Open Science Grid

Ruth Pordes, Fermilab

Open Science Grid

Goals.

Services & Principals.

Organization & Activities,

Intertwining with the EGEE and LCG.

In the Short Term.

http://opensciencegrid.org/documents/index.html

The Open Science Grid Consortium

Will Build a National Production Grid Infrastructure in the United States, Open to any Science. The Consortium will build on and

Evolve Existing Infrastructures: Grid3+ + Shared Laboratory Facilities, CDF & D0 university facilities, STAR/RHIC facilities, SLAC, Campus Grids.

US LHC is contributing leadership in the roadmap by presenting resources to the Open Science Grid, deploying distributed data and processing services in a common environment, & running applications on the shared infrastructure.

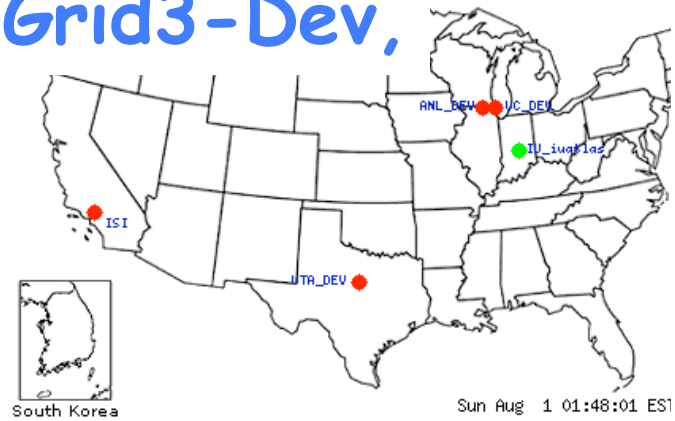
The Open Science Grid Consortium Participants

Include a broad base across many facilities, experiments, and grid projects: Fermilab, BNL, SLAC, LBNL, JLAB, Run II, BaBar, RHIC, BTeV, PPDG, iVDGL, GriPhyN, VDT, Globus, Condor; and are

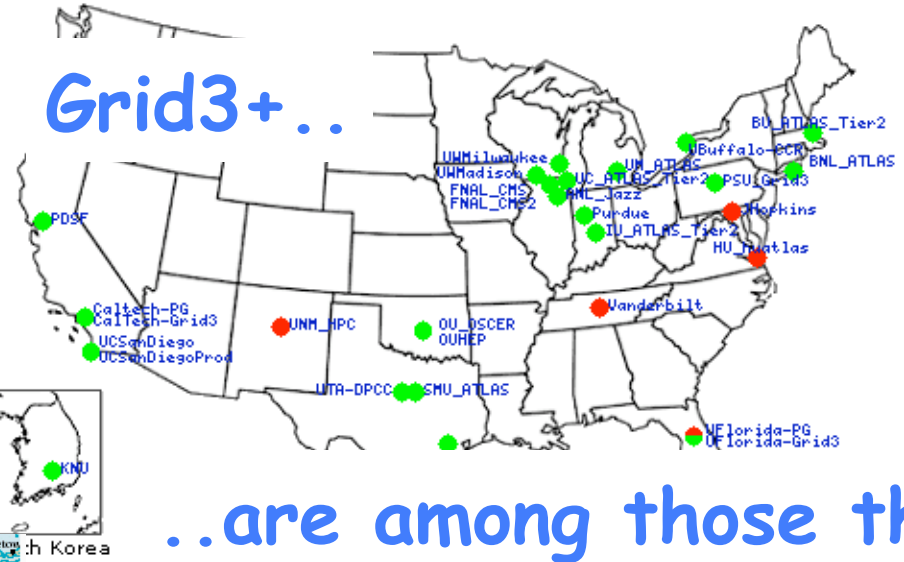
Organized as a Collaborative Partnership with community goals & contributions, deliverables and self-organized governance - like an Experiment.

Grid3 -> OSG, Spring '05

Grid3-Dev,

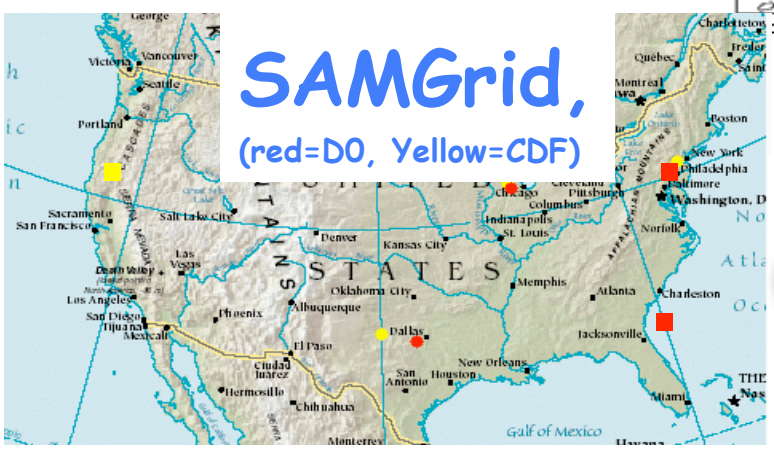


Grid3+..

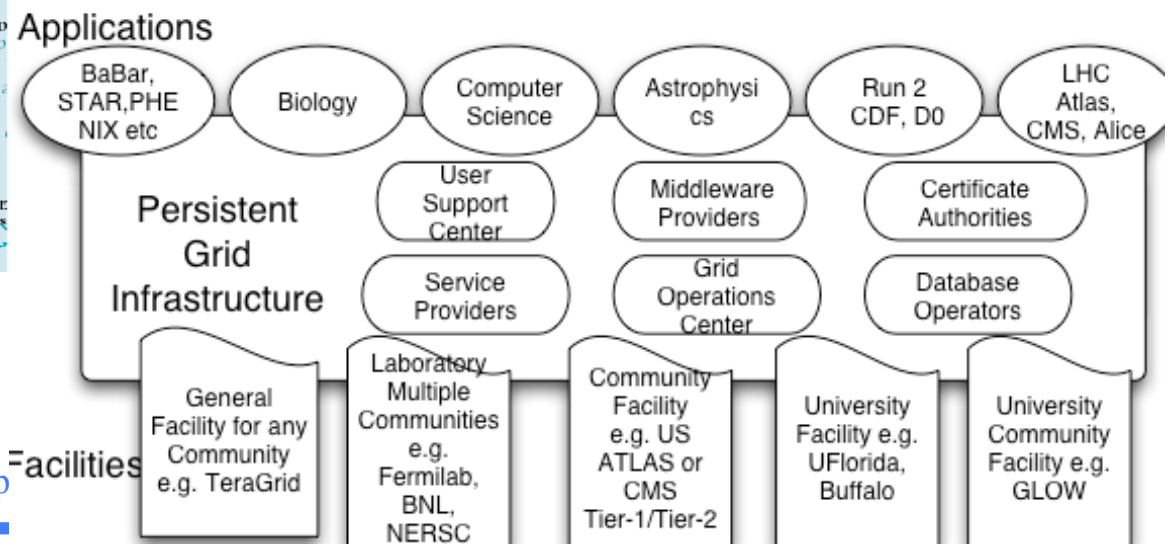


SAMGrid,

(red=D0, Yellow=CDF)



..are among those that will contribute to OSG…



Open Science Grid

Consortium Participants

Adams, David	Brookhaven National Laboratory
Avery, Paul	University of Florida
Aydt, Ruth	National Center for Supercomputing Applications (NCSA)
Baker, Rich	Brookhaven National Laboratory
Bakken, Jon	Fermilab
Ballentijn, Maarten	MIT
Bardeen, Marge	Fermilab
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Berman, Fran	San Diego Supercomputing Center
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Bourikov, Dimitri	University of Florida
Bradley, Scott	Brookhaven National Laboratory
Branson, Jim	University of California San Diego
Bresnahan, Glenn	Boston University
Bunn, Julian	California Institute of Technology
Butler, Joel	Fermilab
Cao, Junwei	MIT
Catlett, Charlie	Argonne National Laboratory
Cavanaugh, Richard	University of Florida
Cook, Jeremy	University of Bergen in Norway
Cousins, Bob	UCLA
Cowles, Bob	SLAC
Crawford, Glen	DOE
Cvernak, Ann	Information Sciences Institute
Dasu, Srihara	University of Wisconsin, Madison
Demchenko, Yuri	University of Amsterdam
Dinda, Peter	Northwestern University
Dobson, James	Dartmouth College
Ernst-Eschgarth, Michael	DESY
Evard, Remy	Argonne National Laboratory
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White, Vicky	Fermilab
Whitmore, Jim	National Science Foundation
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Huth, John	Harvard University
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Jacak, Barbara	Stony Brook University
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Johnson, Eric	Florida International University
Johnston, Bill	Lawrence Berkeley National Laboratory
Kaletka, Mark	Fermilab
Kelsey, David	Rutherford Appleton Laboratory
Kennedy, Robert	Fermilab
Willis, Bill	Columbia University
Womersley, John	Fermilab
Wuerthwein, Frank	University of California San Diego

Kim, Sang	National Science Foundation
Knosp, Boyd	University of Iowa
Koranda, Scott	University of Wisconsin, Madison
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Kramer, Bill	Lawrence Berkeley National Laboratory
Lauret, Jerome	Brookhaven National Laboratory
Lazzarini, Albert	California Institute of Technology
Legrand, Iosif	CERN
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Lorch, Markus	Virginia Tech
Luehring, Fred	Indiana University
Malon, David	Argonne National Laboratory
Mambretti, Joe	Northwestern University
Markowitz, Pete	Florida International University
Melani, Matteo	SLAC
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Moore, Reagan	San Diego Supercomputing Center
Mount, Richard	Stanford Linear Accelerator Center
Nefedova, Veronika	Argonne National Laboratory
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Newman, Harvey	California Institute of Technology
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Pennington, Rob	National Center for Supercomputing Applications
Perelmutov, Timur	Fermilab
Petravick, Don	Fermilab
Philpott, Sandy	Jefferson Lab
Pinsky, Larry	University of Houston
Youssef, Saul	Boston University
Yu, Dantong	Brookhaven National Laboratory
Yu, Jae	University of Texas Arlington

Price, Larry	Argonne National Laboratory
Quick, Rob	Indiana University-Perdue
Rana, Abhishek	University of California San Diego
Ranka, Sanjay	University of Florida
Ravot, Sylvain	CERN
Reed, Dan	University of North Carolina
Rodriguez, Jorge	University of Florida
Roland, Gunter	CERN
Roy, Alain	University of Wisconsin, Madison
Rubi, Ernesto	Florida International University
Schlagel, Thomas	Brookhaven National Laboratory
Schmidt, Jack	Fermilab
Scott, MaryAnne	DOE
Seidel, Ed	Louisiana State University
Shank, Jim	Boston University
Sheldon, Paul	Vanderbilt University
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Skow, Dane	Fermilab
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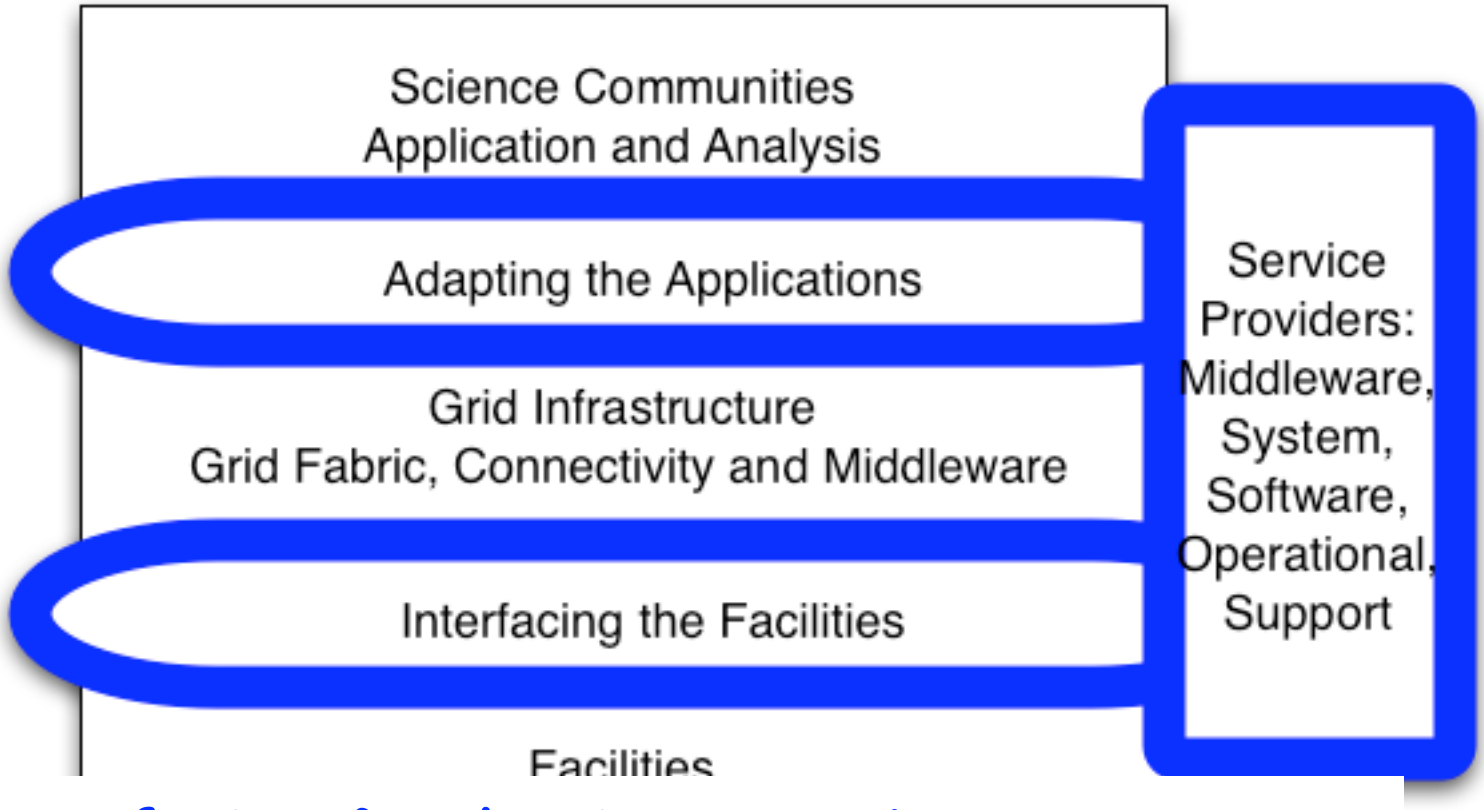
Snider, Rick	Fermilab
St Denis, Rick	University of Glasgow
Steenberg, Conrad	California Institute of Technology
Stevens, Rick	Argonne National Laboratory
Stickland, David	CERN
Szalay, Alex	Johns Hopkins University
Thies, Rick	Fermilab
Thomas, Michael	California Institute of Technology
Thomas, Tim	University of New Mexico
Thompson, Kevin	National Science Foundation
Throwe, Thomas	Brookhaven National Laboratory
Trauner, Mary	Georgia Institute of Technology
Tuts, Michael	Columbia University
Van Lingen, Frank	CERN
Walters, Adam	Fermilab

Technology Roadmap & Principals.

Applications, Infrastructure, Facilities



Interfacing & Adapting to a Common Infrastucture &

Providing Production Quality Common Services

OSG Services & Infrastructure

Compute Elements: Condor-G, GRAM, evolving to Condor-C + interfacing to N>5 Batch systems

Storage Elements: GridFTP + SRM with multiple implementations.

Middleware: evolve Virtual Data Toolkit.

Security Infrastructure: X509; VOMS based administration, including implementation of AuthZ Callouts

Monitoring, Information and Accounting: Ganglia, MDS, MonaLisa, MDViewer, GridCAT + Site/VO specific.

Workflow Management: Chimera, DAGMAN, RunJob + VO specific

Data Management - Grid-wide Replica Location Service (RLS/RLI), SAM + VO specific.

Operational Support Infrastructure: evolve iGOC, Discovery Service, Very simple Policy infrastructure, + Site/VO specific

Applications & Partners

Applications:

US LHC Monte-Carlo generation and processing support for continuous needs + targetted Data Challenges.

Run II, RHIC, BaBar Applications - piloting use of a shared infrastructure.

Other cpu bound, non data-intensive, applications - BTeV simulation, GADU, BLAST, MRI simulations.

Partner Grids:

Campus Grids e.g. ACDC, GLOW, Dartmouth.

TeraGrid interested in Federation.

Open Science Grid

The Open Science Grid

Open Science Grid is the grid under the governance of the Open Science Grid Consortium operated as a sustained and production infrastructure for the benefit of the Users.

Other grids may operate under the governance of the OSG Consortium, for example the grid that validates the infrastructure before it becomes the OSG.

OSG infrastructure interfaces to facility, campus, and community grids that participate in the Consortium;

OSG federates with grids external to the Consortium through partnerships & agreements.

Open Science Grid VO is open to those Users and VOs that have contracts with the OSG.

Principles that Guide the Roadmap

The infrastructure will support multiple versions of services and environments, and also support incremental upgrades

The OSG infrastructure should have minimal impact on a Site.

Services that must run with superuser privileges will be minimized

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s **Principles, Best Practices and Service Decomposition captured in a Blueprint** ents,

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Examples of Principles in the Blueprint

OSG will provide baseline services and a reference implementation. Use of other services will be allowed.

All services should support the ability to function and operate in the local environment when disconnected from the OSG environment.

Users are not required to interact directly with resource providers.

The requirements for participating in the OSG infrastructure should promote inclusive participation both horizontally (across a wide variety of scientific disciplines) and vertically (from small organizations like high schools to large ones like National Laboratories).

The OSG architecture will follow the principles of symmetry and recursion

The OSG infrastructure must always include a phased deployment, with the phase in production having a clear operations model adequate to the provision of production-quality service.

Examples of Best Practices in the Blueprint

The OSG architecture is VO based. Most services are instantiated within the context of a VO.

The infrastructure will support multiple versions of services and environments, and also support incremental upgrades

The OSG infrastructure should have minimal impact on a Site.

Services that must run with superuser privileges will be minimized

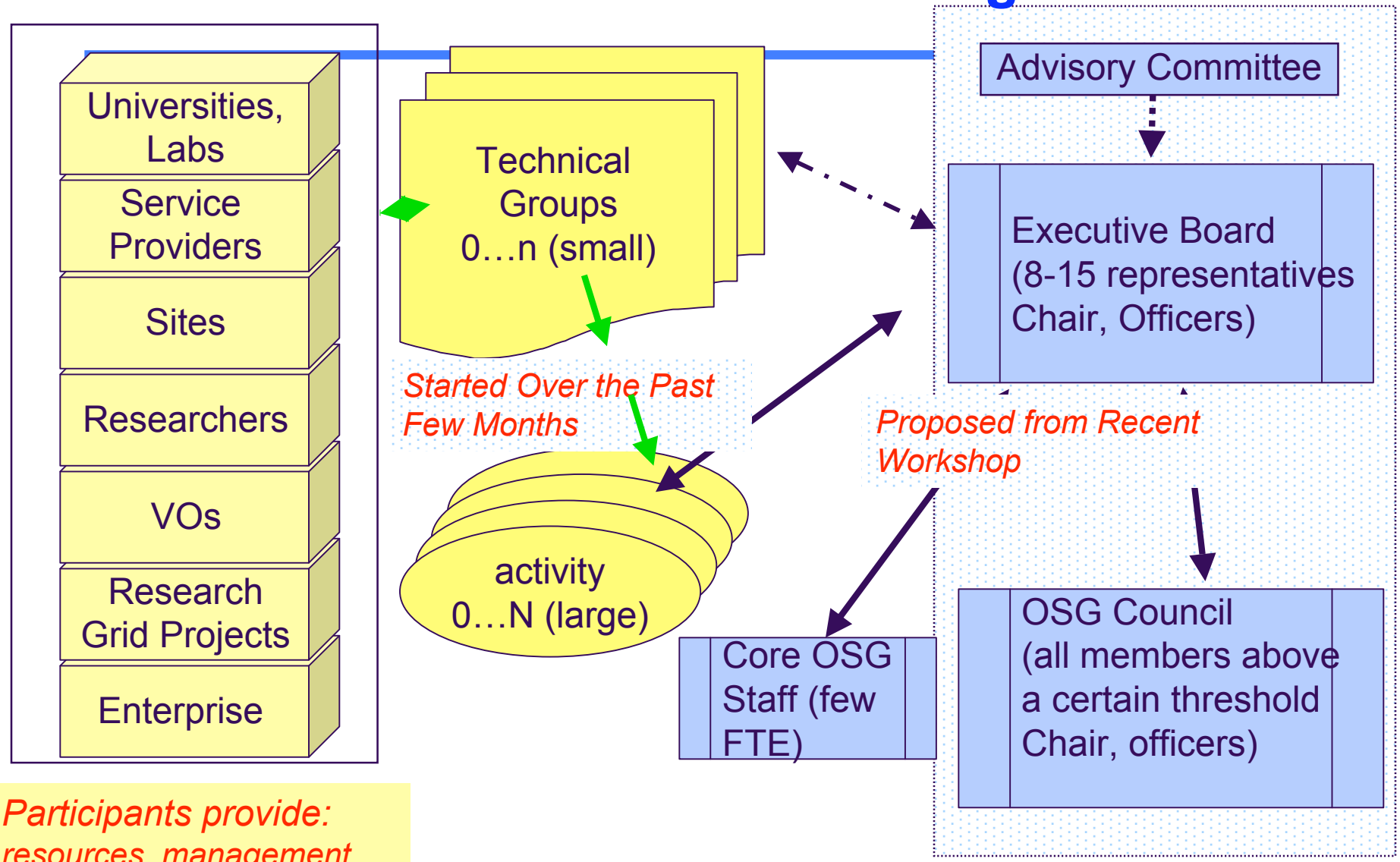
Resource providers should provide the same interface to local use of the resource as they do to use by the distributed services.

The OSG infrastructure will support development and execution of applications in a local context, without an active connection to the distributed services.

Services manage state and ensure their state is accurate and consistent.

Organization & Activities

Details of Governance In Progress



Participants provide: resources, management, project steering groups

Technical Groups and Activities

Technical Groups address and coordinate a technical area.

- propose, endorse, form and oversee activities related to their given areas.
- liaise and collaborate with their peer organizations in the U.S. and world-wide,
- participate in relevant standards organizations.
- chairs participate in the Blueprint, Grid Integration and Deployment.

Activities are well-defined, scoped set of tasks contributing to the OSG.

- has deliverables and a plan.
- self-organized and operated.
- overseen & sponsored by one or more technical groups

Open Science Grid

Technical Groups & Activities - I

Security

- Representatives from DOE Laboratories, US LHC Regional Centers, Grid Operations Centers, TeraGrid, ESNET, University Partners (e.g. Dartmouth).
- Propose Security Model and Oversee Security Infrastructure
- Write Registration Policies (evolution of Grid3), Acceptable Use Policies etc.
- Collaborate with peers in other Grid organizations:
- Members of the EGEE JRA3 and LCG Joint Security Group

Incident Response Activity

- Write & Execute a Security Incident Response Plan for iVDGL and OSG.
- Interfacing also with LCG/EGEE & TeraGrid.

Technical Groups & Activities - II

Storage

- Coordinate activities related to data storage & management.
- Identify requirements and technology gaps.

Storage Service Challenges across OSG and in partnership with LCG

- Compatability across SRM implementations at BNL, Fermilab, LBNL, JLAB, UWisconsin.
- Global Replica Management Service tests.
- BNL/Fermilab, US ATLAS/US CMS participating in sustained, robust data movement challenge with LCG.

Technical Groups & Activities - III

Monitoring and Information Services

- Extension of Grid3 Monitoring Group..
- Includes Accounting which will evolve from Grid3 accounting.
- Includes some testing/validation and publishing services. Test Harness or Grid Exerciser ?
- Execution Environment requirement and framework?

Policy

- Includes Authorization & Access Policies of Organizations (Sites, VOs) and Services (Resource Providers)

Support Centers (Infrastructure, Technology, Operations)

Representatives from iGOC, BNL, Fermilab, LBNL, SLAC, VDT

Define Operational Model.

- Cover "daily operations" "weekly operations" "monthly evolutions and changes" "yearly transitions".
- Ensure Architecture & Services Provide for Operational Needs (Scalability, robustness, management & administrative interfaces, maintainability etc.)

Communicate and Publish Information

- Coordinate helpdesk and trouble ticket infrastructures.

Participate in LCG & EGEE Operations Infrastructures.

Collaborate with TeraGrid & NMI Grid Center Grid Operation Infrastructures.

Open Science Grid

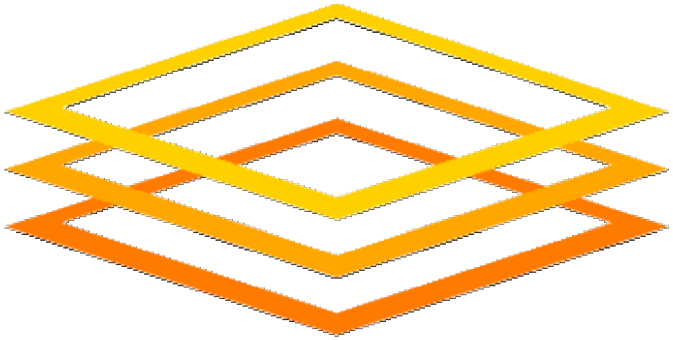
Physics Participants
Special Relationship to the LCG & EGEE

- Technical Groups interact and collaborate with peers in LCG & EGEE as much as possible.
- Blueprint ongoing attention to gLITE/ARDA architecture & design.
- Infrastructure attention to common interfaces between OSG & LCG/EGEE.
- Grid Technology based on common packaging/distribution of Virtual Data Toolkit.
- Site configurations to simultaneously present resources to OSG & LCG environments - access governed by local Site Policies.
- Applications data management and processing enabled across Federated Grid Infrastructures of OSG & LCG.
- Not to forget collaboration with GridPP through Experiments Data Handling and Analysis Projects.

Open Science Grid

Short Term Plans

- Extend Grid3 towards OSG deployment in Spring ‘05:
  - Add full Storage Elements
  - Extend Authorization services
  - Extend Data Management services
  - Interface to sub-Grids.
  - Extend monitoring, testing, accounting.
  - Add VOs. Add OSG(-VO) Wide VO Services.
  - Service challenges & collaboration with the LCG
- Continue with the Blueprint. Planning joint session with ARDA workshop in October.
- Operations Workshop. Exchange information with LCG workshop on operations.
- Applications Meeting in February (probably)



Open Science Grid

the OSG Consortium goal is to build a production quality grid infrastructure to meet the long term data analysis needs of science in the US and to partner with other such grids in the US and across the globe.