



OSG SITE INSTALLATION AND MAINTENANCE

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INTRODUCTION TO OSG TERMS AND OPERATIONS

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Introduction to OSG terms and operations

The OSG compute element

Installing an OSG site

Maintaining a site

Q&A time

INTRODUCTION TO OSG

- OSG stands for Open Science Grid
- Provides high-throughput computing across US
 - Currently more than 75 sites
 - Recent stats:
 - 282,912 jobs for 433,051 hours
 - Used 75 sites
 - Jobs by ~20 different virtual organizations
 - 92% of jobs succeeded
 - Underestimate: 4 sites didn't report anything
 - Provides opportunistic computing for VOs
- Focus on high-throughput computing rather than high performance computing

BASIC TERMS

- CE – Compute Element
- SE – Storage Element
- VO – Virtual Organization
- WN – Worker Node
- GOC – Grid Operations Center
- VDT – Virtual Data Toolkit
- DN – Distinguished name
- VOMS – Virtual Organization Management Server
- GUMS – Grid User Management Server

YOUR ROLE AS AN ADMIN

- As a site admin, you should:
 - Keep in touch with OSG (downtime, security, etc.)
 - Respond to trouble tickets or inquiries from GOC
 - Plan your site's layout
 - Update software as needed (within limits)
 - Participate and be a good community member

SUPPORT PROVIDED FOR ADMINS

- OSG provides:
 - Software and ancillary information (configuration tools, documentation, recommendations)
 - Assistance in keeping site running smoothly
 - Help in troubleshooting and installing software
 - Users for your site
 - An exciting, cutting-edge, 21st-century collaborative distributed computing grid cloud buzzword-compliant environment

INSTALLING AN OSG SITE

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SITE PLANNING

- Bureaucratic details
- Cluster layout
- Disk layout / sharing
- Authorization

BUREAUCRACY

- Certificates (personal/host)
- VO registrations
- Registration with OSG
 - Need a site name (e.g. UC_ITB)
 - Need contacts (security, admin, etc.)
- Site policy on web

STARTING OUT

- Everyone using OSG gets a personal certificate because it is required to do any activity on an OSG resource
- Will need to know or contact someone with DOEGrids certificate in order to obtain a personal certificate

SITE REGISTRATION USING OIM

- Done using OIM at <https://oim.grid.iu.edu/>
- Will need to register first,
- After GOC approves registration :
 - Registrations > Resources > Add New Resource

CLUSTER LAYOUT

- How is software / data being shared
 - NFS can work but gets bogged down with larger workloads
 - Where do services run?
 - Single server vs. dedicated servers
 - Worker node software?
 - Locally present on worker nodes vs. served over nfs
 - Certificates shared?

REQUIRED DIRECTORIES FOR CE / CLUSTER

- **OSG_APP:** Store VO applications
 - Must be shared (usually NFS)
 - Must be writeable from CE, readable from WN
 - Must be usable by whole cluster
- **OSG_GRID:** Stores WN client software
 - May be shared or installed on each WN
 - May be read-only (no need for users to write)
 - Has a copy of CA Certs & CRLs, which must be up to date
- **OSG_WN_TMP:** temporary directory on worker node
 - May be static or dynamic
 - Must exist at start of job
 - Not guaranteed to be cleaned by batch system

OPTIONAL DIRECTORIES FOR CE

- **OSG_DATA:** Data shared between jobs
 - Must be writable from the worker nodes
 - Potentially massive performance requirements
 - Cluster file system can mitigate limitations with this file system
 - Performance & support varies widely among sites
 - 0177 permission on OSG_DATA (like /tmp)

SPACE REQUIREMENTS

- Varies between VOs
 - Some VOs download all data & code per job (may be Squid assisted), and return data to VO per job.
 - Other VOs use hybrids of OSG_APP and/or OSG_DATA
- OSG_APP used by several VOs, not all.
 - 1 TB storage is reasonable
 - Serve from separate computer so heavy use won't affect other site services.
- OSG_DATA sees moderate usage.
 - 1 TB storage is reasonable
 - Serve it from separate computer so heavy use of OSG_DATA doesn't affect other site services.
- OSG_WN_TMP is not well managed by VOs and you should be aware of it.
 - ~100GB total local WN space
 - ~10GB per job slot.

WORKER NODE STORAGE

- Provide about 12GB per job slot
- Therefore 100GB for quad core 2 socket machine
- Not data critical, so can use RAID 0 or similar for good performance

AUTHORIZATION

- Two major setups:
 - Gridmap setup
 - File with list of mappings between DN and local account
 - Can be generated by edg-mkgridmap script
 - Doesn't handle users in multiple VOs or with VOMS roles
 - GUMS Service with list of mappings
 - A little more complicated to setup
 - Centralizes mappings for entire site in single location
 - Handles complex cases better (e.g. blacklisting, roles, multiple VO membership)
 - Preferred for sites with more complex requirements
 - Ideally on dedicated system (can be VM)

CE INSTALLATION OVERVIEW

- Prerequisites
 - Certificates
 - Users
- Installation
 - Pacman
- Configuration
- Getting things started

LOCAL ACCOUNTS

- You need following local accounts:
 - User for RSV
 - Daemon account used by most of VDT
 - Globus user is optional but will be used if found

BASIC INSTALLATION AND CONFIGURATION

- Install Pacman
 - Download
 - http://physics.bu.edu/pacman/sample_cache/tarballs/pacman-3.26.tar.gz
 - Untar (keep in own directory)
 - Source setup
- Make OSG directory
 - Example: `/opt/osg` symlink to `/opt/osg-1.0`
- Run pacman commands
 - Get CE (`pacman -get OSG:ce`)
 - Get job manager interface (`pacman -get OSG:Globus-Condor-Setup`)
- Configure
 - Run `edg-mkgridmap` or `gums-host-cron`
 - Configure CA certificates updater
 - Edit `config.ini`
 - Run `configure_osg.py` (`configure-osg.py -c`)
- Start services (`vdt-control -on`)

SITE MAINTENANCE

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UPDATING CAs

- CAs are regularly updated
 - New CAs added
 - Old CAs removed
 - Tweaks to existing CAs
- If you don't keep up to date:
 - May be unable to authenticate some user
 - May incorrectly accept some users
- Easy to keep up to date
 - vdt-update-certs
 - Runs once a day, gets latest CA certs

MONITORING SITE STATUS

- Several tools available
- RSV
 - Part of install
 - Will present a web page with quick status update site functionality
 - Can integrate with nagios
- Nagios/Ganglia/Cacti
 - Presents information on non-grid specific details of cluster
 - Can set up alerts, pages, etc.
- Gratia
 - Provides accounting information on jobs running on your site
 - Useful to see who is using your site and how much utilization comes from various users
- Daily/Weekly email reports
 - Provides quick information on your site and osg at large at a glance



OSG RSV Status - Main

04-07-2009 15:33:07

[Archived HTML pages](#)

uct3-edge7.uchicago.edu

Probe	Metric	Last Executed	Status
osg-version-probe	org.osg.general.osg-version	2009-04-07 15:21:05 CDT	OK
ping-host-probe	org.osg.general.ping-host	2009-04-07 15:27:01 CDT	OK
cacert-crl-expiry-probe	org.osg.certificates.cacert-expiry	2009-04-07 13:48:16 CDT	OK
jobmanagers-status-probe	org.osg.batch.jobmanager-default-status	2009-04-07 14:48:09 CDT	OK
gridftp-simple-probe	org.osg.globus.gridftp-simple	2009-04-07 15:09:02 CDT	OK
vo-supported-probe	org.osg.general.vo-supported	2009-04-07 14:24:14 CDT	OK
gram-authentication-probe	org.osg.globus.gram-authentication	2009-04-07 15:31:01 CDT	OK
cacert-crl-expiry-probe	org.osg.certificates.crl-expiry	2009-04-07 14:48:20 CDT	WARNING
certificate-expiry-local-probe	org.osg.local.httpcert-expiry	2009-04-07 12:06:00 CDT	OK
certificate-expiry-local-probe	org.osg.local.containercert-expiry	2009-04-07 12:29:01 CDT	OK
certificate-expiry-local-probe	org.osg.local.hostcert-expiry	2009-04-07 12:43:00 CDT	OK
vdt-version-probe	org.osg.general.vdt-version	2009-04-07 06:47:08 CDT	OK
cacert-expiry-local-probe	org.osg.local.cacerts-expiry	2009-04-07 12:58:02 CDT	OK
jobmanagers-available-probe	org.osg.batch.jobmanagers-available	2009-04-07 04:59:05 CDT	OK
osg-directories-probe	org.osg.general.osg-directories-CE-permissions	2009-04-07 06:05:07 CDT	OK

uct3-edge6.uchicago.edu

RSV OUTPUT FOR UC_ITB RESOURCE

Web page generated by RSV showing the output of various probes. Clicking on the probe output will give history for last few invocations and error output

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Farms	Nodes status			CPUs	
	Idle nodes (load < 0.5)	Active nodes (load > 0.5)	Total nodes	Number of CPUs	
18. OU_OCHEP_SWT2	13	52	65		
19. OU_OSCER_ATLAS	425	104	529		
20. OU_OSCER_CONDOR	313	17	330		
21. OUHEP_OSG	1	39	40		
22. PolyHub_UT	-	-	-		
23. SBGrid-Harvard-East	8	13	21		
24. SBGrid-Harvard-Exp	5	4	9		
25. SPRACE	54	32	86		
26. TTU-ANTAEUS	0	1	1		
27. UCHC_CBG	16	0	16		
28. UColorado_HEP	9	2	11		
29. UCSDT2	4	93	97		
30. UCSDT2-B	4	93	97		
31. UmissHEP	9	13	22		
32. UNM_HPC	-	-	-		
Total	1093	1547	2640	0	

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Running Jobs Statistics

Integrated Running Jobs - last day

Running Jobs * hours															
Farms \ VOs (**)	ATLAS	CDF	CMS	DOSAR	DZERO	ENGAGE	FERMILAB	GEANT4	GLOW	LIGO	MIS	NANOHUB	RSV	SBGRID	Total
1. AGLT2	2496	-	-	-	-	-	-	-	-	-	0	-	-	-	2496
2. cinvestav	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. CIT_CMS_T2	0.8	-	10458	-	80	-	-	0.1	-	10	-	48	-	-	10597
4. FLTECH	-	-	1819	-	-	-	-	8	20	-	-	-	-	-	1847
5. FSU-HEP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. GLOW	2	2	8842	-	0	0.1	-	0	46	0	-	2	-	-	8894
7. gpnstor-MU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8. GRASE-GENESEO-ROCKS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9. HEPGRID_UERJ_OSG64	4	-	305	-	-	-	-	-	-	-	-	-	-	-	309
10. Lehigh_coral	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11. LONI_OSG1	-	-	-	-	1535	-	-	-	-	-	-	-	-	-	1535
12. LTU_OSG	-	-	-	-	254	-	-	-	-	-	-	-	-	-	254
13. MWT2_IU	1820	-	-	-	5850	-	-	-	-	-	-	-	-	-	7670
14. NWICG_NDCCL	-	-	-	-	-	17	-	-	-	-	-	45	-	-	62
15. NWICG_NotreDame	-	-	-	-	-	1	-	0.9	-	-	-	0.1	-	-	2
16. NYSGRID-CLUSTER04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17. NYSGRID-CUNY-GRID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18. OU_OCHEP_SWT2	1110	-	-	-	5067	-	-	-	-	-	-	-	-	-	6177
19. OU_OSCER_ATLAS	50	-	-	7352	-	-	-	-	-	-	-	-	-	-	7402
20. OU_OSCER_CONDOR	-	-	-	7619	-	-	-	-	-	-	-	-	-	-	7619
21. OUHEP_OSG	-	-	-	1072	-	-	-	-	-	26	-	-	-	-	1098
22. PolyHub_UT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23. SBGrid-Harvard-East	69	-	-	-	-	2	-	3	-	546	-	54	-	5	679
24. SBGrid-Harvard-Exp	-	-	-	-	-	4	2	11	-	0	0.6	77	-	13	108
25. SPRACE	11	-	133	-	2921	-	0.4	-	-	1624	0.1	18	-	-	4908
26. TTU-ANTAEUS	6	-	11	-	48	13	0	3	-	-	-	20	4	-	105
27. UCHC_CBG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28. UColorado_HEP	-	-	123	-	-	-	-	-	-	-	0.1	-	-	-	123
29. UCSDT2	4	1313	7996	-	464	14	-	0.5	313	-	-	6	-	-	10111
30. UCSDT2-B	2	1251	1181	-	-	19	-	0	323	-	-	5	-	-	2781
Total	5575	2566	30868	7352	25474	70	2	27	702	2847	0.8	275	4	18	75782

DAILY EMAIL REPORT ON PRODUCTION SITES

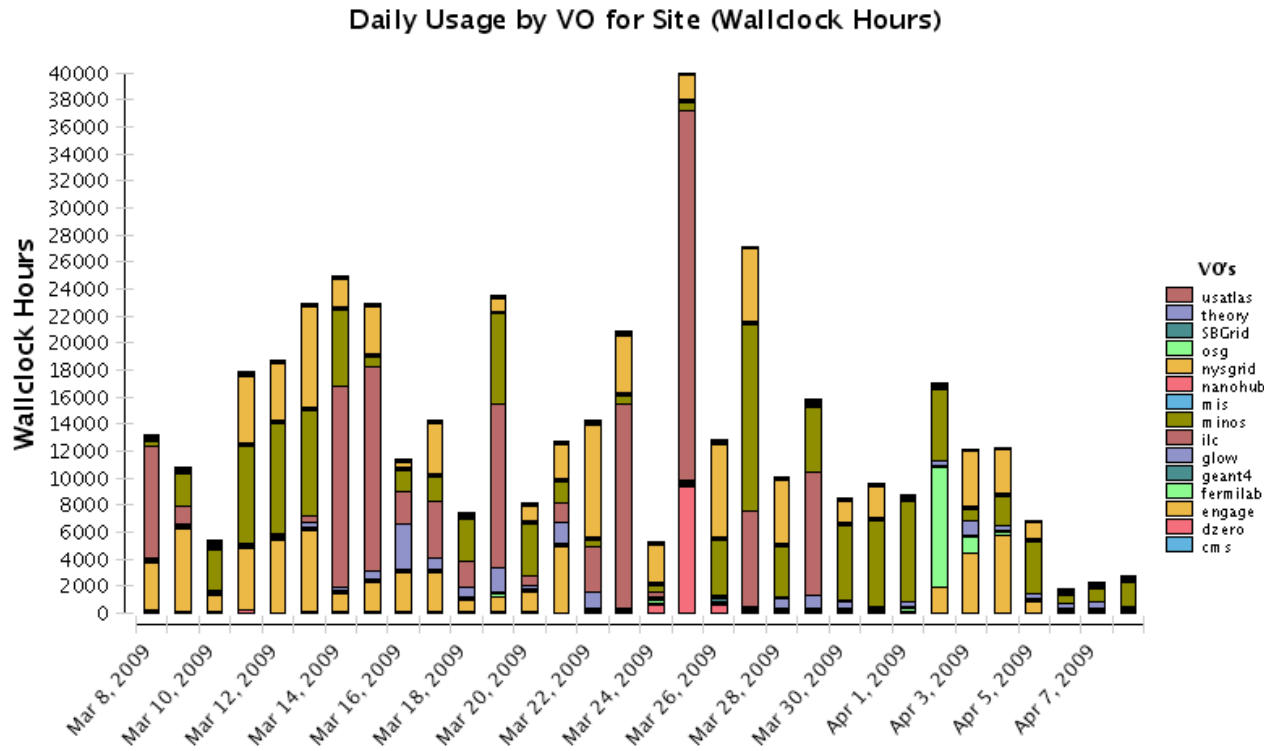
Example of the daily email sent out to administrators with information on jobs and sites over the last day

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GRATIA REPORT FOR THE LAST MONTH AT FERMIGRID

This shows the daily usage by VOs of the Fermigrid resource over the last month as VO validations were run

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GANGLIA OUTPUT FOR CLUSTER AT UC

Top level information on the servers and compute nodes at a small cluster at the University of Chicago, clicking on hosts will allow more detailed information on each host to be obtained

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INCREMENTAL UPDATES

- Frequent (Every 1-4 weeks)
- Can be done within a single installation
- Either manually:
 - Turn off services
 - Backup installation directory
 - Perform update (move configuration files, pacman updates, etc.)
 - Re-enable services
- Or use vdt-updater script (automates the above steps)

MAJOR UPDATES

- Irregular (Every 6-12 months)
- Must be a new installation
- Can copy configuration from old installation
- Process:
 - Point to old install
 - Perform new install
 - Turn off old services
 - Turn on new services

QUESTIONS? THOUGHTS? COMMENTS?

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