

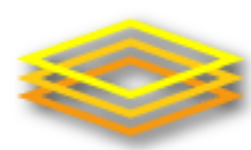


# **Open Science Grid Software Stack, Virtual Data Toolkit and Interoperability Activities**

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for the OSG

[www.opensciencegrid.org](http://www.opensciencegrid.org)

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Taipei  
7-11 April 2008

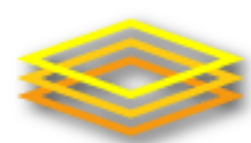


# Abstract

Open Science Grid

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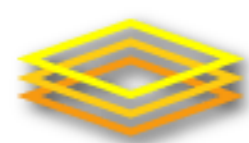
We will present the current status and plans for the Open Science Grid Software Stack, Virtual Data Toolkit and OSG Interoperability Activities. During 2008 our focus in the VDT is to update our support for Condor, VOMS/gLite, Globus, and other components, and add full support for resource and service validation software, storage management access through BestMan and dCache. We are improving the ability to update versions of VDT "at the side" of existing installations, and reduce the time and effort for updating to new versions of the OSG software. Support for new variants of Linux, MacOSX and AIX are also planned. The Open Science Grid software stack supports the OSG model of interoperation, which provides service bridges and/or adaptors between distributed infrastructures and not necessarily direct compatibility between service interfaces - which we regard as an impossible goal. We have successfully demonstrated this model for interoperation with the EGEE, GLOW, Clemson and FermiGrid campus infrastructures, and ongoing work with TeraGrid.



# Contents

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- The software stack – emphasis for 2008
  - Updates for Condor, VOMS/gLite, Globus, ...
  - Support of Resource Validation
  - Storage elements
  - In-place installation upgrades
  - Additional OS support
- Interoperability
  - Interoperation model
  - Examples
- Acknowledgements



# The VDT

An internally consistent build of a large suite of middleware across variety of platforms. Condor, Globus, VOMS/gLite, ...

Virtual Data Toolkit Contents - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://vdt.cs.wisc.edu/releases/1.8.1/contents.html

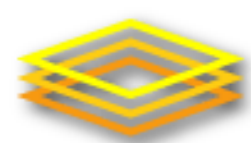
## What is in VDT 1.8.1?

### What Software is Supported on each Platform?

**Legend**

- Supported
- No Unsupported

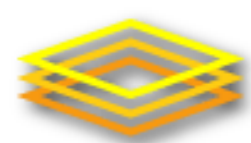
	CentOS 5	CentOS 5 (x86-64)	Debian 3.1 (Sarge)	Fedora Core 4	Fedora Core 4 (x86-64)	Fedora Core 4 (x86 on x86-64)	Red Hat Enterprise Linux 3 AS	Red Hat Enterprise Linux 3 AS (x86-64)	Red Hat Enterprise Linux 3 AS (x86 on x86-64)	Red Hat Enterprise Linux 3 AS (x86 on x86-64)
<a href="#">Apache Ant 1.6.5</a>	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
<a href="#">Apache HTTPD 2.2.4</a>	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
<a href="#">Apache Tomcat 5.0.28</a>	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
<a href="#">Apache Tomcat 5.5.25</a>	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported	Unsupported



# Emphasis in 2008

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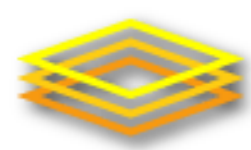
- Updates for
  - Condor
    - Currently 6.8.8
    - improvements for WS-GRAM
  - Globus
    - Currently 4.0.5
    - Adjustments for OSG deployment of WS-GRAM
    - expecting GT4.2
  - VOMS/gLite
    - Converging on common user registration function of voms-admin and VOMRS
    - Multiple certificates/user
    - More administrative roles for registration workflow
  - authZ
    - Interoperability update (later slide)
- Full support for Resource Service Validation
  - See talk in Operations & Management I session



# More Emphasis in 2008

Open Science Grid

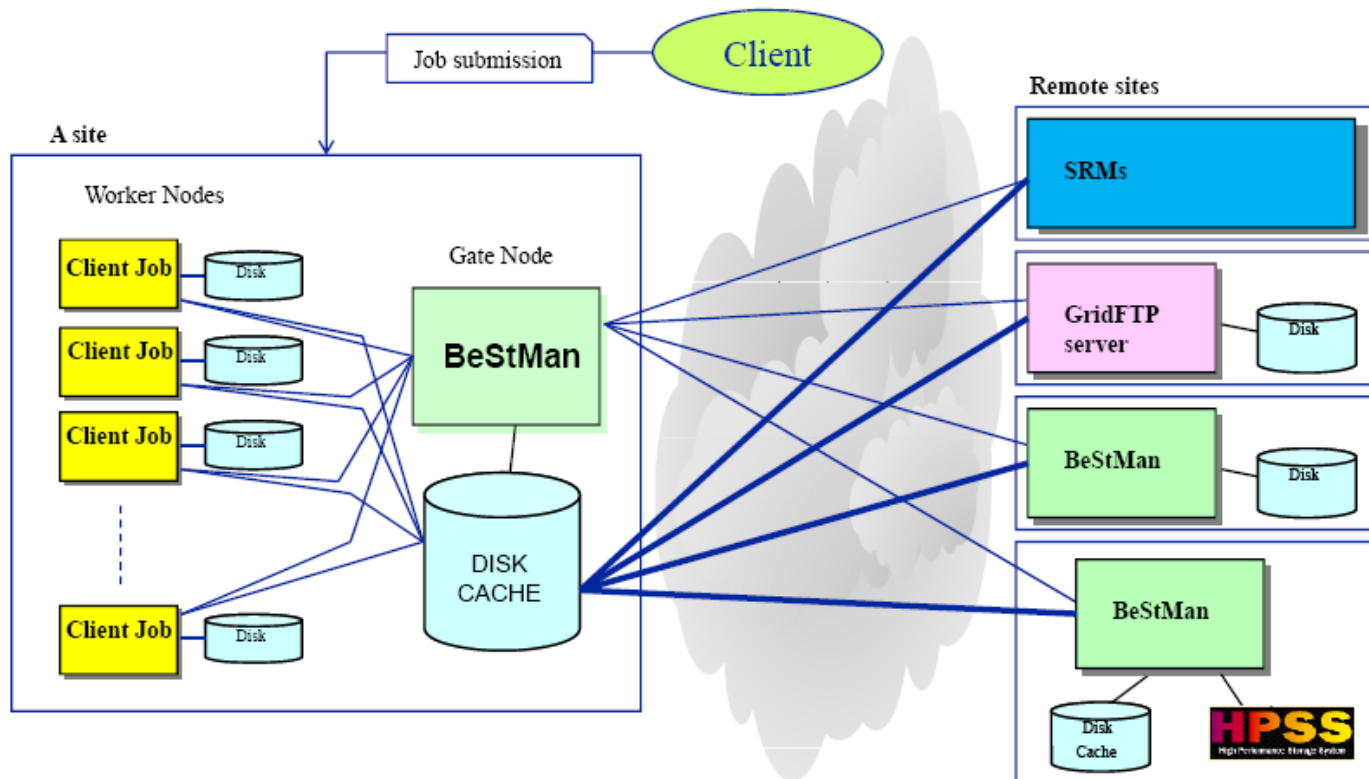
- Storage
  - BeStMan
  - dCache
  - Xrootd/Scalla
    - Code is in VDT, deployment configuration is in progress
- Better support of in-place upgrades
  - Carrying over previous configuration to new installation
- Requests for RPM and Debian packages
- Goal of same version of VDT packages across OSG, TeraGrid, EGEE
- Additional platforms
  - Mac OS X
  - AIX
  - Additional linux flavors

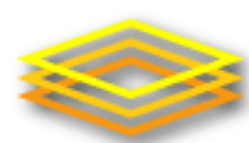


# BeStMan SE in VDT

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- Light-weight SRM using unix disk
- One step install for default configuration
- Client access to data:
  - available as posix filesystem
  - optional as gateway to Xrootd
  - optional interface to HPSS and adaptable to other MSS



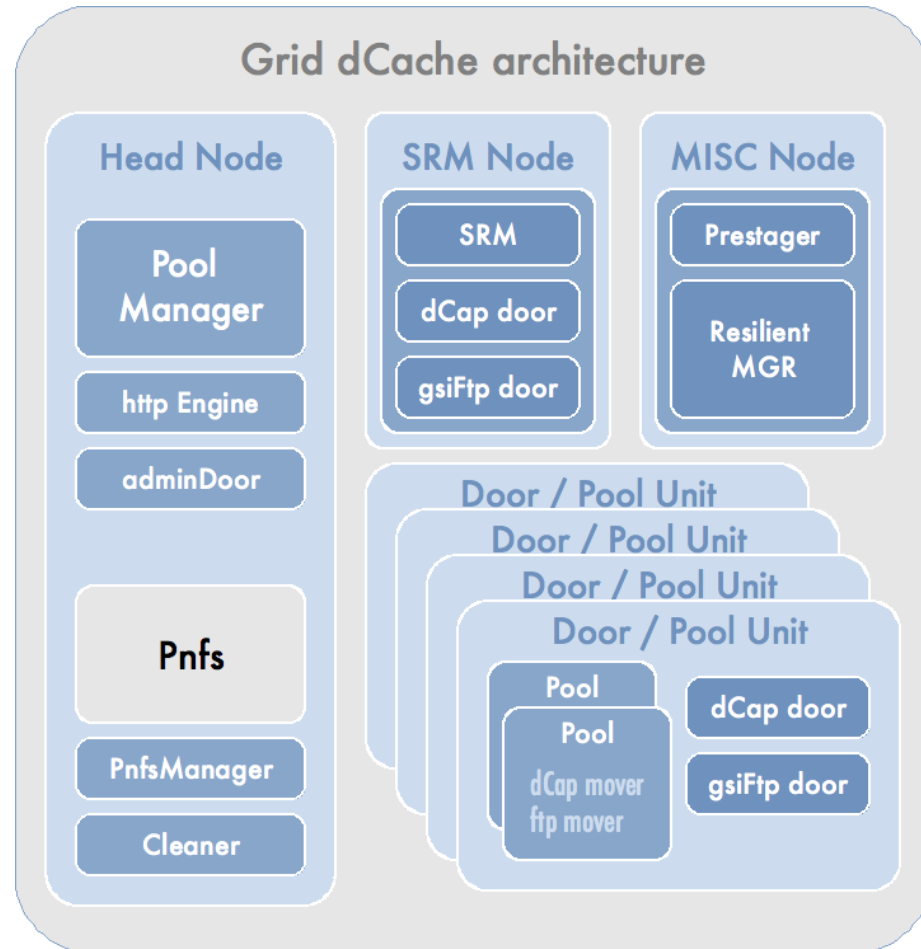


# dCache SE in VDT

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## Key Features of VDT-dCache

- Convenient and easy deployment of SRM/dCache to create an OSG Storage Element (SE)
  - A single configuration file for multi-node installations
  - Reduces installation steps to 20% for regular install
- Hardware and configuration recommendations
- Dry run option for the installation
- dCache Gratia probe
- Step-by-Step installation cleanup, pnfs upgrade & Gratia setup instructions
- Installation and debugging support



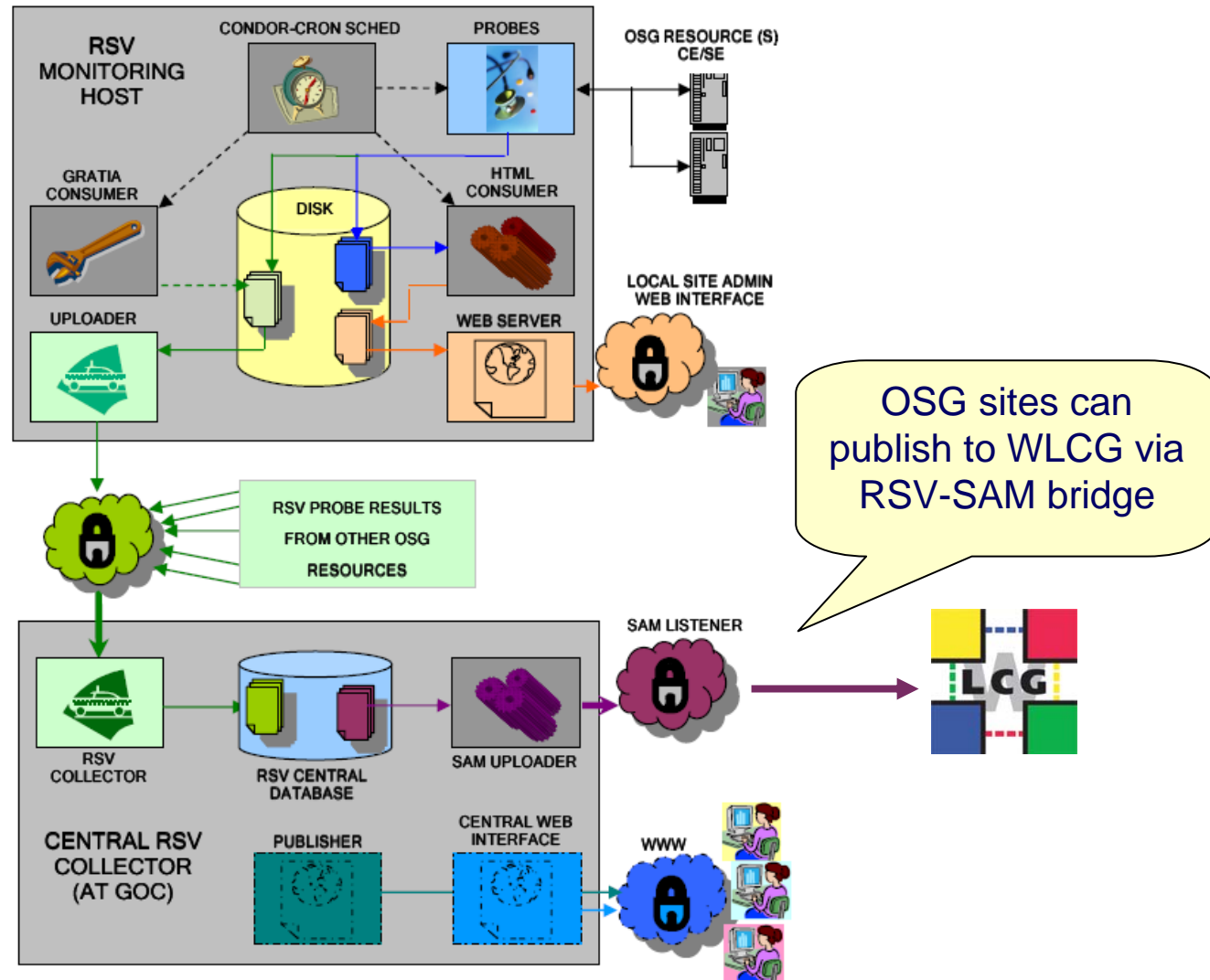


# Interoperability / Interoperation

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- RSV-SAM project for resource info interoperability
- authZ interoperability
  - Effort underway to have common authZ framework across
    - Involves OSG, EGEE, Globus, Condor
    - Policy components - GUMS, SAZ, LCAS/LCMAPS, ...
    - Resource gateways – Gatekeeper, SRM, gLExec, ...
  - Expect to be in testing by this fall
- Model of interoperation is to support bridges and gateways between differing infrastructures and not at the low level service API level.
  - Reduces dependencies to a manageable level.
- Interoperations today
  - EGEE
  - GLOW
  - Clemson
  - Fermigrid
  - working on TeraGrid

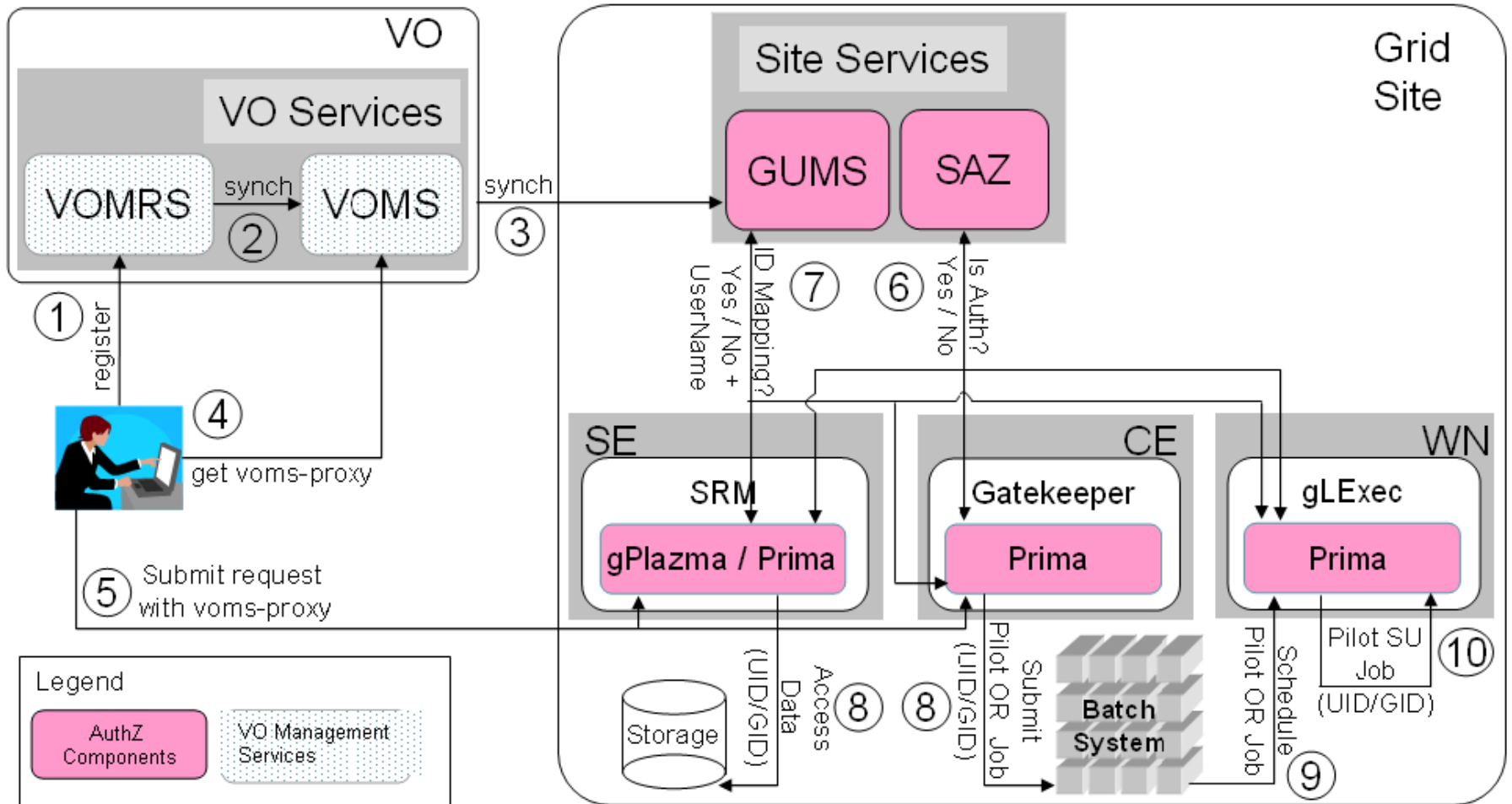
# Resource and Service Validation schematic



Schematic of RSV

(Proposed Phase II work shown in dotted-dashed line).

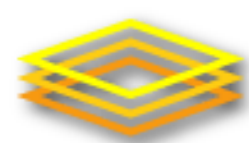
# VO Services Architecture



# OSG-EGEE Interoperations

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- Weekly WLCG operations meeting
- Trouble ticket interchange
- Publishing service info to WLCG/SAM for those sites participating in WLCG
- VDT builds of Globus, Condor used by EGEE
- CMS analysis jobs run across multiple grids from central submission point (next slide)



# Example: CMS Analysis Snapshot

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~ 1/3 of worldwide jobs running on OSG

## JOB SUMMARY

[You found a bug? You have a suggestion?](#)

- 
- 
- 
- 
- 
- 
- 
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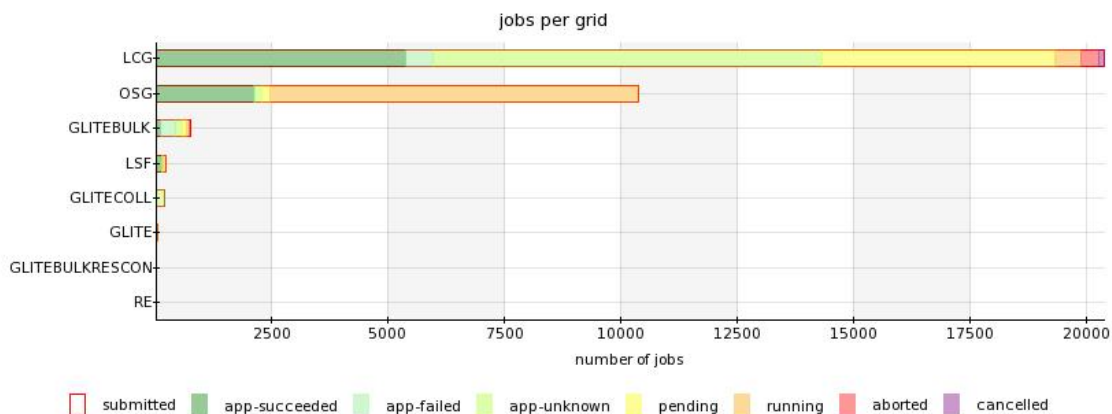
- unk  pend  run  term
- done  canc  abort  g-unk
- succ  fail  a-unk
- donesuccess

2008-03-29 20:50:40 to 2008-03-30 21:50:40

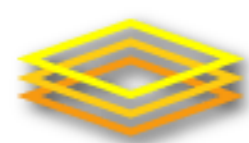
all jobs regardless submission time

sort by grid

bars in the plot



grid\	dashboard					grid					application				overall	
	Sub	Unk	Pend	Run	Term	Done	Canc	Abort	Unk	Grid%	Succ	Fail	Unk	App%	D/S	Overall%
GLITE	40	0	0	0	40	40	0	0	0	100	0	40	0	0	0	0
GLITEBULK	749	0	94	56	599	568	0	31	0	94.82	101	320	178	23.99	101	16.86
GLITEBULKRESCON	10	0	0	0	10	9	0	1	0	90	8	0	2	100	8	80
GLITECOLL	180	0	2	0	178	177	1	0	0	100	4	1	173	80	4	2.25
LCG	20385	0	5003	567	14815	14107	140	361	207	97.5	5377	568	8870	90.45	5170	34.9
LSF	228	0	13	78	137	0	0	0	137	0	136	1	0	99.27	0	0
OSG	10376	0	167	7917	2292	1377	0	0	915	100	2114	29	149	98.65	1220	53.23
RE	1	0	0	0	1	1	0	0	0	100	0	1	0	0	0	0
<b>total/</b>	<b>31969</b>	<b>0</b>	<b>5279</b>	<b>8618</b>	<b>18072</b>	<b>16279</b>	<b>141</b>	<b>393</b>	<b>1259</b>	<b>97.64</b>	<b>7740</b>	<b>920</b>	<b>9412</b>	<b>89.38</b>	<b>6503</b>	<b>35.98</b>



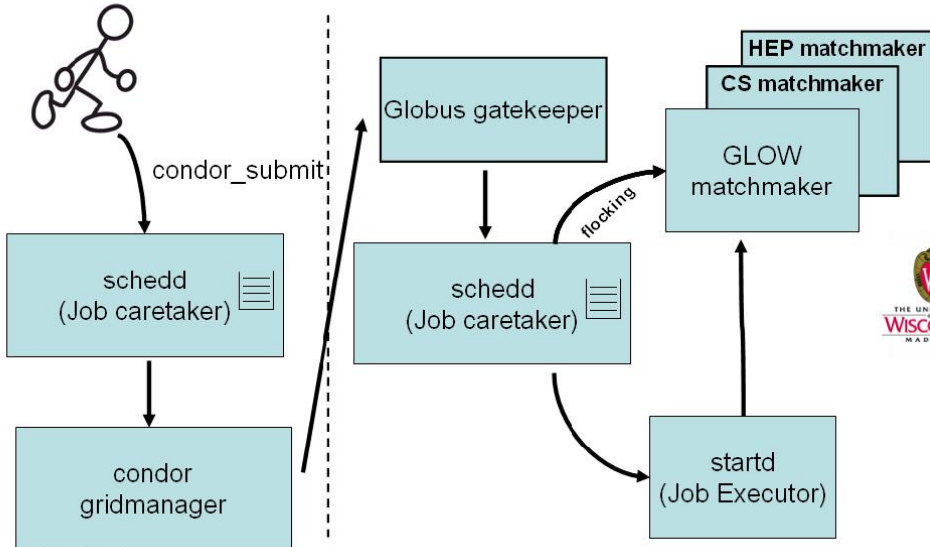
# OSG-GLOW Interoperations

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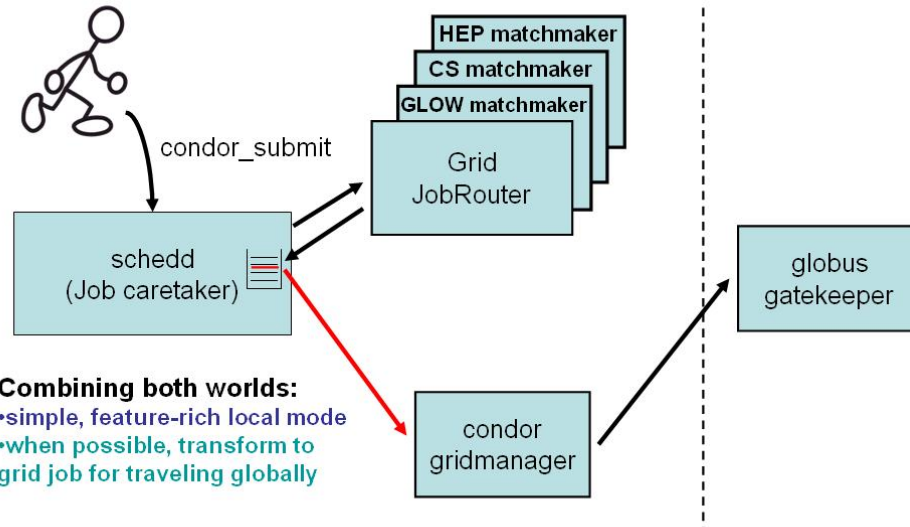


## Submitting jobs through OSG to UW Campus Grid

Open Science Grid User

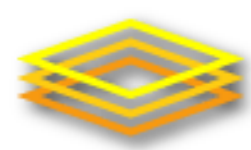


## Routing Jobs from UW Campus Grid to OSG



**Combining both worlds:**

- simple, feature-rich local mode
- when possible, transform to grid job for traveling globally



# OSG-Clemson

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- Clemson campus grid
  - Windows Condor pool
  - Unix applications in Colinux or Cygwin
  - No shared filesystem
  - Linux gatekeeper running NFSlite jobmanager

Virtual Organization Resource Selector

Grids: OSG

Virtual Organizations: All

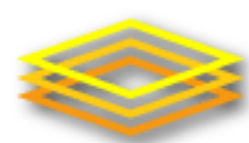
[Usage & Documentation](#)

Legend:

- Resource is currently up
- Resource is currently down
- Resource is under maintenance or on peering grid

Resource Site Verify Data | Resource BDI/GLUE Data | Virtual Organization Information

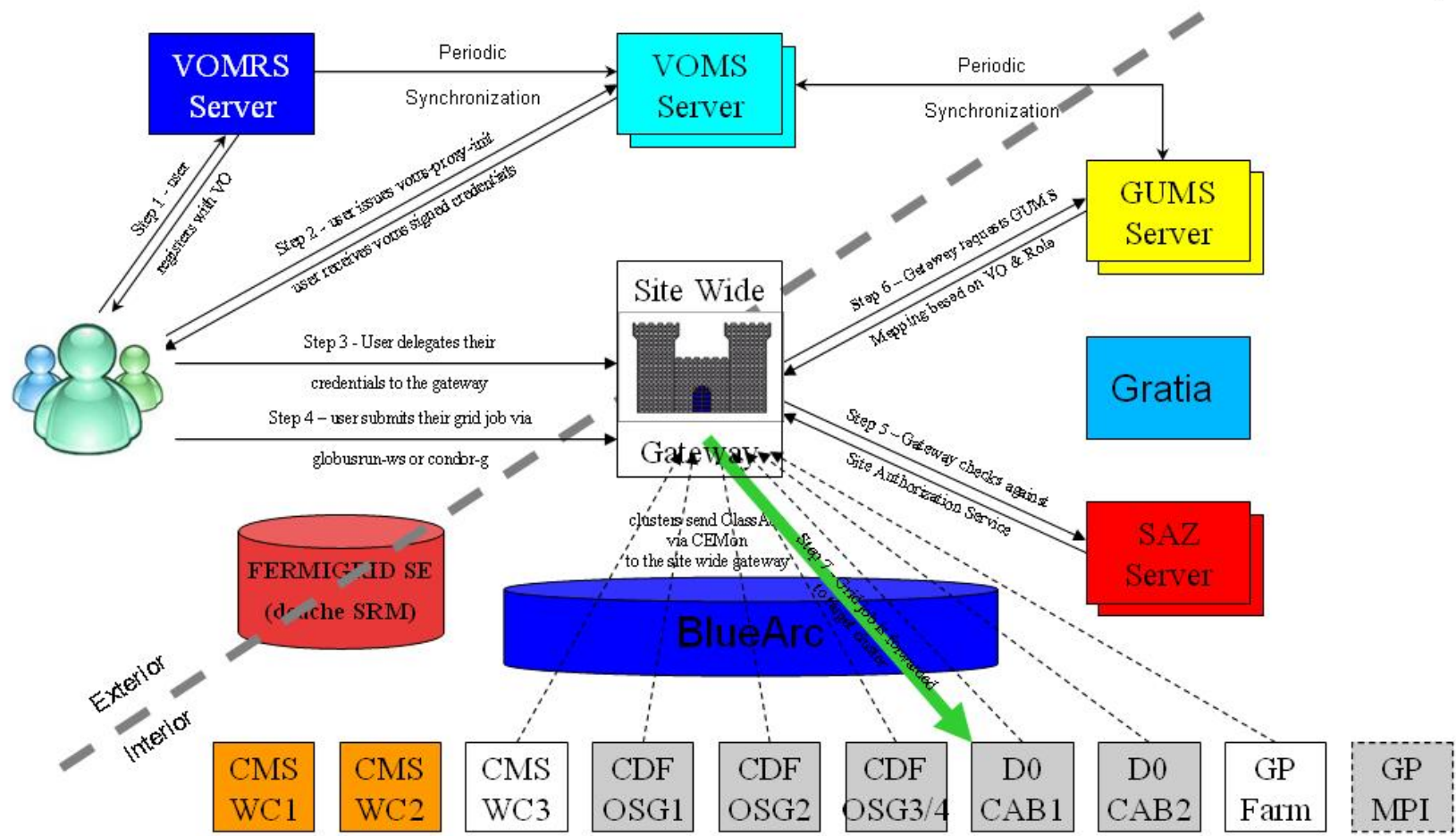




# OSG - FermiGrid



## FermiGrid - Current Web Services Architecture

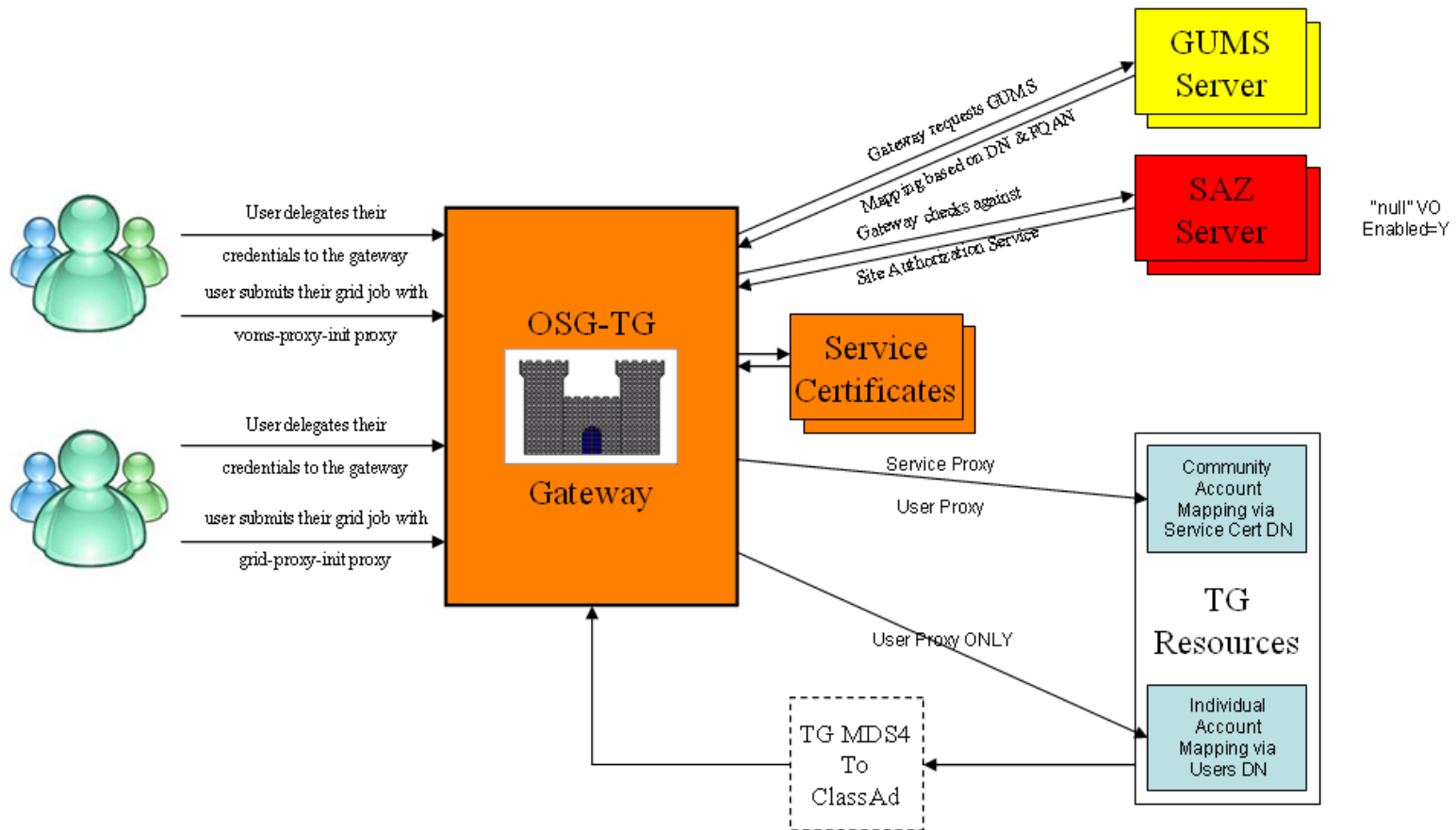


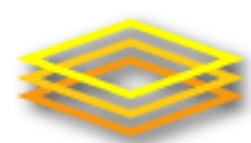


# OSG-TeraGrid Gateway Planned for summer 2008



## OSG-TG Gateway Web Services Architecture





# Acknowledgements

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Open Science Grid

- Deploying a functional and evolving software stack is a large effort of many dedicated people
  - The VDT team
  - The integration team
  - The documentation team
  - Feedback from the administrators and users