrid production resources. As the TeraGrid's first Alpha/Tru-64-based systems, LeMieux and Rachel pose the challenge of interoperability. PSC is coordinating the TeraGrid effort to meet this challenge, which is crucial to the vision of TeraGrid as a heterogeneous, extensible infrastructure.

Drawing on experience with LeMieux, PSC also co-chairs the GGF Grid Checkpoint Recovery Working Group. For terascale and beyond, relying on thousands of components, today's scientific applications require that application codes have portable checkpoint capability. Having developed a checkpoint/recovery system for LeMieux and for Intel IA32- and IA64-based Linux systems, PSC has already contributed significantly to this work. With GGF, PSC focuses on standards and services that allow applications to checkpoint, recover and continue on other Grid systems.

## International Grid School Returns to Italy



The Second International Summer School on Grid Computing 2004 will again be held in Vico Equense (Naples) Italy, July 18-29.

The school will consist of lectures by experts in various aspects of grid middleware and grid applications and laboratory sessions in which students will carry out practical exercises.

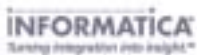
A maximum of 80 students will be admitted to the school. The typical student will be a postdoctoral researcher who will be working on a grid project at his or her home institution. Applications will be accepted starting Mid-March.

The school is being sponsored by the Global Grid Forum and funding support has been pledged by the UK e-Science Program, the Italian National Institute for Nuclear Physics (INFN), Institute for High Performance Computing and Networking (ICAR-NA), and Institute for Composite and Biomedical Materials (IMCB).

For inquiries send email to [grid-school@ggf.org](mailto:grid-school@ggf.org). More information will be available on the GGF website soon.

### GGF Welcomes 8 New Sponsors

The following organizations have joined GGF as new sponsor members since the Fall 2003 Grid Connections.



## GGF Document Series

After GGF9, three documents were finalized and posted to the Final Documents category of the GridForge Editor project (<https://forge.gridforum.org/projects/ggf-editor>):

### GFD.19

#### Job Description for GGF Steering Group Members

(J. Schopf, P. Clarke, B. Nitzberg, C. Catlett)

GFSG

### GFD.20

#### GridFTP: Protocol Extensions to FTP for the Grid

(W. Allcock)

DATA

### GFD.21

#### GridFTP Protocol Improvements

(I. Mandrichenko)

DATA

A listing of the GGF Document Series may be found at:

[https://forge.gridforum.org/docman2/ViewCategory.php?group\\_id=90&category\\_id+28](https://forge.gridforum.org/docman2/ViewCategory.php?group_id=90&category_id+28)

### For Final Review

The following documents have completed their public comment period and are in final review prior to publication:

#### Grid Constitution

(Informational) Author(s):

G. Myers

#### GSS-API Extensions

(Recommendation) Author(s):

S. Meder, V. Welch,  
S. Tuecke, D. Engert

#### JSIM Specification

(Informational) Author(s):

E. Stokes, L. Flon

#### Usage Record -- XML Format

(Recommendation) Author(s):

R. Lepro, S. Jackson

*continued on page 7*

## Group Updates

### Eleven New Groups since GGF9

The following groups have been approved since GGF9 (email lists provided):

Astronomy Applications-RG  
(astro-rg)

Configuration Description,  
Deployment, and Lifecycle  
Management-WG (cddlm-wg)

Data Format Description

Language-WG (dfdl-wg)

Grid File System-WG (gfs-wg)

Grid Scheduling

Architecture-RG (gsa-rg)

Grid Storage Management-  
WG (gsm-wg).

OGSA Data Replication

Services-WG (orep-wg)

Open Grid Service Common  
Management Model-WG  
(cmm-wg)

Particle and Nuclear Physics  
Applications-RG (pnpa-rg)

Preservation Environments -  
RG (pe-rg)

User Program Development  
Tools For the Grid-RG  
(updt-rg)

With the addition of these 11 new groups, GGF now has a total of 27 working groups and 22 research groups.

In addition to the new groups, the following ten charter discussion BOF's are proposed for new working and research groups:

Business Process-WG

Enterprise Grid

Requirements-RG

GGF Process-WG

Grid API-WG

Grid Federation-RG

Grid Scheduling Ontology-WG

Grid Support for Ubiquitous  
Computing -RG

Humanities, Arts, and Social  
Science -RG

Metadata Management Services  
Architecture-WG

Workflow Management-RG

Draft charters may be found at:  
[https://forge.gridforum.org/tracker/index.php?func=browse&group\\_id=100&atid=751](https://forge.gridforum.org/tracker/index.php?func=browse&group_id=100&atid=751) .

RG: Research Group

WG: Working Group

## GridForge Hits 1,000 User Mark

### An Interview with GGF Executive Director Steve Crumb

One year ago, GGF launched a web-based, collaboration tool called GridForge (<http://forge.ggf.org>). Based on the same software that runs the popular sourceforge.net site, GridForge has recently surpassed the 1,000-user threshold and is nearing the 100 project mark. In an interview with Steve Crumb, GGF's Executive Director, Grid Connections asked about the acceptance of GridForge in the community.

### *How has the community accepted GridForge as a collaboration tool?*

"While the potential benefit to the community is huge, the acceptance period has been a real challenge. GGF has a love-hate relationship with GridForge. Some groups like OGSA have adopted it fully and find it a useful tool. The GGF Editor and the GFSG have also found it very helpful for their functions. Other groups are just beginning to explore its capabilities and are being challenged with the learning curve. But overall, I see a very positive trend toward acceptance."

### *What have been the biggest barriers to acceptance?*

"In many ways, GridForge is too feature-rich. After getting excellent feedback from our users, we learned that "simple is better." So, we are requiring that chairs and secretaries do just a few necessary tasks with GridForge so that the community as a whole can benefit."

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# GGF11 Explores “Enterprise Grids”

Join us for GGF11, June 6-9, in Honolulu for the Grid in Practice.

The plenary program of GGF11 in Honolulu is focused on Grids deployed. Attendees will have an opportunity to hear from a variety of organizations including major corporations who have transformed at least part of their ICT infrastructure to a Grid approach. Program tracks will

include a focus on particular industries: pharmaceuticals, automotive, aerospace, teleco, petroleum, entertainment and financial. There will also be a focus on research grids, but the emphasis will be on grids deployed to serve diverse research needs rather than research on grids. Other tracks will address issues: technology, people, business processes, resist-

ance, and cost/benefit. One track will be devoted to future needs: what isn't yet available that would materially improve grid deployment.

GGF11 plenary speakers are grid deployment veterans. They will recount their experiences, share their triumphs, and frankly discuss what they would do differently. Those in attendance will go away with a strong, clear view of

the “state-of-the-art” well equipped to pursue Grid deployment in their own sectors.

The GGF11 Program Committee Co-chairs are Walter Stewart, SGI, and Alan Blatecky, San Diego Supercomputing Center.



## The Business Value of Grids

By Robert B. Cohen, Fellow, Economic Strategy Institute

Responding to the desires of many commercial participants in the GGF, the Grid Market Awareness Committee (GMAC) has been working to answer the question, “What is the business value of grids?” This article presents a number of advantages for grid computing and mentions some case studies found by the Economic Strategy Institute’s US Grid study.

Many companies have already deployed grids and are seeing benefits, including:

### Sizable savings in hardware costs

Firms typically push the CPU power of their computers to just 15% to 20% of capacity but with grid middleware, processing power is pushed to 85% to 90% of capacity - realizing substantial savings.

- A pharmaceutical firm saved \$2 million in hardware costs in the first year of using a PC-grid with much of the savings from squeezing more computer power out of PCs and avoiding new purchases.
- A financial firm that used clusters in its risk reporting group saved 40% of hardware costs in six months and 14% on operational costs.

### A measurable speed-up for parallel processes, particularly batch processes

Grid middleware splits complex problems into parts that can be addressed by many CPUs simultaneously. Results are obtained quickly and workers become more productive.

- By using grid clusters, Cadence Design’s engineering group improved labor productivity 67% to 97% in the first year and reduced hardware costs.
- An aerospace design group cut the 30 days required for design analysis to 1-2 days with Linux cluster.
- Charles Schwab reduced processing time for investment inquiries from 4 minutes to 15 seconds.

### Speeding time-to-market

Faster processing times mean that products get to market quicker. Grid clusters can process simulations and complete design analyses rapidly, reducing the time for the product development.

- Pharmaceutical firms use clusters to identify the best new drugs, even modeling the human response to potential drugs long before clinical trials.
- Semiconductor firms must create “pipelines” of innovative products and employ clusters to speed new chip designs.
- Brokerage firms take positions with sophisticated financial instruments and must evaluate their positions swiftly to maximize profitability.

### Performing more sophisticated analyses and data mining

Clusters examine much larger databases and run more complex analyses.

- Pharmaceutical firms apply highly complex protein folding analyses to drug designs. This speeds the identification of chemical best suited for use against disease such as HIV.
- Chip producers study performance characteristics in new chip designs. Grids enable companies to link computer power across multiple locations, giving additional benefits, including:

### Fulfilling on-demand compute needs

A bank or auto producer can call on extra compute capacity from anywhere. This makes compute power “fungible,” available anywhere in the corporation “on demand.” The result is reduced computer hardware redundancy and lower hardware costs. Resources are used more efficiently.

### Significant time-savings resulting from greater agility and collaboration within the firm

A semiconductor firm creates a global grid so “virtual” design groups collaborate on a new chip design 24 hours a day. It links design centers in Europe, the US and Asia to bring products to market faster and improve its competitiveness.

### Support for a services grid

Grids help companies collect and distribute information, including software. Over the next 10 years, a large auto firm will use its services grid to support and service the new electronics and software that it sells with cars. This grid will send dealers software “fixes” needed to replace corrupt software that is used to regulate an engine’s performance settings (set compression ratios, etc.).

### Changes in business processes

Greater control over information and more detailed ways to analyze it will open new ways for businesses to develop products and services. By combining information on human reactions to drugs in the drug development process, pharmaceutical firms are developing “personalized” medicine.

These benefits and savings will be further discussed and demonstrated at GGF11 – “Enterprise Grids” – June 6-9, Honolulu, Hawaii.

For more information on the ESI’s report: <http://www.econstrat.org/Projects/Grid%20Computing%20Page.html>

## Upcoming Events

### GGF Meetings:

GGF11 - Hawaii/ Jun. 6-9, 2004

GGF12 - Brussels/ Sept. 2004

### GridToday 2004 (Gt04)

*The Premiere Enterprise Grid Computing Conference*

May 25-26, 2004

Philadelphia, PA

<http://www.gridtoday.com>

*Registration now open!*

Gt'04 is the first conference to address the critical issues and solutions for commercial adoption of Grid computing in the enterprise computing market.

Implementation of Grids has proven to increase productivity in a number of industries—precisely the edge companies need to outperform their toughest competitors.

Major reports from IDC, Insight Research, Nucleus, and Cohen Communications have indicated that a significant number of large global companies will be developing strategies or deploying Grid technology within the next year. Industries initiating this trend include pharmaceuticals, aerospace, financial services, insurance, automotive, semiconductor, online gaming, and oil and earth sciences.

Gt'04 conference sessions are designed to exemplify exactly how to implement Grid technologies into existing infrastructures.

Industry and Grid leaders will present on:

- Measuring ROI across Grid computing environments
- Constructing and deploying Grid and enterprise solutions
- Developing and employing solutions to overcome the real challenges they've encountered
- Resource allocation, storage, and security considerations issues for implementing Grids
- Technical requirements for selecting a Grid compute platform
- Implementing company-wide intergrids

Registration is now open. The cost of this two-day event is \$495. Gt'04 is offering an early bird special of \$395, good through March 31, 2004.

*Gt'04 is sponsored by:*

*Platinum Sponsor: Sun Microsystems*

*Gold Sponsors: Butterfly.net, HP, IDC, Intel*

*Silver Sponsors: Data Synapse, IBM*

### ClusterWorld Conference & Expo

April 5 - 8, 2004

San Jose Convention Center

San Jose, CA

[www.clusterworldexpo.com](http://www.clusterworldexpo.com)

CWCE 2004 features intensive tutorials and three days of sessions in eight vertical industries including a special GRID track with topics such as "Getting Started With the Globus Toolkit", "Managing Resources in the Enterprise Grid", "Grid Security: Status and Futures" and "Enterprise Computing with Sun Grid Engine" with Keynotes by Ian Foster, Argonne/University of Chicago and Globus Alliance, Benny Souder, Oracle and Thomas Sterling, California

Institute of Technology.

GGF Community Members get an additional 25% off registration rates. Please use the Special Priority Code - GGFM - to get the best rates. Click <http://www.clusterworldexpo.com> to register today. ClusterWorld Magazine is a GGF Silver Sponsor Member Organization!

### CCGrid 2004

April 19-22, 2004

Chicago, IL

[www.cccgrid.org/ccgrid2004](http://www.cccgrid.org/ccgrid2004)

The IEEE/ACM International Symposium on Cluster Computing and the Grid (CCGrid) brings together the leading developers of cluster computing systems and grid computing middleware from academia, government and industry throughout the world. CCGrid 2004 is at the landmark Drake Hotel in downtown Chicago.

Keynote speakers are Rick Stevens, University of Chicago and Argonne National Laboratory, Wesley Kaplow, Qwest Communications, and Satoshi Matsuoka, Tokyo Institute of Technology.

This year's technical program highlights 38 papers selected by the program committee from over 150 submissions and will feature seven special workshops and three tutorials. Additionally, a variety of posters and papers will be available as well as vendors of related software and hardware.

## GridForge Hits 1,000 User Mark *continued from page 4*

*What are those "few necessary tasks"?*

People browse to GGF to find out about our groups and their activities. My ultimate goal is that anyone can come to our website, click on a group name and with consistency from group to group find four things: a link to the group's mail list, the group's charter, any work-

ing drafts in progress, and the group's meeting minutes. As a result, we have created a project template that presents a consistent front page view, consistently names document folders, and provides simple links to the four pieces of information. Every new group is created with this template. Also, we recently published the GridForge

"cookbook" which gives chairs simple procedures for posting their charter, drafts, and minutes. If we can get all groups to adopt the template and follow the simple procedures detailed in the cookbook, I think the community will experience the greatest benefit from GridForge.

## **For Public Comment**

The following documents are currently in public comment period:

### **A Hierarchy of Network Performance Characteristics for Grid Applications and Services**

(Recommendation) Author(s):  
B. Lowekamp, B. Tierney, L. Cottrell, R. Hughes-Jones, T. Kielmann, M. Swany

### **Persistent Archive Capabilities**

(Informational) Author(s):  
R. Moore, A. Merzky

### **Peer to Peer and Grid: Synergy and Opportunities**

(Informational) Author(s):  
A. Chien

### **An Analysis of "Top N" Event Descriptions**

(Informational) Author(s):  
D. Gunter, J. Magowan

## **Distributed Resource**

### **Management Application API Specification 1.0**

(Recommendation) Author(s):  
H. Rajic, R. Brobst, W. Chan, F. Ferstl, J. Gardiner, A. Haas, B. Nitzberg, J. Tollefsrud

*We invite you to download and provide comments to the authors on any of these documents (<http://sourceforge.net/projects/ggf>).*

## **Other documents in the Editor pipeline include:**

### **Grid PKI Disclosure Statement**

(Community Practice) Author(s):  
T. Genovese, M. Helm

### **Accounting Interchange Natural Language Description**

(Recommendation) Author(s):  
R. Mach

### **Grid Informational Retrieval Requirements**

(Recommendation) Author(s):  
K. Gamiel, S. Karimi, G. Newby, N. Nassar

## **Certificates for Automated Clients**

(Community Practice) Author(s):  
S. Chan, M. Crawford

### **Security Requirements of Advanced Collaborative Environments**

(Informational) Author(s):  
D. Agarwal, B. Corrie, J. Leigh, M. Lorch, J. Meyers, R. Olson, M. Papka, M. Thompson

### **Operations for Access, Management, and Transport at Remote Sites**

(Informational) Author(s):  
R. Moore

### **Grid Authentication, Authorization, and Accounting Requirements**

(Informational) Author(s):  
M. Crawford, M. Lorch, S. Mullen, D. Skow

# Web Services Resource Framework:...**continued from cover**

tool kits (e.g. Globus GT3) will probably find that these services remain unchanged with the switch to WSRF. The Globus Alliance has made statements to this effect at [www.globus.org/wsrf/faq.asp](http://www.globus.org/wsrf/faq.asp).

In the same way that these higher-level interfaces will remain largely unaffected by the emergence of a WSRF-based standard over the coming year, standardization activities at higher levels of the Grid stack will also find adaptation straightforward. The GGF's flagship architecture working group (OGSA-WG) has already made an assessment of the impact that WSRF will have on their work, concluding that most of the key functions of OGSA are largely unaffected. The OGSA work timetable remains unchanged as a result of the WSRF announcement. At GGF10 (March 2004) a draft OGSA roadmap will be available for discussion within the working group, although all are welcome to comment. This draft will continue to use the language of OGSI, but will be adapted to WSRF once WSRF enters a standardization process (March 2004) and have a final version will be submitted to the GGF editor by GGF11 (June 2004).

WSRF has indeed introduced a few twists in the roadmap for the Grid computing community, but the benefit will be better quality foundations and broader acceptance in the longer term. According to Hiro Kishimoto, co-chair of OGSA-WG, "WSRF is simply a re-factoring of those essential elements upon which we are building OGSA. We are still at full throttle and see no reason to slow down."

At press time for this issue of Grid Connections the WSRF team is on track to submit the specifications to OASIS for standardization - with GGF and OASIS developing plans for cross-fertilization and collaboration. The WSRF team is working aggressively toward open standardization with the intent to publish WSRF as a royalty-free specification. In the meantime, GGF continues to move toward completion and acceptance of OGSA and related higher-level services. Full speed ahead for open Grid standards!

*Dave Snelling is co-Area Director for GGF's Architecture area and a co-chair of the OGSI working group.*

# GGF People

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1

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2

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3

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