



Open Science Grid Virtual Organizations

Ruth Pordes, Fermilab

Open Science Grid

July 18th 2011

thanks to Dan Fraser and Chander Sehgal for the diagrams



Open Science Grid Project supported by the Department of Energy Office of Science SciDAC-2 program from the High Energy Physics, Nuclear Physics and Advanced Software and Computing Research programs, and the National Science Foundation Math and Physical Sciences, Office of CyberInfrastructure and Office of International Science and Engineering Directorates.





Open Science Grid

Introduction to OSG

National Cyber Infrastructure of 18 communities, >80 sites Open to all science, research, educators, campuses, laboratories

Project funded by DOE and NSF. Satellite projects contribute new software, services, users etc.

Service Provider to the new XD XSEDE project.

Member of MAGIC,
Partner with EGI,
Work closely with ESNET & Internet2
“on the periphery” of OGF

www.opensciencegrid.org

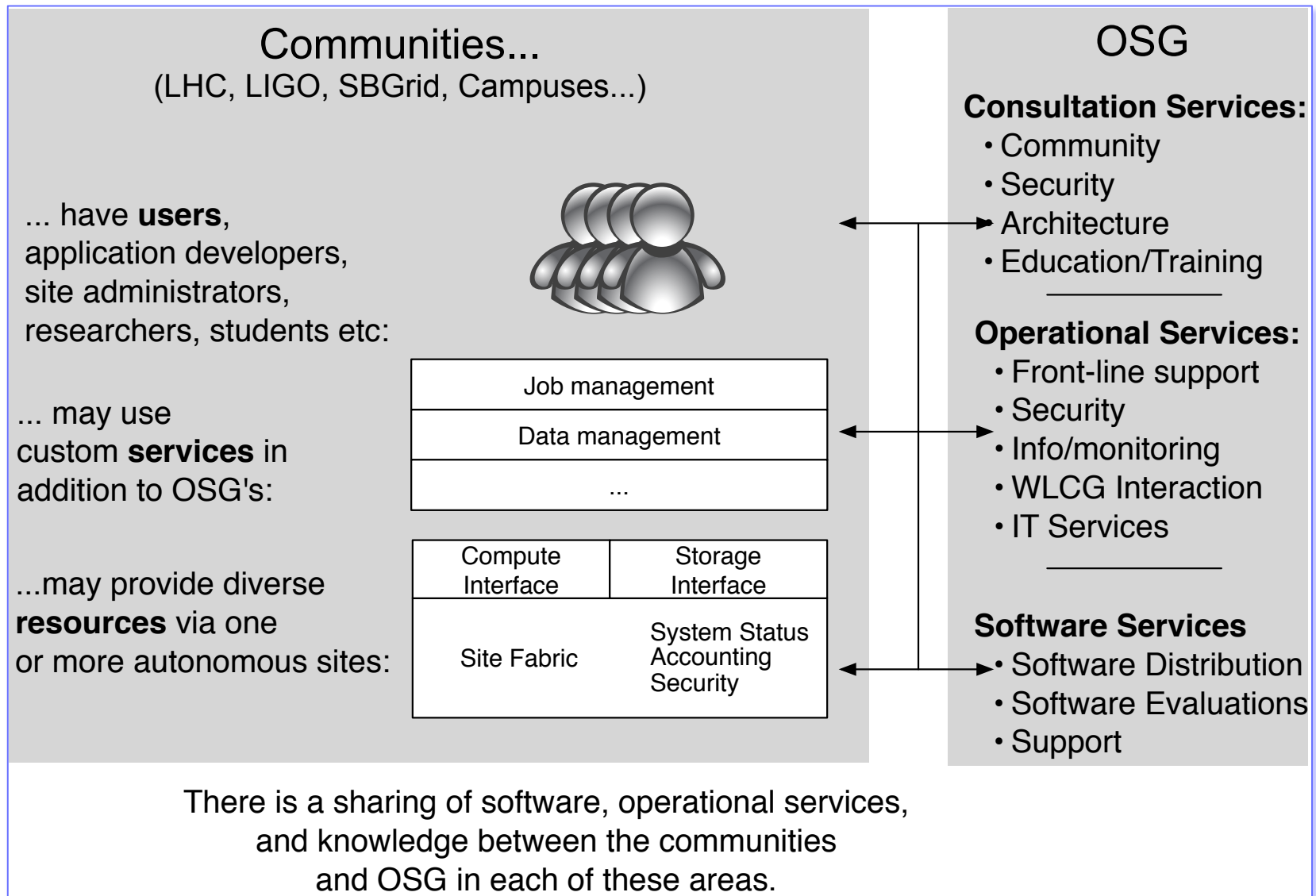


(available, scheduled downtime, unavailable)



Open Science Grid

OSG Scope: a Fabric of Services for Communities





Communities aka Virtual Organizations

are a core concept and the principles surrounding them help us design and organize our current and future roadmaps

A Virtual Organization

A Virtual Organization in the OSG is a **group** that **shares** at least one or more things including

- People and organizations with common goal and definition
- Tangibles such as clusters, disk areas, tapes, that are owned/leased/allocated to the group
- Services such as databases, data management, job management, that the group provides and/or uses
- Intangibles such as support, communication etc.



Groups

Can be a loose coupling – small amount of sharing/ overlap - or a tight coupling – whole group working on “one thing”

Examples:

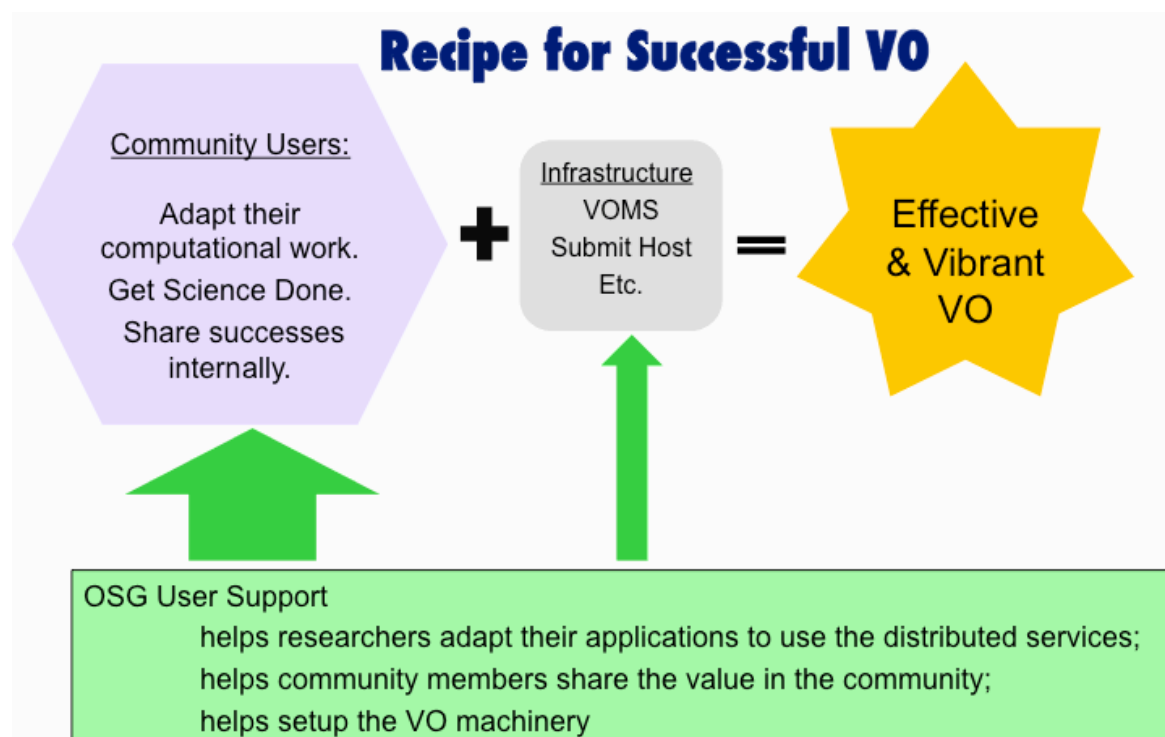
Campus VO – common administrative organization; often includes independent clusters, diverse applications, mix of research, science and education, single PI to small groups.

Physics experiment – one detector, one production application, common analysis, centralized management of publishing results.

Sharing Resources and Services

Sharing Expertise and Knowledge gained

“Organic” Training and Education
e.g. <http://derekweitzel.blogspot.com/>

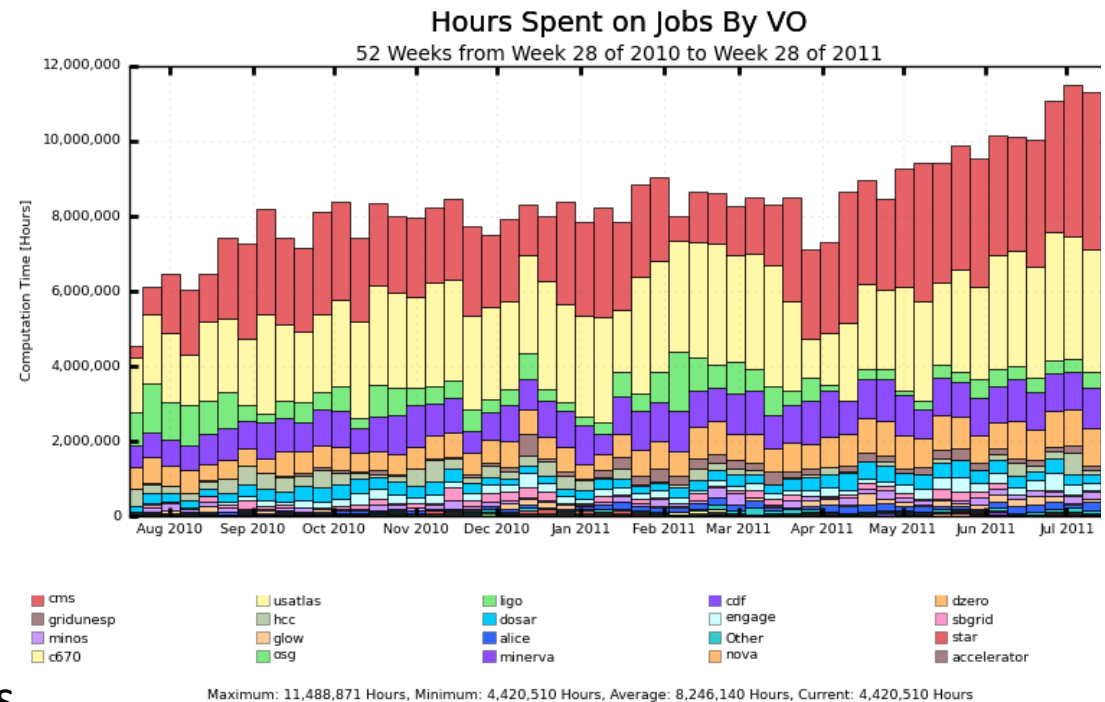




Open Science Grid

Science VOs on the OSG

- Astrophysics
- Biochemistry
- Bioinformatics
- Earthquake Engineering
- Genetics
- Gravitational-wave physics
- Mathematics
- Nanotechnology
- Nuclear and particle physics



> 1.4M hours / day



Open Science Grid

Multi-Disciplinary VOs in OSG, examples

| VO Name | Characteristics |
|------------------------------|--|
| Engage | Small groups of new entrants. Sharing is of the services offered by the support group. Sub-VOs differentiate between the disciplines. |
| FermiGrid | Automatically includes all users registered locally on the campus; All members of the organization automatically have access to the computing resources. |
| Grid Laboratory Of Wisconsin | Campus at University of Wisconsin Madison. Shared purchasing for cost efficiencies; Foster culture of sharing across faculties; Retain local administration and control; Access to central support, expertise, and software. |
| Holland Computing Center | Common services to access clusters on several campuses of the University of Nebraska system; Central administration and purchasing for cost and expertise efficiencies; On the ground teaching/inclusion of new entrants and students. |
| Purdue | Integration of diverse clusters and participation in multiple CIs |
| GridUNESP | Federated grid in Brazil – “clone” of OSG sharing OSG services while building & gaining experience in own local national infrastructure. |
| OSGEDU | For students and educators learning how to use the services. |



VOs in OSG

Registration in the group – knowing the complete set of people and stuff

Administration of policies, procedures, priorities, authorization groups: can be from simple to complex.

Services abide by VO and policy attributes and rules.

Conceptually Sub-VOs inherit from VO.

The VO Management Service

provides definition and then real time checking of membership, roles and authorizations.

These attributes are then transmitted with the users credential.

Services that Support VO Attributes

Job Execution at a resource:

VO and Attributes used to map to different job queues (priorities).

Data access:

Data management callouts (e.g. SRM, GridFTP servers) that support VO and Attribute mapping to different UIDs.



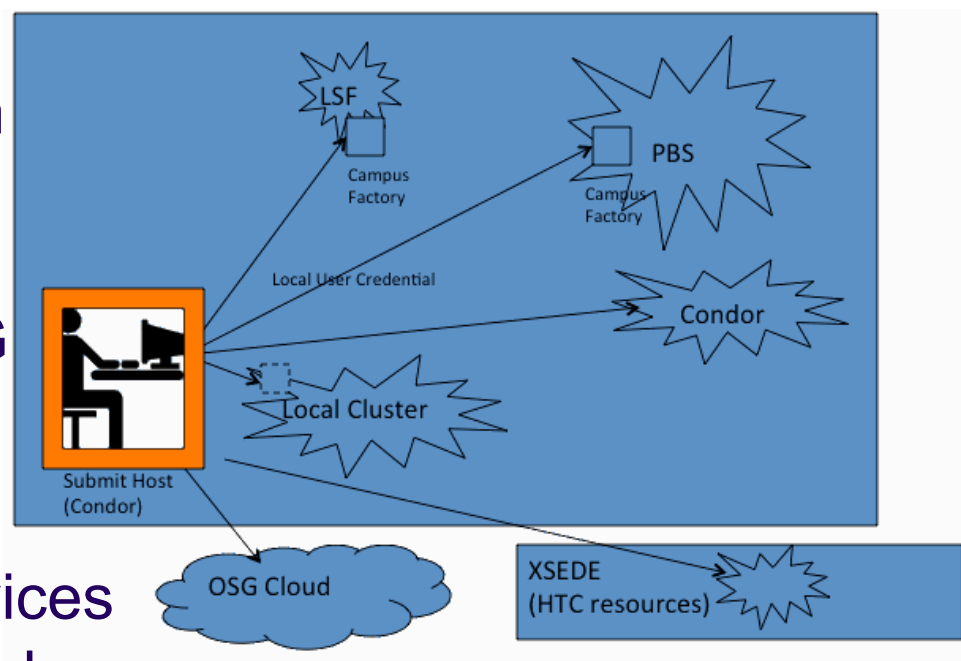
Open Science Grid

Works across Diverse Resources

CPU and data accessed through standard grid interfaces.

Translation services map from local campus infrastructures (using local authorization/identification services) to OSG environment.

Overlay job management services enable the reach into the Cloud, maintaining the VO management at the overlay level.





Opportunistic, Allocated, Paid, Usage

OSG resource owners retain local control and allow/enable use of available resources (no allocation scheme).

“Allocation” schemes currently by manual agreement (will be extended as part of XSEDE SP).

Commercial clouds need actual \$. Don't yet understand if OSG acts as a broker or VO purchases for themselves (adds to the resources they own).