Open Science Grid School
Operations Support and Tools
or
"What to Do When You Have Problems and Other Interesting Stuff"

10 December - 2010
Sao Paulo, Brazil

Rob Quick
OSG Operations Coordinator
Indiana University

Gedankenexperiment

- You have geographically distributed resource consumers (users) working under different administrative domains who want to run “grid enabled” jobs.
- You have geographically distributed compute resources operating under different administrative domains that allow “grid enabled” jobs to be submitted.

- Given these two positions are true… What next?

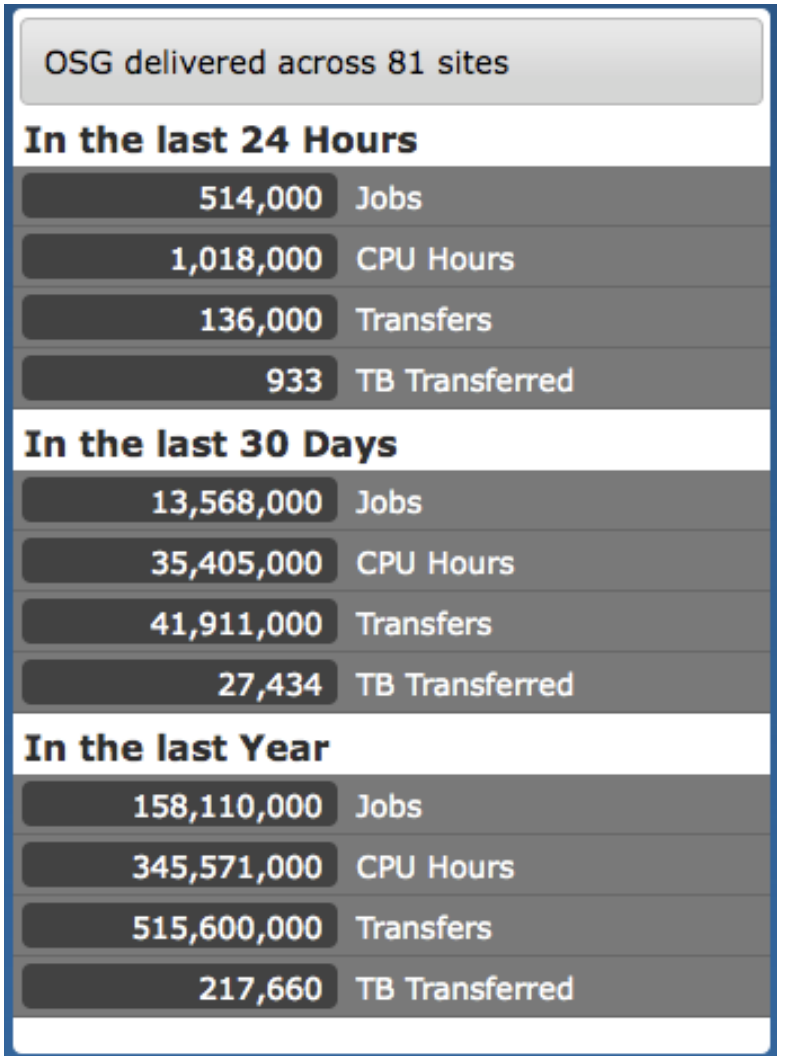
Economies of Scale

There are factors that cause a producer's average cost per unit to fall as the scale of output is increased. "Economies of scale" is a long run concept and refers to reductions in unit cost as the size of a facility and the usage levels of other inputs increase.

-Wikipedia

OSG

"The Open Science Grid (OSG) advances science through open distributed computing. The OSG is a multi-disciplinary partnership to federate local, regional, community and national Cyberinfrastructures to meet the needs of research and academic communities at all scales."

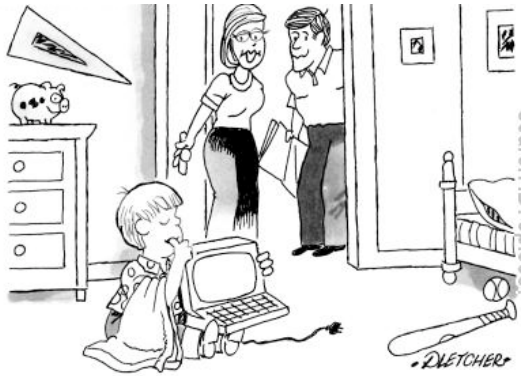


What is Operations?

- Business Operations Definition

"Operations transform resource or data inputs into desired goods, services, or results, and create and deliver value to the customers."

- businessdictionary.com



"NOTICE HOW HE LIKES HIS PERSONAL COMPUTER ALMOST AS WELL AS HIS SECURITY BLANKET..."

What is OSG Operations?

- Community
  - Communication
  - Support
  - Infrastructure

Who Uses OSG Operations?

- Users
- Resource Administrators
- VOs
  - VO Administrators
  - Application Developers
- Other Interests
  - OSG Management
  - Funding Agencies

- Anyone with an OSG or “Grid” Issue or Problem

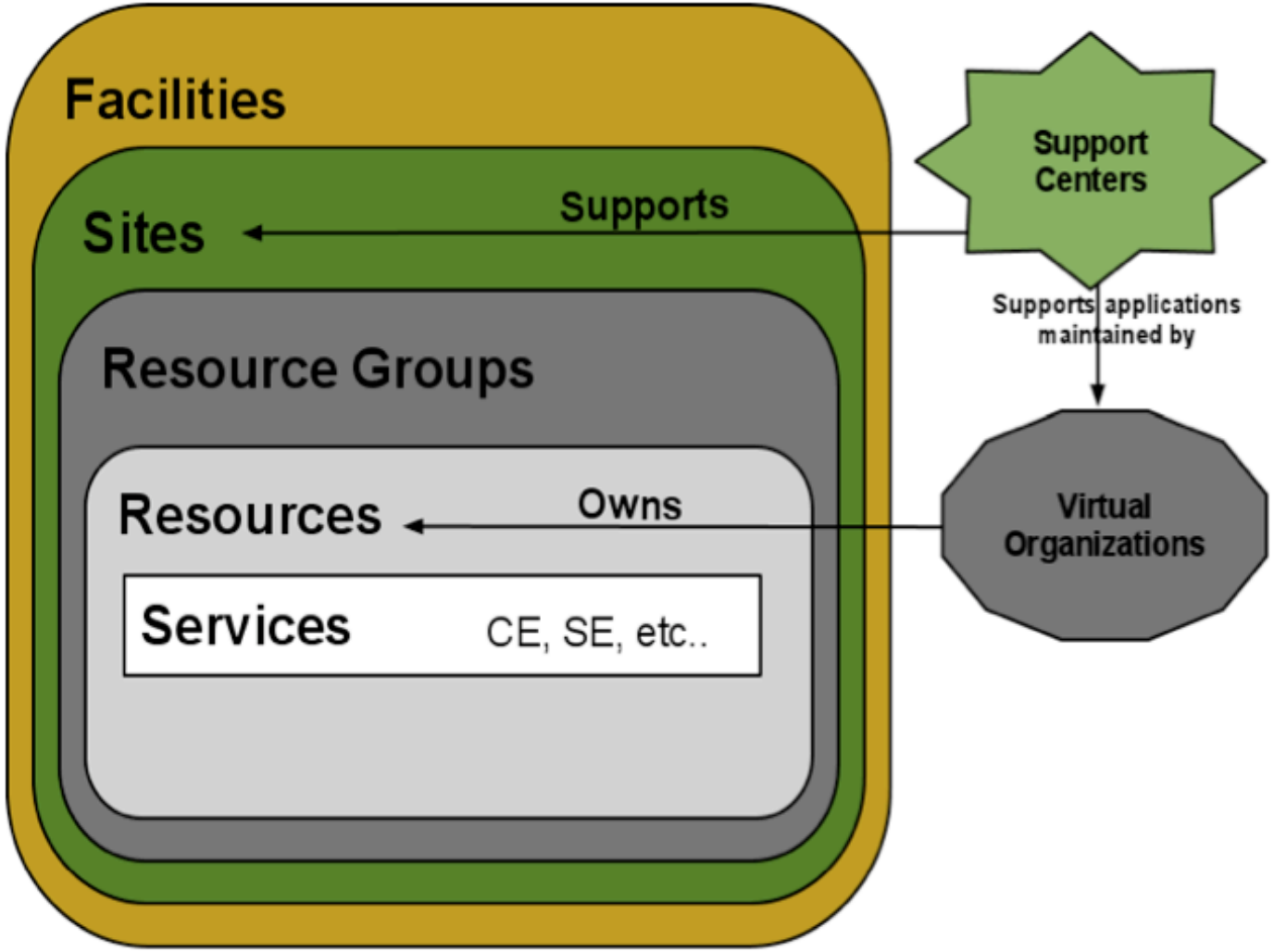
A User Walkthrough

- Issuing Credentials
- Registration with OSG and/or VO
- Documentation for getting started
  - Extracting and Using Credentials
  - Client Installation
- Software Cache
- Resource Discovery
  - BDII, ReSS, OSG Matchmaker
- Problem Reporting/Troubleshooting
- Accounting

A Resource Administrator Walkthrough

- Issuing Credentials
- Installation Documentation
- Software Cache
- Resource Registration
  - Administrative
  - Security
- Publishing
- Monitoring
- Reporting Issues/Troubleshooting
- Accounting

Some Operational Terminology



OIM Registration Database

- Describes OSG Topology
- Record of Administrative Data
  - Administrative Contacts
  - Emergency Contacts
  - Other Descriptive Information
- Semi-static Technical Information
  - Important endpoints (Resource and VO)
  - Information Publishing
  - Part of WLCG
- Downtime Information
- https://oim.grid.iu.edu

TWiki Collaborative Documentation

- Collaborative Documentation Environment
  - Installation Documentation
    - OSGRA Documentation (How to Install a Cert)
  - Details on all OSG Work Areas
    - Operations
    - Engagements
    - VOs
    - Many Others
  - Technical Documentation
- Weekly Meeting Agendas and Minutes
- Weak Search Engine
- https://twiki.grid.iu.edu

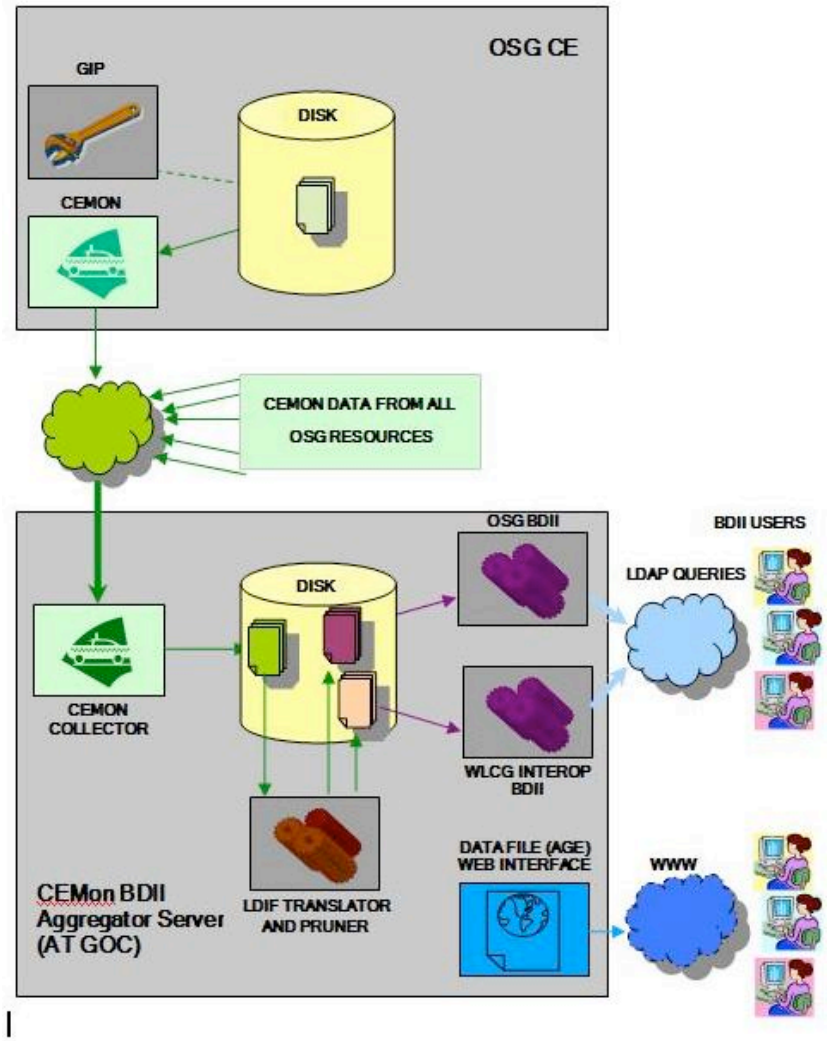
OSG Middleware Cache

- http://software.grid.iu.edu/
- Pointers to VDT Software Packages
- Certificate Authority Distribution (CADist)
  - http://software.grid.iu.edu/pacman/cadist/
- VO Package
- Certificate Requests
  - https://software.grid.iu.edu/cert/certreg.php

Information Systems

- BDII
  - GLUE Schema LDIF
  - http://is.grid.iu.edu
  - How to write an LDAP Search (Coming Up)
- ReSS
  - GLUE Schema Class Ad
  - https://osg-ress-1.fnal.gov:8443/ReSS/
- OSG Matchmaker
  - Mats Already Covered This
- MyOSG
  - Raw GLUE Data
  - Along with other important information

BDII Architecture



Schematic of CEMon BDII Information Service on the OSG

Open Science Grid

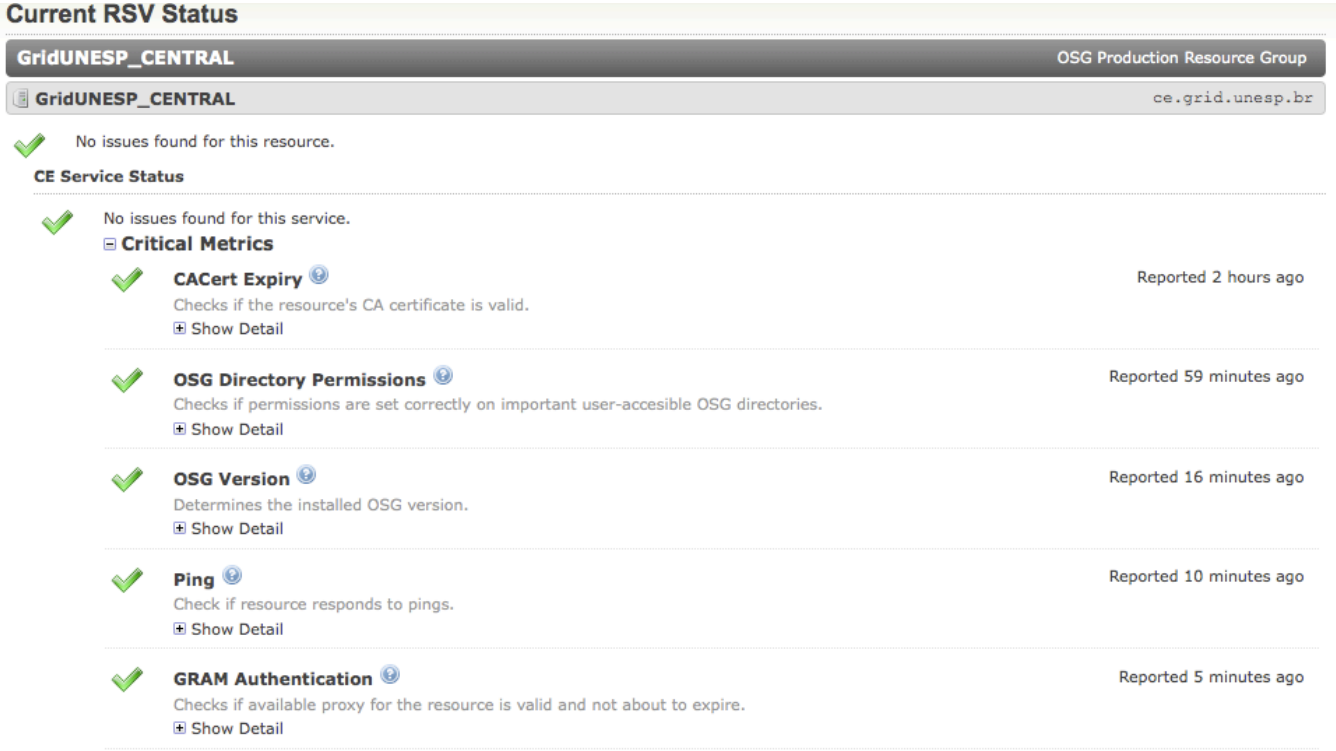
Hands On BDII

Constructing a BDII Query

- `ldapsearch -h is.grid.iu.edu -p 2170 -x -b mds-vo-name=local,o=grid`
- `ldapsearch -h is.grid.iu.edu -p 2170 -x -b mds-vo-name=GridUNESP_CENTRAL,mds-vo-name=local,o=grid`
- `ldapsearch -h is.grid.iu.edu -p 2170 -x -b mds-vo-name=local,o=grid "(&(objectClass=GlueCE) (GlueCEAccessControlBaseRule=*gridunesp))”`
- `ldapsearch -h is.grid.iu.edu -p 2170 -x -b mds-vo-name=local,o=grid "(&(objectClass=GlueCE) (GlueCEAccessControlBaseRule=*gridunesp))” GlueCEInfoLRMSType GlueCEStateFreeCPUs GlueCEInfoApplicationDir GlueCEInfoDataDir`

Monitoring

- Resource and Service Validation (RSV)
  - Locally run probes on baseline functionality
  - Results published to the RSV Collector
  - Some results pushed forward to WLCG



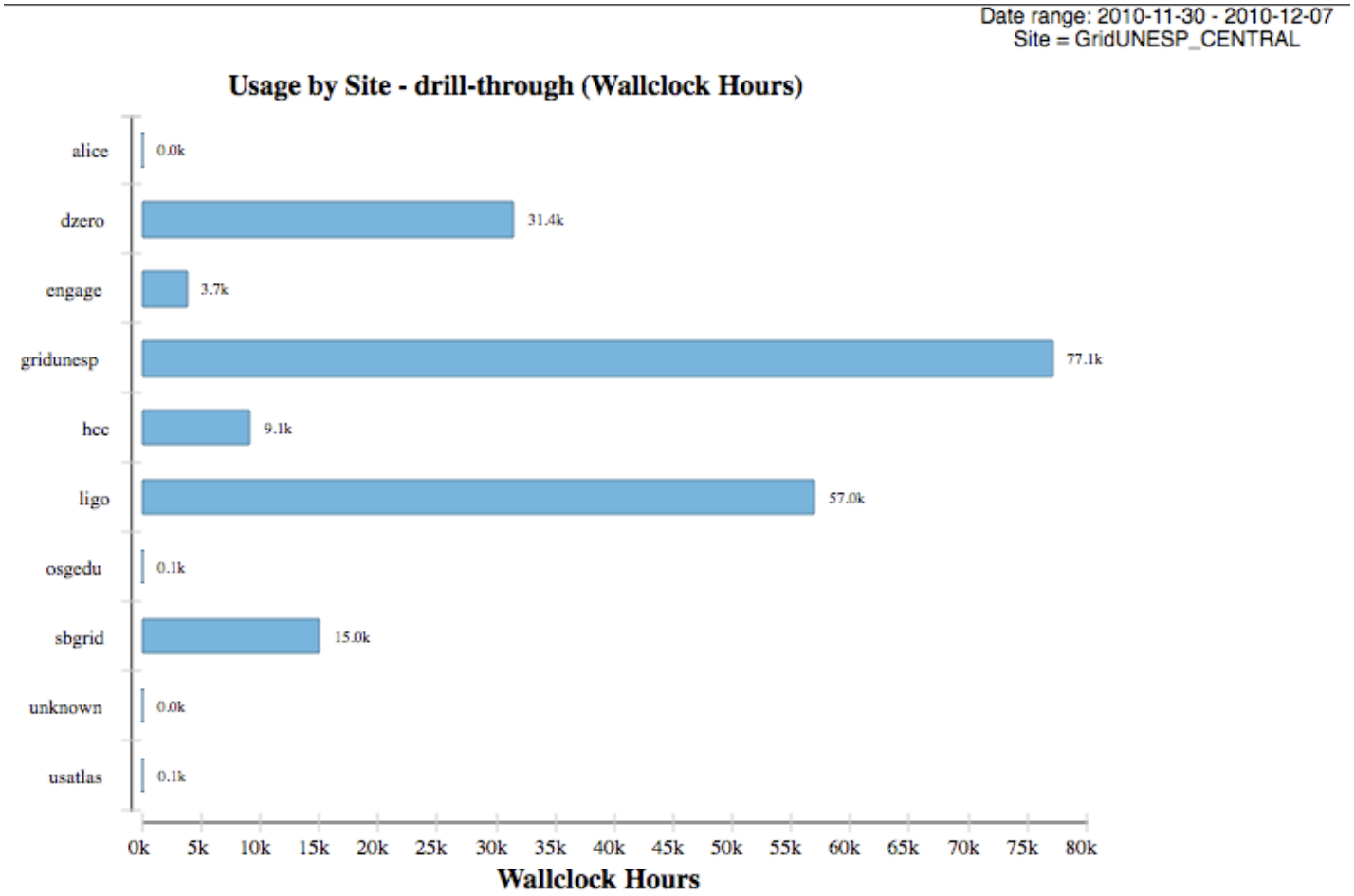
Uh oh! Trouble!!

- Something goes wrong somewhere in the chain…
  - https://ticket.grid.iu.edu
  - ~8-10 tickets per day
  - Same interface to submit and track tickets

- If you ever get stuck, get an error, can't accomplish something submit a ticket!

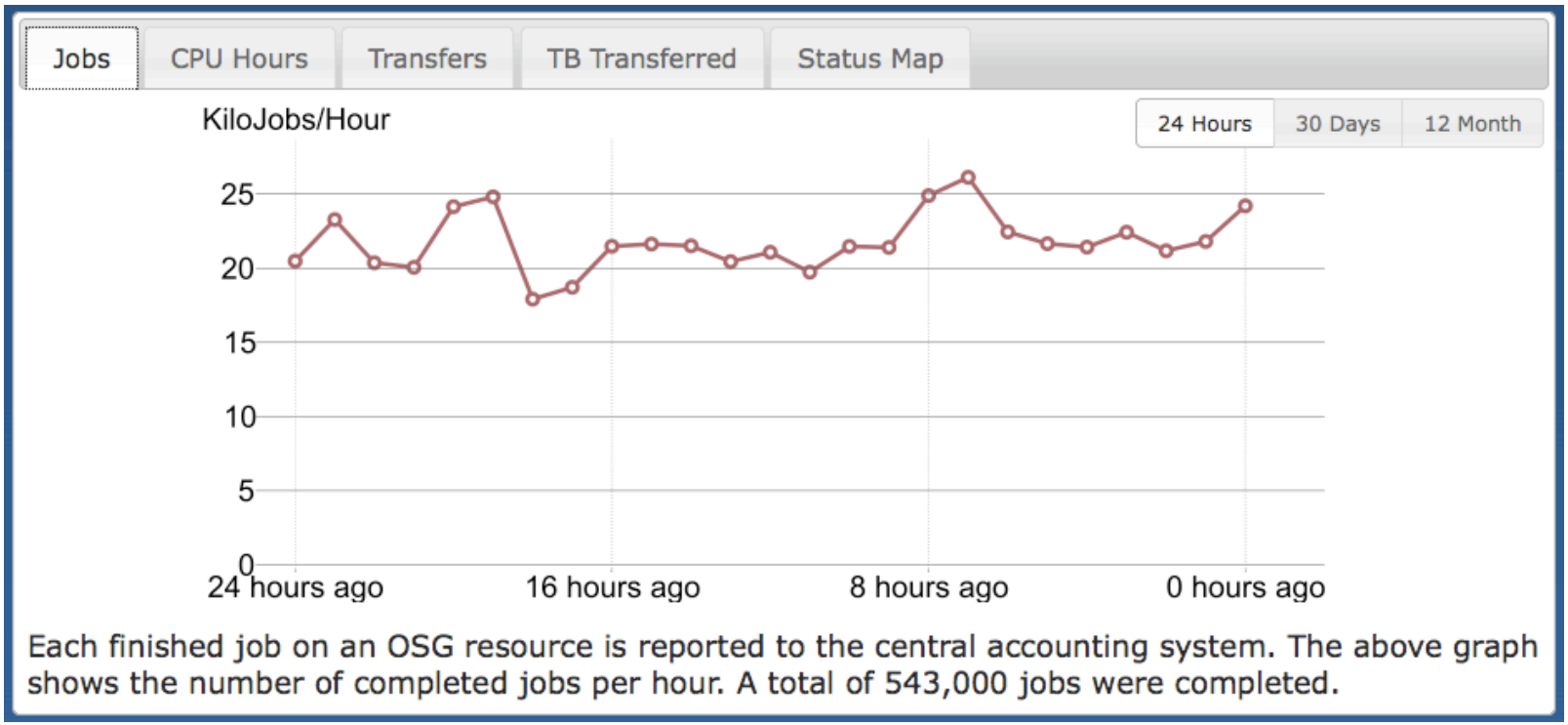
Accounting

- http://gratia-osg-prod-reports.opensciencegrid.org/gratia-reporting/



OSG Display

- http://display.grid.iu.edu/
- Accounting and Status Monitoring Overview
  - Created specifically for the DOE



More Communication

- Community Notifications
  - http://osggoc.blogspot.com/
- OSG Web Pages
  - http://www.opensciencegrid.org/
- Document Database
  - http://osg-docdb.opensciencegrid.org/
- Trouble Ticket Exchange
  - GGUS, USATLAS, VDT
- VOMS for MIS and OSGEDU

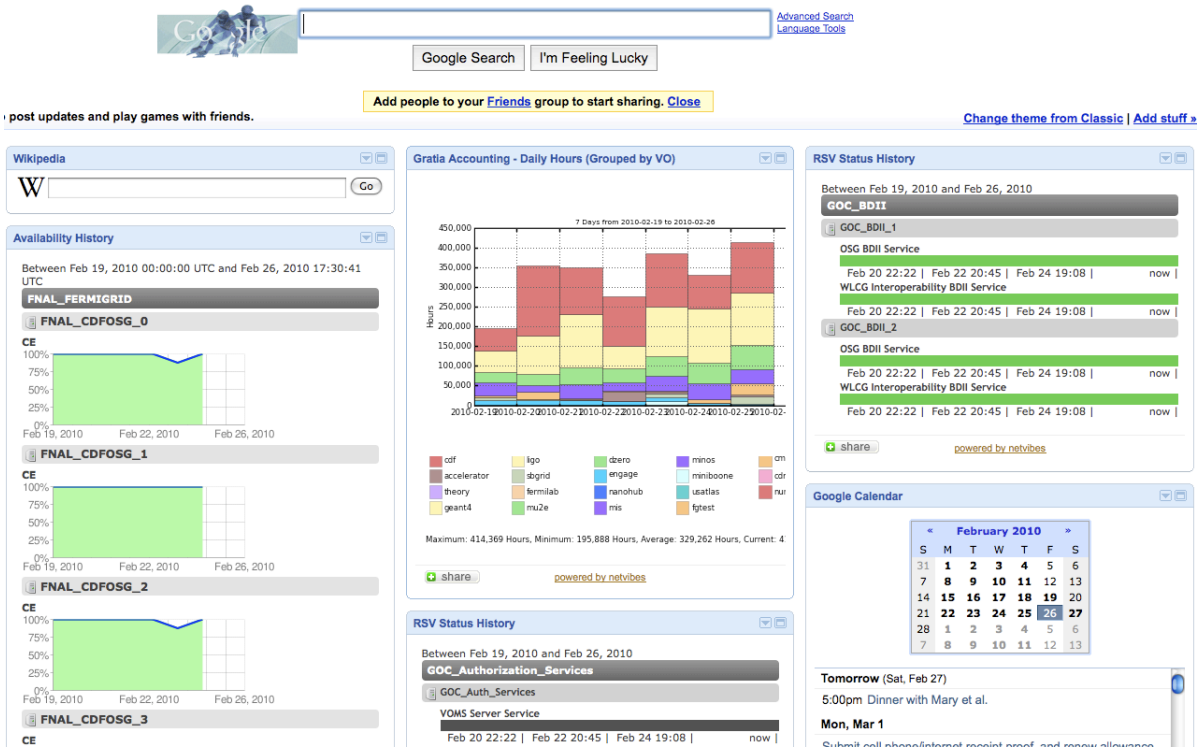
The ITB and Operations Services

- Most services mentioned have a mirror Integration Testbed (ITB) Service
  - New features and bug fixes
  - Testing

- Change Management Schedule
  - 1st,3rd Tuesdays ITB Release
  - 2nd, 4th Tuesdays Production Release

MyOSG Presentation

- Ties most services together at a single address
  - https://myosg.grid.iu.edu



Open Science Grid

MyOSG

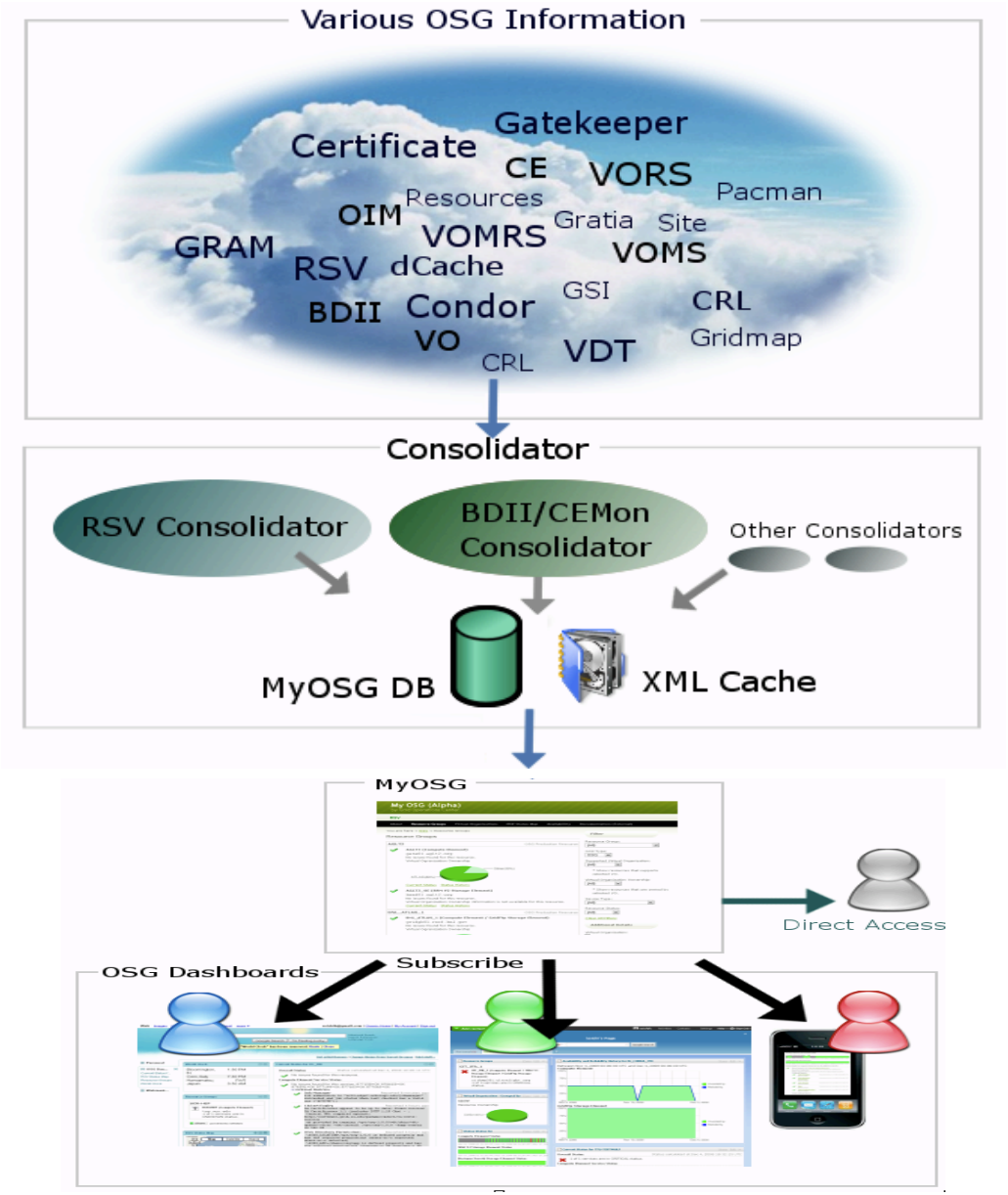
- The **Problem** we were trying to solve
  - There are a plethora of **Operational Tools**
    - Administrative, Monitoring, Accounting, Information Systems
  - Several different groups are **Developing** these tools independently
  - Users find these tools **Useful** for various information
  - These tools are **Distributed** out among a variety of sources
  - **New collaborators** didn't know each of these tools and sometimes are unaware of the information published about there resource
  - **Experienced collaborators** had to manage several bookmarks to each source of information
  - Different sources could sometime be publishing **contradictory** information

Open Science Grid

Other Considerations

- Each consumer of Operational Data needs a **Unique** view
  - The site administrator, the application submitter, the Operations Coordinator, etc.
- Data should be available in the form the user can adopt into there **own daily workflow**
- New tools services should be **easily added** as they are developed and become useful to the community
- All the information should be available from a **single** location

Original Conceptual Design



Experiences

- **Widgets** (UWA format) didn't catch on like we expected
  - Though it is still available
- **Mobile content**, **XML** or using the MyOSG **web pages** directly are most popular forms of access
- New consolidators are **rarely** necessary
  - Though easy enough to add

- Merlin Mann

  "…open your heart to the remote possibility that any mythology of personal failure that involves messiahs periodically arriving to make everything "easy" for you might not *really* be helping your work *or* your mental health *or* your long-standing addiction to using tools solely to ship new excuses."

Hands On MyOSG

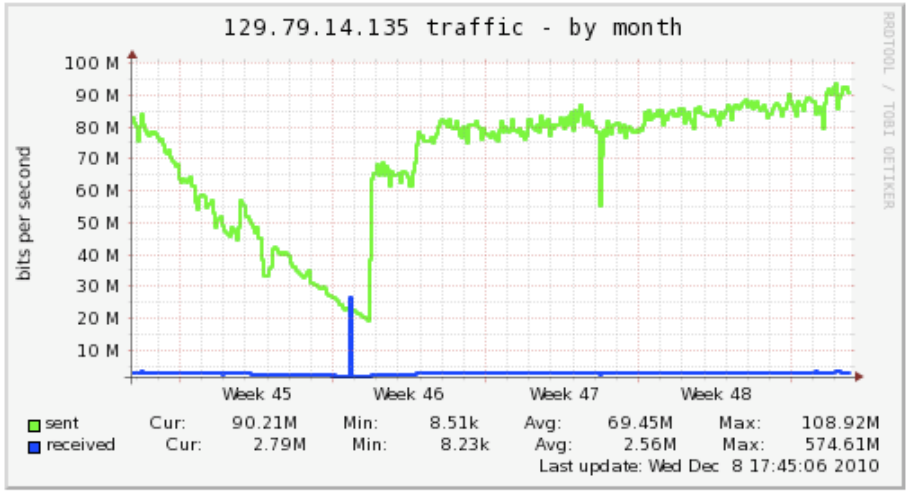
Open Science Grid

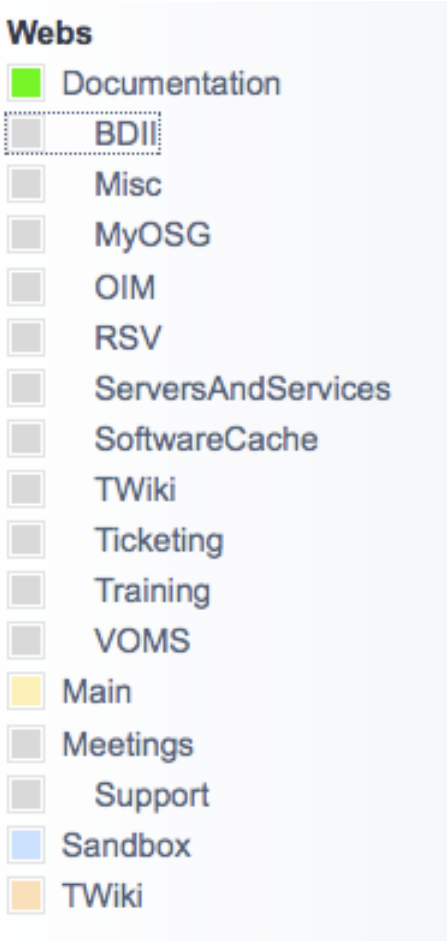
Some Things to Try

- Filter on an Interesting Visualization
  - Health, Accounting, Administrative, Information
- Filter on an Interesting Set of Resources
- Export in an interesting Format
  - Universal Widget API (UWA), XML, Mobile

Internal Monitoring

- Internal Monitoring and Documentation





What Other Services are Needed?

Human Support Services

- Answering Phone/Email/Tickets
  - 24x7x365 Coverage
- Troubleshooting and Routing of Issues
- Emergency Response
  - Certificate Revocation
- Organizing Meetings
- Building Relationships
- Engaging the OSG Community