

# **OSG Operational Infrastructure**

December 12, 2008

II Brazilian LHC Computing Workshop

Rob Quick - Indiana University

Open Science Grid Operations Coordinator



# Contents

---

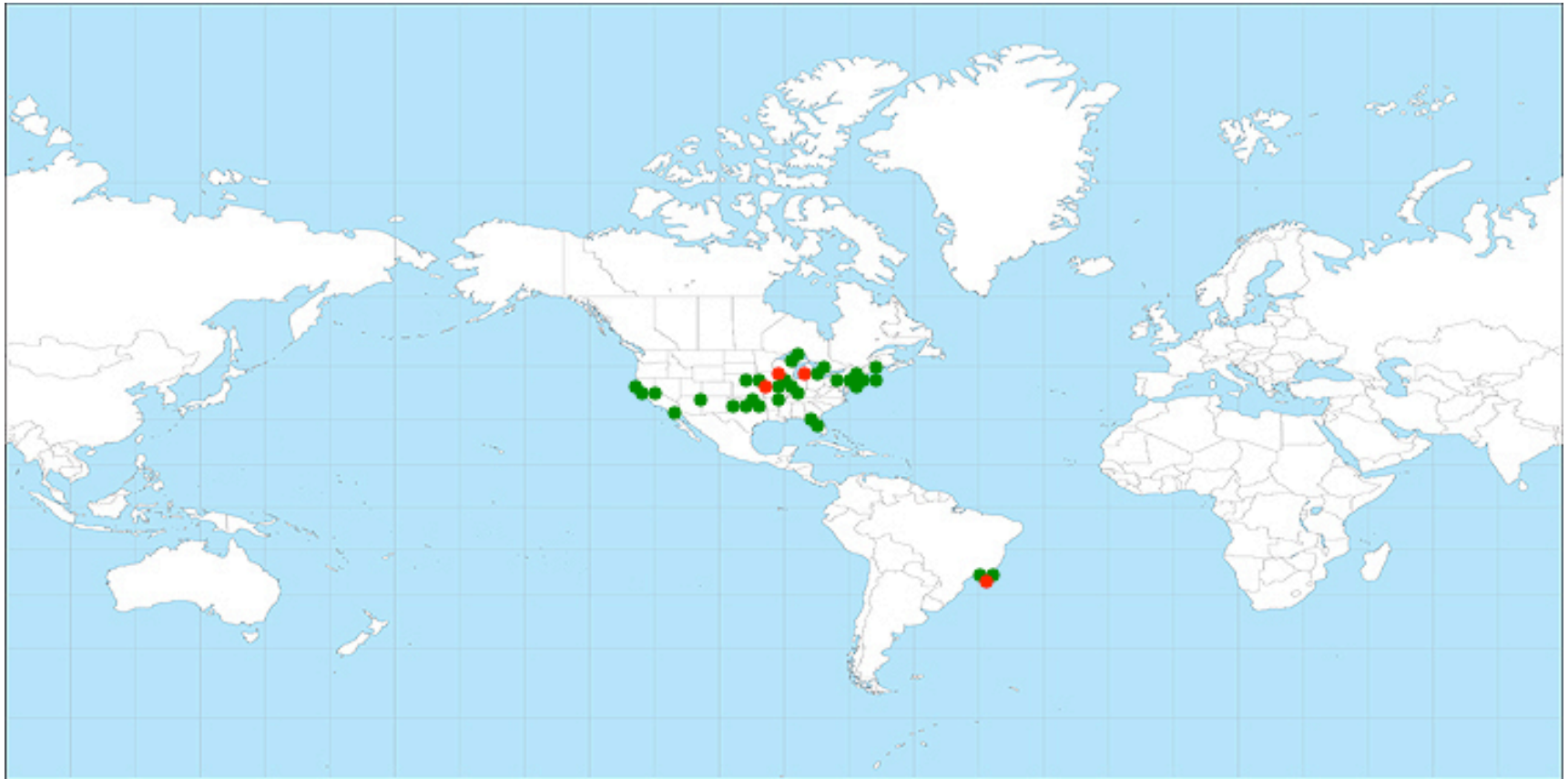
- ✓ Introduction to the OSG Operations Center (GOC)
- Support Services
- Hardware and Facility Services
- Compute Services
- Lessons Learned as Operations Coordinator
- Questions and Comments



Open Science Grid

# The Open Science Grid

---





# What is the GOC?

---

- Modeled off of the hugely successful Global Research Network Operations Center (<http://www.grnoc.iu.edu>)
  - The GRNOC services worldwide research and education networks such as Internet 2, NLR, AMPATH, TransPAC, MAN LAN, and others with highly responsive network support.
  - Collocated with the GOC to leverage 24x7 support.
  - Leveraged other systems such as ticketing, internal monitoring, people and knowledge of Operations Centers
- 6 FTE Effort (4 OSG and 2 IU)
  - Split into separate Support and Service Infrastructure groups.
  - OSG is a distributed grid, so operational effort is not entirely at IU, FNAL, BNL, and others offer contributions
- Hardware located at IU Bloomington, IU Indianapolis, and FNAL
- Services are run locally but usually borrowed from other sources
  - Some bridging development is necessary for these services



# What do we do?

---

- Support Services
  - User, Administrator, Application Developer, and Other Collaborator Support
  - Problem Tracking and Troubleshooting
  - Communication Hub
  - Participation in just about every aspect of OSG
- Hardware Services
  - Physical Facility Infrastructure
  - System Administration
  - Testing Environments
- Compute Services
  - Information Services
  - Monitoring Services
  - Communication Services
  - Administrative Services
  - Metric and Reporting Services
  - Collaborative Documentation Services



# Contents

---

- Introduction to the OSG Operations Center (GOC)
- ✓ Support Services
- Hardware and Facility Services
- Compute Services
- Lessons Learned as Operations Coordinator
- Questions and Comments

# OSG Support Services

- User, Administrator, Application Developer, and Other Collaborator Support
  - 24x7 Problem Reporting
    - Webform Submission (<https://oim.grid.iu.edu/goticket/open>)
    - Phone (+1 317 278 9699)
    - Email (goc, support, abuse, incident, help...@opensciencegrid.org)
  - Emergency Response to Security Issues and Critical Service Outages
    - A GOC Engineer is contact 24x7
  - While ticket creation is 24x7 unless there is an security incident or a critical service is down most response is postponed until the next business day
- Problem Tracking and Troubleshooting
  - Footprints Trouble Ticketing System (Leveraged from the GRNOC)
    - GOC Support members gather information and troubleshoot problems received and either find solutions or pass them to the responsible party in the OSG organization
    - ~6200 Tickets in since the OSG was formed, ~70 open tickets being worked at any given time.
  - VO Support Centers handle most VO-centric issues and a lot of times the GOC only acts as a conduit for exchange tickets
    - Automated ticket exchange is set up with WLCG GGUS, BNL RT, FNAL Remedy, VDT RT, and other collaborators

## OSG Footprint Ticket Submitter

[Submit A Ticket](#)
[List Tickets](#)

You are here > List Tickets

[Open Tickets](#)
[Closed Tickets](#)

### CSC

[6003](#) Resource Specific Issue on UNM\_HPC (Support Agency)

### Fermilab

[6136](#) OSG:gums gums.template minerva VO invalid Role (Engineering)

### GLOW-TECH

[6013](#) Running E@H with GLOW (Support Agency)

### GRASE

[6126](#) OSG Resource failing critical site\_verify tests - NYSGRID\_RIT (Support Agency)

### GRATIA

[5986](#) Gratia problem with nanoHUB (Support Agency)  
[5028](#) Gratia Not Reporting for UNM-HPC (Customer)

### IceCube

[6134](#) IceCube VO error in gums.template. (Support Agency)

### MIS

[6124](#) RSV Problem (Engineering)  
[6114](#) GWL problem for Burt Holzman (Engineering)  
[6104](#) OSG TWiki account request -Stephen Chan (Engineering)  
[6085](#) [SBGrid #17670] New VO-Package Released - SBGrid Update and Removal of fMRI \   
[6073](#) IceCube VO Registration (Engineering)  
[6027](#) Gridscan Cert Change Master Ticket (Engineering)  
[5995](#) VO Registration - FermilabGrid (Engineering)  
[5994](#) Suggestions for fixing configure-osg.py script for VO allocation percentages (Support Agency)  
[5718](#) OIM: Why are some registrations missing a 'submitter' contact? (Engineering)  
[5675](#) OIM accepts blank summary on downtime creation/updates (Engineering)

### nanoHUB

[5823](#) Invigo Service00 jobs at NWICG\_NotreDame (Support Agency)

# OSG Support Services (Continued)

- Communication Hub
  - Community Notifications
    - Email
    - News RSS (<http://www.grid.iu.edu/news/>)
  - Collaborative Documentation
    - Twiki (<https://www.twiki.grid.iu.edu>)
- Participation in just about every aspect of OSG
  - Integration
  - Software and Tools
  - Security
  - WLCG Interoperability
  - Education and Outreach
  - Site Admins Group
  - VO Users Group
  - Storage
  - Executive Board and Council



## Grid Operations Center News & Announcements

Operations Home

Submit a Trouble Ticket

OSG Registration (OIM)

OSG Maintenance

Operations News

Systems/Services

Working Documents & Files

Meetings & Events

OSG Registration Authority

Footprints Login

Trouble Ticket Reports

Search the OSG Site:

search... GO

Search OSG at Work:

search... GO

View or Subscribe to our RSS Feed: [RSS](#)

[RSV Collector down for maintenance - Update 2008-12-11 \(Ticket 6131\) - \(OSG-GOC Ticket #6131\)](#)  
**Thu, 11 Dec 2008 12:50:12 UTC** - RSV Collector down for maintenance - Update 2008-12-11 (Ticket 6131)

[RSV Collector down for maintenance](#)  
**Wed, 10 Dec 2008 17:36:41 UTC** - RSV Collector down for maintenance

[VDT 1.10.1p has been released](#)  
**Wed, 10 Dec 2008 1:44:07 UTC** - VDT 1.10.1p has been released

[OSG CA distribution v1.2](#)  
**Tue, 9 Dec 2008 20:48:33 UTC** - OSG CA distribution v1.2

[VDT 1.10.1n has been released](#)  
**Tue, 25 Nov 2008 21:08:27 UTC** - VDT 1.10.1n has been released

[Service Restored After Brief BDII Outage - \(OSG-GOC Ticket #6047\)](#)  
**Fri, 21 Nov 2008 21:42:51 UTC** - Service Restored After Brief BDII Outage

[Emergency RSV Collector maintenance Nov 13 2008 -- COMPLETE](#)  
**Thu, 13 Nov 2008 20:06:36 UTC** - Emergency RSV Collector maintenance Nov 13 2008 -- COMPLETE

[Emergency RSV Collector maintenance Nov 13 2008](#)  
**Thu, 13 Nov 2008 19:58:39 UTC** - Emergency RSV Collector maintenance Nov 13 2008

[New VO-Package Released - SBGrid Update and Removal of fMRI VO - \(OSG-GOC Ticket #5967\)](#)  
**Tue, 11 Nov 2008 14:25:28 UTC** - New VO-Package Released - SBGrid Update and Removal of fMRI VO

[OIM Downtime 11/3 COMPLETED! - \(OSG-GOC Ticket #5941\)](#)  
**Tue, 4 Nov 2008 17:41:07 UTC** - OIM Downtime 11/3 COMPLETED!

[OIM Downtime 11/3 - \(OSG-GOC Ticket #5941\)](#)  
**Mon, 3 Nov 2008 22:10:54 UTC** - OIM Downtime 11/3

[GOC OIM and Central RSV Collector Maintenance - \(OSG-GOC Ticket #5935\)](#)  
**Mon, 3 Nov 2008 19:44:29 UTC** - GOC OIM and Central RSV Collector Maintenance

[TWiki Service Restored - \(OSG-GOC Ticket #5911\)](#)  
**Fri, 31 Oct 2008 2:53:57 UTC** - TWiki Service Restored

[OSG TWiki Outage - \(OSG-GOC Ticket #5911\)](#)  
**Thu, 30 Oct 2008 22:54:00 UTC** - OSG TWiki Outage

[OSG TWiki Maintenance Complete - \(OSG-GOC Ticket #5897\)](#)  
**Thu, 30 Oct 2008 19:57:54 UTC** - OSG TWiki Maintenance Complete

View or Subscribe to our RSS Feed: [RSS](#)





# Contents

---

- Introduction to the OSG Operations Center (GOC)
- Support Services
- ✓ Hardware and Facility Services
- Compute Services
- Lessons Learned as Operations Coordinator
- Questions and Comments



# Hardware Services

---

- Physical Facility Infrastructure
  - State of the Art Machine Room Facilities (Indianapolis and Bloomington)
  - Power and Cooling (24x7 machine room operators on site)
  - Institutional Backup System
  - Institutional Security (Physical and Software)
  - Network Facilities (GRNOC in house)
- System Administration
  - One Full Time Administrator
  - Approximately 25 Machines
    - Mostly Dell PowerEdge
  - RHEL 5.1 and Gentoo OS
- Testing Environments
  - For each production instance of a service there is at least one integration or test instance
  - Test Instances Moving to VMs



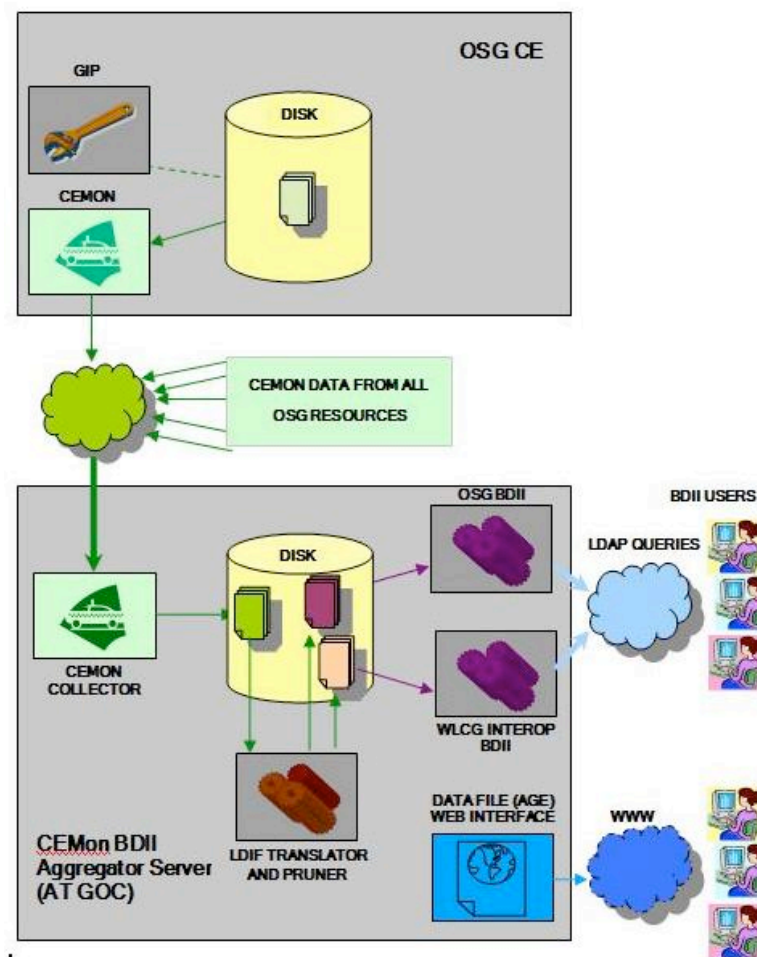
# Contents

---

- Introduction to the OSG Operations Center (GOC)
- Support Services
- Hardware and Facility Services
- ✓ Compute Services
- Lessons Learned as Operations Coordinator
- Questions and Comments

# Compute Services (Information Services)

- **BDII**
  - Defined as a Critical level service by CMS and ATLAS
  - CEMon Client pushes raw GLUE Schema to collectors
  - Data is put into BDII which allows the information to be collected via LDAP queries
  - Currently running queries at about 60Hz, testing has show we should be OK up to ~5 times this level on one BDII instance
  - DNS Roundrobing is currently being set up this will allow failover and load balancing
  - Pushed up to WLCG top level BDII
- **ReSS**
  - Housed at FNAL
  - CEMon pushes raw GLUE data to the ReSS collector
  - Uses Condor friendly class-ads



Schematic of CEMon BDII Information Service on the OSG



# Compute Services (Monitoring Services)

---

- RSV
  - Local test probes test basic grid functionality
    - CondorCron Scheduler
    - Gratia Collector
  - Puts monitoring back into the hands of the Admin
  - Results are published locally and to the GOC
  - ATLAS and CMS results are forwarded to WLCG in a specified format
  - Alpha version of central display tools at <http://myosg.grid.iu.edu/resources>
    - Allows individually filtered views
- VOMS Monitor
  - Sends queries to VOMS machines to see if they are available
  - Tabular display at <http://voms-monitor.grid.iu.edu/cgi-bin/index.cgi>
- VORS
  - Serial heartbeat monitoring
  - Soon to be deprecated
  - Display at <http://vors.grid.iu.edu>
- GIP Validator
  - Tests for sanity of GIP data reported by resources
  - Being redesigned by CMS



# Compute Services (Monitoring Services)

---

- RSV
  - Local test probes test basic grid functionality
    - CondorCron Scheduler
    - Gratia Collector
  - Puts monitoring back into the hands of the Admin
  - Results are published locally and to the GOC
  - ATLAS and CMS results are forwarded to WLCG in a specified format
  - Alpha version of central display tools at <http://myosg.grid.iu.edu/resources>
    - Allows individually filtered views
- VOMS Monitor
  - Sends queries to VOMS machines to see if they are available
  - Tabular display at <http://voms-monitor.grid.iu.edu/cgi-bin/index.cgi>
- VORS
  - Serial heartbeat monitoring
  - Soon to be deprecated
  - Display at <http://vors.grid.iu.edu>
- GIP Validator
  - Tests for sanity of GIP data reported by resources
  - Being redesigned by CMS



## Compute Services (Other Services)

---

- Communication Services
  - Footprints Trouble Ticket System
    - Trouble Ticket Exchange
  - Notification Tools
  - News Feeds
  - Webform Ticket Submissions
  - Downtime Reporting Tools
  - Weekly Operations Meeting
- Administrative Services
  - OSG Information Management Database
  - Software Caches
- Metric and Reporting Services
  - Several daily reports about status of OSG
  - Availability and Reliability Statistics to WLCG
  - Trouble ticket metrics
- Collaborative Documentation Service
  - TWiki



# Contents

---

- Introduction to the OSG Operations Center (GOC)
- Support Services
- Hardware and Facility Services
- Compute Services
- ✓ Lessons Learned as Operations Coordinator
- Questions and Comments





## Lessons Learned

---

- Supporting a wide range of collaborators takes a wide range of support mechanisms.
- The number one cause of problems is solutions.
- While distributed hardware works well, some central coordinating and reporting services will always be necessary.
- There is always more work than effort.
- A centralized troubleshooting group can not find and solve every customer issue.
- Bad documentation can be worse than no documentation.
- Everyone has need of a different view of the OSG. (Admin, User, GOC Engineer, VO Coordinator, Support Center)
- Conway's Law: Any piece of software reflects the organizational structure that produced it.
- Any data that does not exist in two places, may not exist at all.



## Lessons to be Learned

---

- The LHC turn up will create an explosion in the user base, how will the OSG infrastructure and support mechanisms handle this load.
- Can we effectively consolidate the information sources into a single display?
- How will collaborators embrace RSV? We can only report issues, we can not fix them.
- Can social networking technologies help build community?
- How will growth and expansion affect operations?



# Contents

---

- Introduction to the OSG Operations Center (GOC)
- Support Services
- Hardware and Facility Services
- Compute Services
- Lessons Learned as Operations Coordinator
- ✓ Questions and Comments