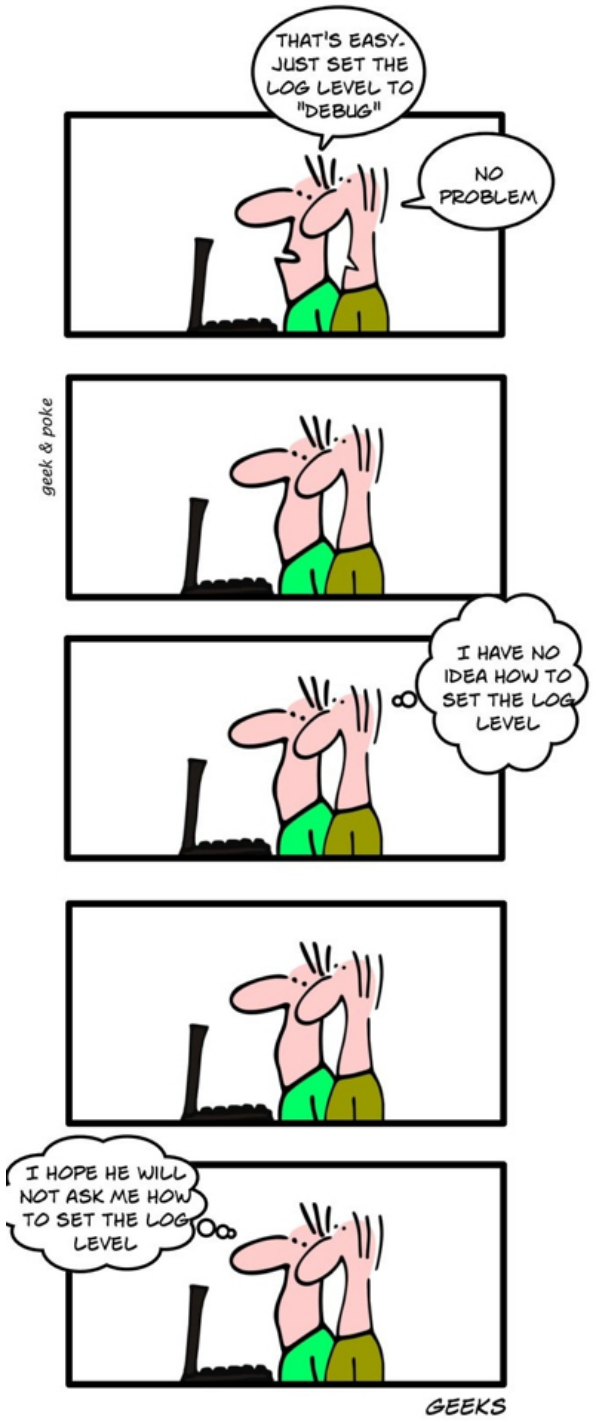
Open Science Grid

OSG Software: Debugging Common Problems

Alain Roy

OSG Software Coordinator



osg-system-profiler: What?

- A tool to collect information about the user's system.
- Only useful if they can get a basic installation working.
  - It doesn't work if they can't install anything.
- Note: Best to run as root
  - Can collect more information

osg-system-profiler: Why?

- Reduce number of round-trips: It answers lots of questions all at once
- You don't have to ask embarrassing questions that make people defensive:
  - Are you sure you have free disk space?
  - Are you sure you're running a supported OS?
  - Are you sure you didn't put crap into `/etc/hosts`?
  - Are you sure your host cert isn't expired?

osg-system-profiler

```
% sudo osg-system-profiler
[sudo] password for alainroy:
OSG System Profiler
Analyzing...

Your system profile is located in:
  /home/alainroy/osg-profile.txt

If you are having problems, please mail a
description of your problem and
this file to vdt-support@opensciencegrid.org
```

osg-system-profiler: the basics

```
***** Running: hostname
fermicloud084.fnal.gov

***** Running: uname -a
Linux fermicloud084.fnal.gov 2.6.18-274.18.1.el5 …

***** RPM: kernel
kernel-2.6.18-238.19.1.el5.x86_64
kernel-2.6.18-274.7.1.el5.x86_64
kernel-2.6.18-274.17.1.el5.x86_64
kernel-2.6.18-274.18.1.el5.x86_64
kernel has not been modified

***** /etc/issue
Scientific Linux SLF release 5.5 (Lederman)
Kernel \r on an \m
```

osg-system-profiler: disk & memory

```
***** Running: df --human-readable --print-type
Filesystem     Type     Size  Used Avail Use% Mounted on
/dev/vda1      ext3     9.5G  2.3G  6.8G  26% /
tmpfs         tmpfs    1006M     0 1006M   0% /dev/shm
/dev/ram0      ext3      16M  1.2M   14M   8% /etc/cloud-security
blue2:/fermigrid-login/alainroy
               nfs      500G  224G  277G  45% /home/alainroy

***** Running: free
             total       used       free     shared    buffers     cached
Mem:       2058272     937420    1120852          0     137020     705900
-/+ buffers/cache:     94500    1963772
Swap:      2097144          0    2097144
```

osg-system-profiler: CPU

```
***** /proc/cpuinfo
processor    : 0
vendor_id    : GenuineIntel
cpu family   : 6
model        : 6
model name   : QEMU Virtual CPU version 0.9.1
stepping     : 3
cpu MHz      : 2660.074
cache size   : 32 KB

...

processor    : 1
vendor_id    : GenuineIntel
...
```

Note:

- 2 CPUs
- Looks like a VM

osg-system-profiler: network

```
***** Running: netstat -i
Kernel Interface table
Iface       MTU Met    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK
eth0       1500   0  1725848      0      0      0   419050
lo        16436   0      167      0      0      0      167

***** Running: /sbin/iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               dest

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
```

Note:

- No blocked ports
- Not dual-homed

osg-system-profiler: OSG Version

```
***** Running: osg-version
OSG 3.0.10

osg-system-profiler-1.0.3-1.osg.el5.noar
osg-version-3.0.10-1.osg.el5.noarch
osg-wn-client-3.0.0-13.noarch
osg-configure-gip-1.0.7-1.osg.el5.noarch
osg-configure-1.0.7-1.osg.el5.noarch
osg-configure-managedfork-1.0.7-1.osg.el5.noarch
osg-ce-condor-3.0.0-27.x86_64
osg-wn-client-glexec-3.0.0-13.noarch
osg-ca-certs-1.27-2.osg.el5.noarch
osg-release-3.0-18.osg.el5.noarch
osg-ce-3.0.0-27.x86_64
...
```

Ask:

Do versions match up?

Recent version?

osg-system-profiler: osg-configure

```
***** RPM: osg-configure
osg-configure-1.0.7-1.osg.el5.noarch
S.5....T    /usr/lib/python2.4/site-packages/osg_configure/
configure_modules/gip.py
S.5....T    /usr/lib/python2.4/site-packa
configure_modules/gip.pyc

***** /var/log/osg/osg-configure.log (last 200 lines)
2012-04-04 16:09:50,862 DEBUG Subscribing to http://
is2.grid.iu.edu:14001 using RAW dialect

2012-04-04 16:11:36,312 WARNING Option 'sponsor' in section
'Site Information' located in /etc/osg/config.d/40-
siteinfo.ini: Can't currently check VOs in sponsor setting
because the /var/lib/osg/user-vo-map is empty. If you are
configuring osg components, this may be resolved when osg-
configure runs the appropriate script to generate this file
later in the configuration process
```

Note:

- gip.py was modified!!

osg-system-profiler: osg-configure

```
***** Files in /etc/osg/config.d
File: /etc/osg/config.d/20-condor.ini
;=================================================
;                                  Condor
;=================================================


[Condor]
; The enabled setting indicates whether you want your CE to use
a Condor job
; manager
; valid answers are True or False
enabled = True


; The condor_location setting should give the location of
condor install directory
condor_location = /tmp
```

Note:

- Condor is in /tmp? Really?

osg-system-profiler: certificates

```
***** Contents of /etc/grid-securit
drwxr-xr-x   2 root root 57344 Apr
-rw-r--r--   1 root root    61 Mar
-rw-r--r--   1 root root    61 Apr  4 16:11 gsi-authz.conf
-rw-r--r--   1 root root    55 Apr 11 15:00 hostcert.pem
-rw-r--r--   1 root root    54 Apr 11 15:00 hostkey.pem
drwxr-xr-x   2 root root  4096 Apr 11 15:00 http/
drwxr-xr-x  43 root root  4096 Mar 18 14:50 vomsdir/

***** Certificate: /etc/grid-security/hostcert.pem
Certificate:
        Validity
            Not Before: Jul 27 01:08:09 2011 GMT
            Not After : Jul 26 01:08:09 2012 GMT
        Subject: DC=org, DC=doegrids, OU=Services,
CN=fermicloud084.fnal.gov
```

Note:

Host key is world readable!

osg-system-profiler: Using GUMS/lcmaps?

```
***** /etc/grid-security/gsi-authz.conf
#globus_mapping liblcas_lcmaps_gt4_mapping.so lcmaps_callout
```

Note:

Should have lcmaps.db: future version

osg-system-profiler: yum config

```
***** Files in /etc/yum.repos.d/
File: /etc/yum.repos.d/osg.repo
[osg]
name=OSG Software for Enterprise Linux 5 - $basearch
mirrorlist=http://repo.grid.iu.edu/mirror/osg-release/$basearch
failovermethod=priority
priority=98
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-OSG
consider_as_osg=yes
```

Note:

Is repo enabled?

osg-system-profiler: GRAM

```
***** /var/log/globus-gatekeeper.log (last 200 lines)
JMA 2012/04/10 09:29:30 GATEKEEPER_JM_ID
2012-04-10.09:29:30.0000009407.0000000932 for /DC=org/
DC=doegrids/OU=People/CN=Alain Roy 424511 on ::ffff:
131.225.155.31
JMA 2012/04/10 09:29:30 GATEKEEPER_JM_ID
2012-04-10.09:29:30.0000009407.0000000932 mapped to alainroy
(11500, 3200)
JMA 2012/04/10 09:29:30 GATEKEEPER_JM_ID
2012-04-10.09:29:30.0000009407.0000000932 has
GRAM_SCRIPT_JOB_ID 15513 manager type fork
JMA 2012/04/10 09:29:35 GATEKEEPER_JM_ID
2012-04-10.09:29:30.0000009407.0000000932 for /DC=org/
DC=doegrids/OU=People/CN=Alain Roy 424511 on ::ffff:
131.225.155.31
```

osg-system-profiler: All RPMs

```
***** All RPMs
acl-2.2.39-6.el5.x86_64
acpid-1.0.4-9.el5_4.2.x86_64
alsa-lib-1.0.17-1.el5.x86_64
amtu-1.0.6-1.el5.x86_64
anacron-2.3-45.el5.x86_64
...
```

Note:

When you're desperate

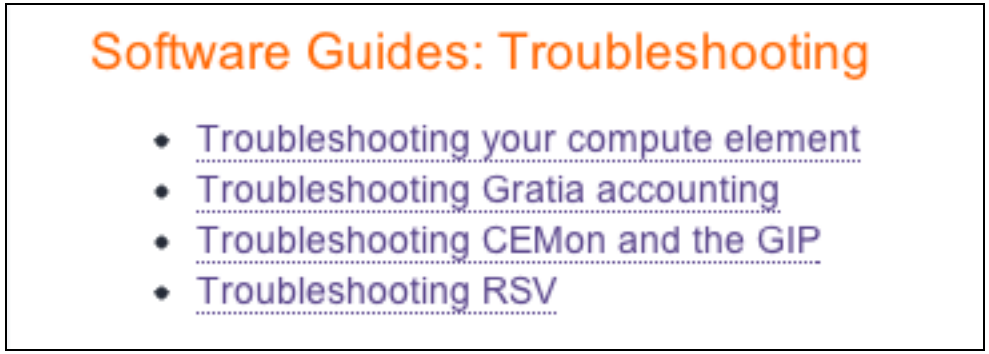
osg-system-profiler

- If you think of other things to add, just holler.
  - osg-system-profiler is easy to extend (just a Bourne shell script)
  - If adding more helps you, it's completely worth it to add it,
- For anyone who has gotten software to install, it's a great first step in collecting more information. Use it!

Troubleshooting

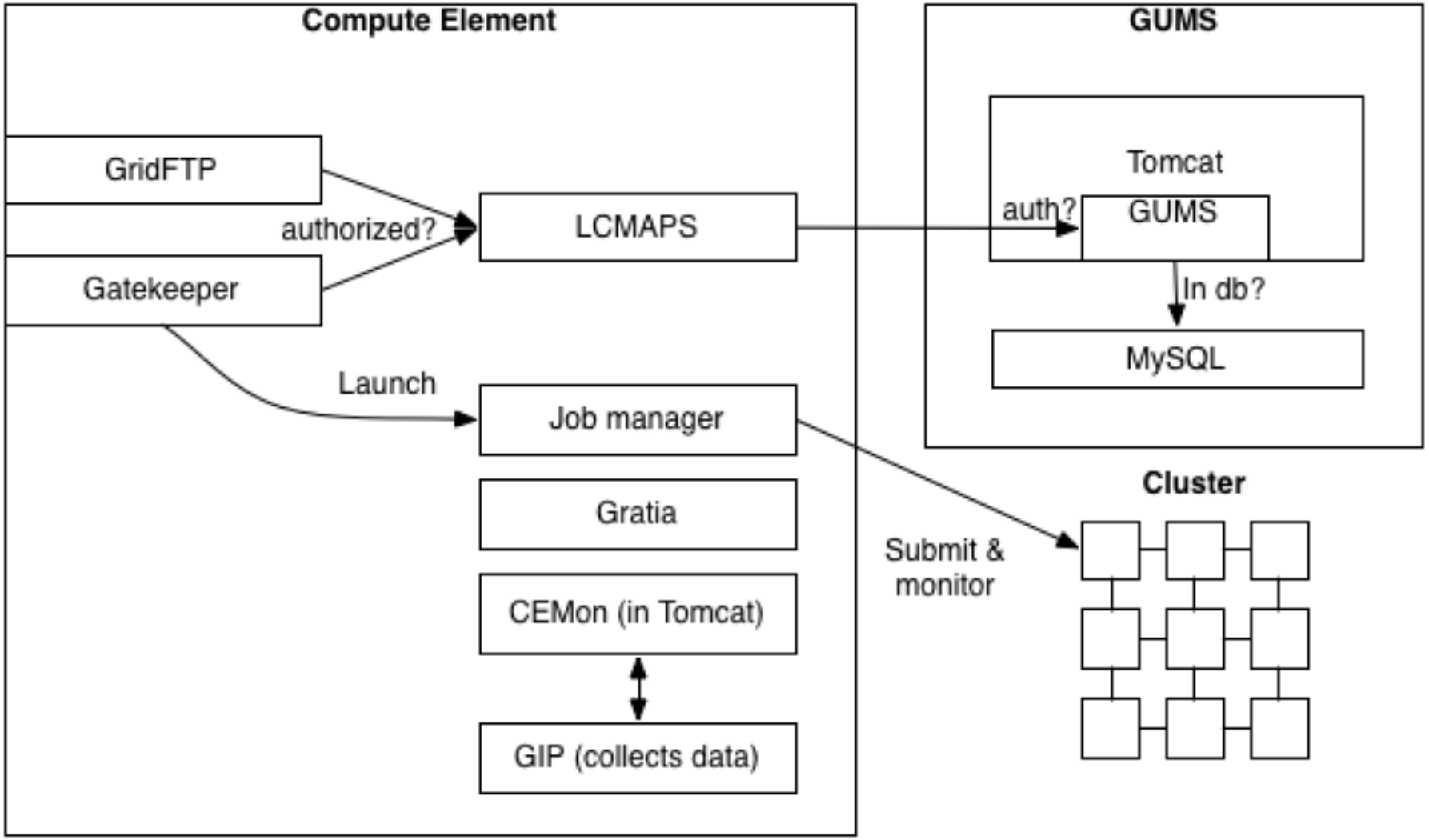
- We're getting more troubleshooting documents:

```
https://twiki.grid.iu.edu/bin/view/Documentation/Release3/
```



- Use them
- Expand them!

Common GRAM problems



osg-system-profiler: GRAM

```
% globus-job-run localhost /bin/hostname
GRAM Job submission failed because the connection to the server
failed (check host and port) (error code 12)
```

Is the service running? Telnet should wait forever. You can check this without the user's help!

```
% telnet fermicloud084.fnal.gov 2119
Trying 131.225.155.31...
telnet: connect to address 131.225.155.31: Connection refused
telnet: Unable to connect to remote host: Connection refused
```

Ask the user to check:

```
% ps auwx | grep globus-gatekeeper | grep -v grep
```

GRAM: grid-mapfile authorization

```
% globus-job-run localhost /usr/bin/whoami
GRAM Job submission failed because authentication with the
remote server failed (error code 7)
```

Check /var/log/globus-gatekeeper log to see if not in grid-mapfile:

```
TIME: Fri Dec  2 09:44:47 2011
 PID: 875 -- Failure: globus_gss_assist_gridmap() failed
authorization. globus_gss_assist:
 Gridmap lookup failure: Could not map /DC=org/DC=doegrids/
OU=People/CN=Alain Roy 424511
```

GRAM: GUMS authorization

/var/log/globus-gatekeeper.log

```
TIME: Fri Dec  2 10:17:20 2011
 PID: 2160 -- Failure: globus_gss_assist_gridmap() failed
authorization. globus_gss_assist: Error invoking callout
globus_callout_module: The callout returned an error
an unknown error occurred
```

/var/log/messages (reformatted for legibility)

```
Dec  2 10:12:42 fermicloud081 l_l_gt4[2051]:
    xacmlqueryscas(): XACML: Interaction failed:
    TCP/IP, SSL or SOAP Error with endpoint:
    "https://fermicloud081.fnal.gov:8443/gums/services/
GUMSXACMLAuthorizationServicePort"
```

GUMS not running? Bad hostname/URL?

GRAM: No user

User did:

```
% globus-job-run fermiclou081.fnal.gov /usr/bin/whoami
GRAM Job submission failed because the gatekeeper failed to run
the job manager  (error code 47)
```

/var/log/globus-gatekeeper.log:

```
PID: 32172 -- Notice: 5: Authorized as local user: alainroo
Failure: getpwname() failed to find alainroo
```

GRAM works, but something else doesn't

- You are in the MIS VO!
  - You can run jobs against the site
  - Fork jobs run on the CE: you can discover all sorts of things on your own

```
% globus-job-run fermicloud084.fnal.gov \
                 /bin/cat /etc/redhat-release
Scientific Linux SLF release 5.5 (Lederman)
```

- Notes:
  - Provide full pathnames (i.e. /bin/cat)
  - Provide full pathnames (/etc/redhat-release)

Nifty-difty tool: gsh

- Simplifies running globus-job-run against a site:

```
% ./gsh vdt-itb.cs.wisc.edu

Welcome to gsh!
vdt-itb.cs.wisc.edu =>> cat /etc/redhat-release
Scientific Linux SL release 5.4 (Boron)

vdt-itb.cs.wisc.edu =>> grep Alain /etc/grid-security/grid-mapfile
"/DC=org/DC=doegrids/OU=People/CN=Alain Roy 424511" roy

vdt-itb.cs.wisc.edu =>> tail -2 /opt/itb/globus/var/globus-
gatekeeper.log
TIME: Fri Apr 13 12:58:42 2012
 PID: 15119 -- Notice: 0: Child 15160 started
```

More on gsh

- Gsh has not been released yet
  - Tony Tiradani's pet project
  - Plan to put it into OSG Software as "crontrib"
  - I can give you a tarball if you want
- Gsh is not a real shell
  - cd doesn't really work: only affects current cmd

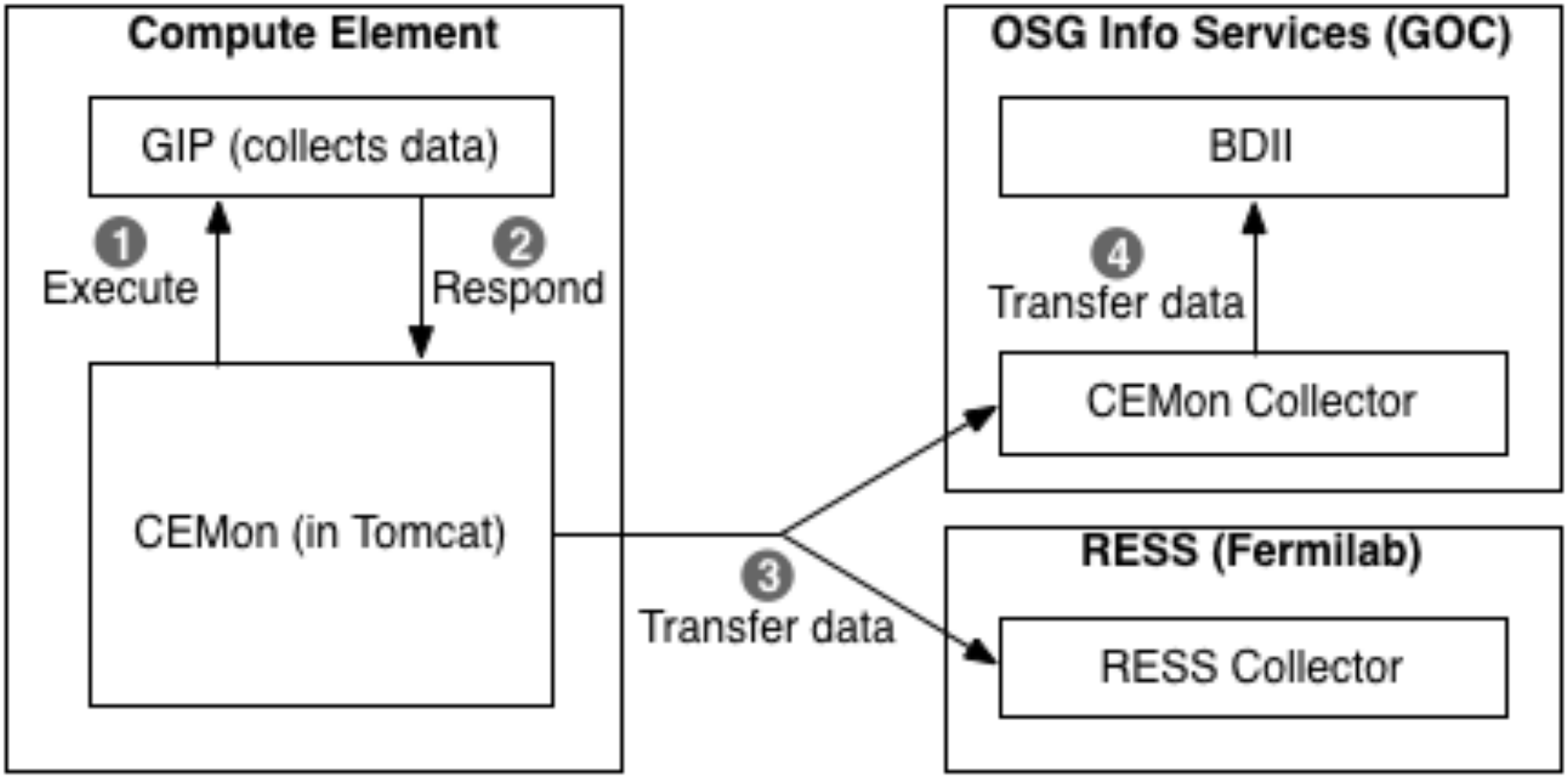
```
% ./gsh localhost

Welcome to gsh!
localhost =>> cd /etc; cat redhat-release
Scientific Linux SLF release 5.5 (Lederman)
```

  - But it *really* simplifies remote debugging

Open Science Grid

Breather: Questions?

Let's debug Cemon & GIP



Is the data getting to BDII?

- Check MyOSG (I assume you know how to do this)
- Query the BDII with command-line tools:

```
% ldapsearch -x -LLL -p 2170 -h is.grid.iu.edu \
             -b mds-vo-name=WISC-OSG-EDU,mds-vo-name=local,o=grid

n: Mds-Vo-name=WISC-OSG-EDU,Mds-Vo-name=local,o=grid
objectClass: GlueTop
objectClass: Mds
Mds-Vo-name: WISC-OSG-EDU
... lots more output trimmed ...
```

Is the BDII getting to RESS?

```
[user@client ~]$ condor_status -l -pool osg-ress-1.fnal.gov  -
constraints 'GlueSiteName == "FNAL_FERMIGRID"'

GlueCEStateWorstResponseTimeOriginal = 86400
GlueSiteSecurityContact = "mailto: fermigrid-help@listserv.fnal.gov"
GlueClusterUniqueID = "d0cabosg1.fnal.gov"
... more output trimmed ...
```

Open Science Grid

If it's not…

- Is the site collecting good data?
- Is the site successfully sending the information?
- Is it being accepted by the GOC collector?

Good data?

- Errors in /var/log/gip/gip.log?

```
2012-03-26 11:11:08,784 GIP.Wrapper:WARNING
    /usr/lib/python2.4/site-packages/osg_info_wrapper.py:531:
    Unable to open /var/log/gip/module.log;
    this might be a permissions error in your GIP install if
    you are running as daemon.
```

- Errors in gip_info?

```
# gip_info
...
Traceback (most recent call last):
  File "/usr/lib/python2.4/site-packages/gip_common.py", line 389, in ?
    add_giplog_handler()
...
IOError: [Errno 13] Permission denied: '/var/log/gip/gip.log'
```

Successfully sending?

- Is tomcat running?

```
# ps auwx | grep tomcat
tomcat   21311  2.2  4.7 957940 97120 ?        Sl   15:52   0:04 /usr/
lib/jvm/java/bin/java -Dcatalina.ext.dirs=/usr/share/tomcat5/shared/
lib:...
```

- If yes, check glite-ce-monitor.log:

```
06 Mar 2012 21:19:17,700 org.glite.ce.monitor.holder.NotificationHolder
    - [name=subscription-http___is2_grid_iu_edu_14001-OSG_CE-RAW]
    - sending notification (containing 1 events) to http://
is2.grid.iu.edu:14001 ...
```

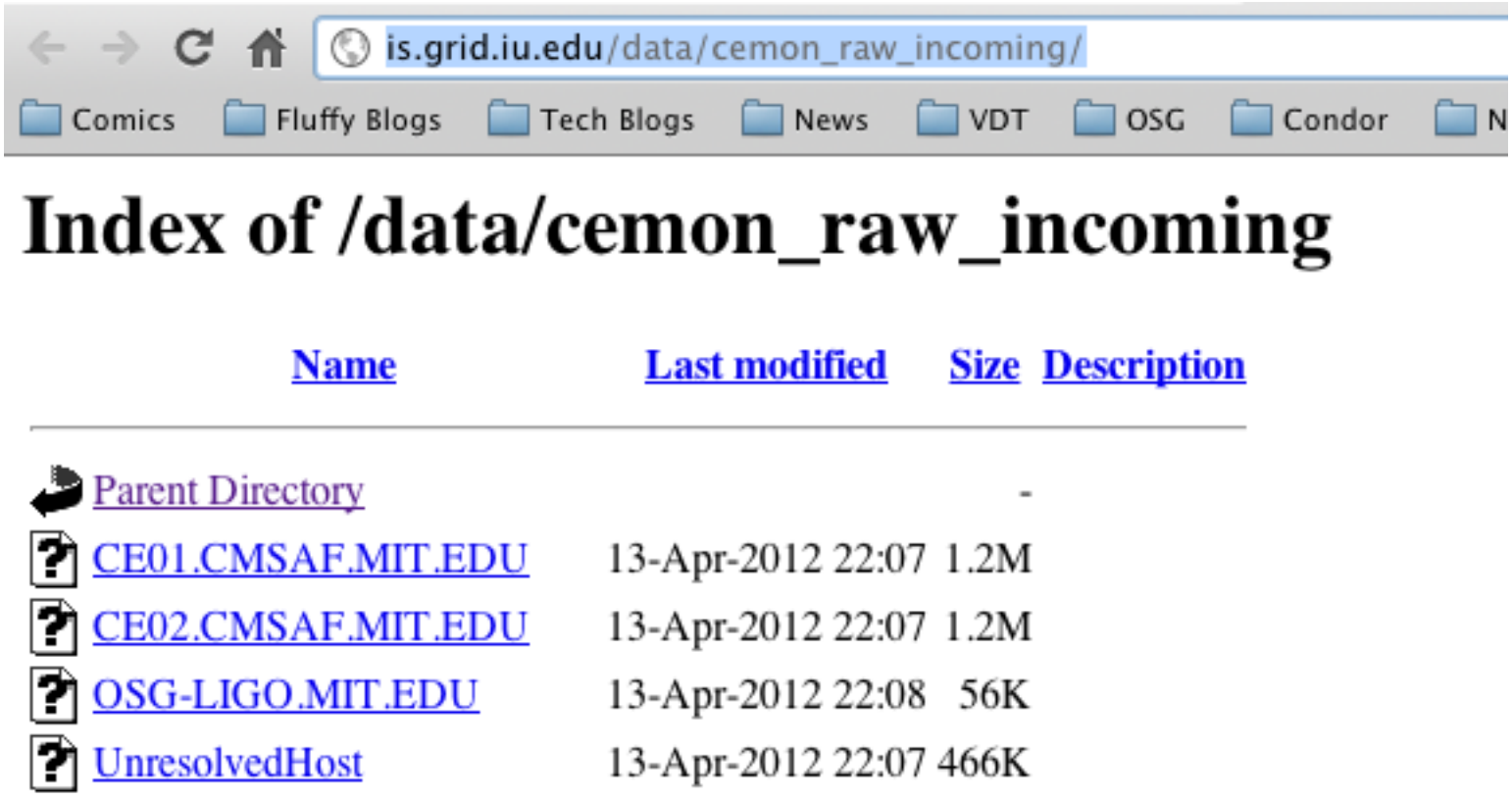
```
06 Mar 2012 21:40:31,061 org.apache.axis.Message - java.io.IOException:
java.net.SocketException: Connection reset
```

```
03 Mar 2012 20:56:45,695 org.glite.ce.commonj.authz.GridMapServicePDP
     - /etc/grid-security/grid-mapfile (No such file or directory)
```

Data being accepted?

- Data arrives at GOC & is written in web-accessible directory:

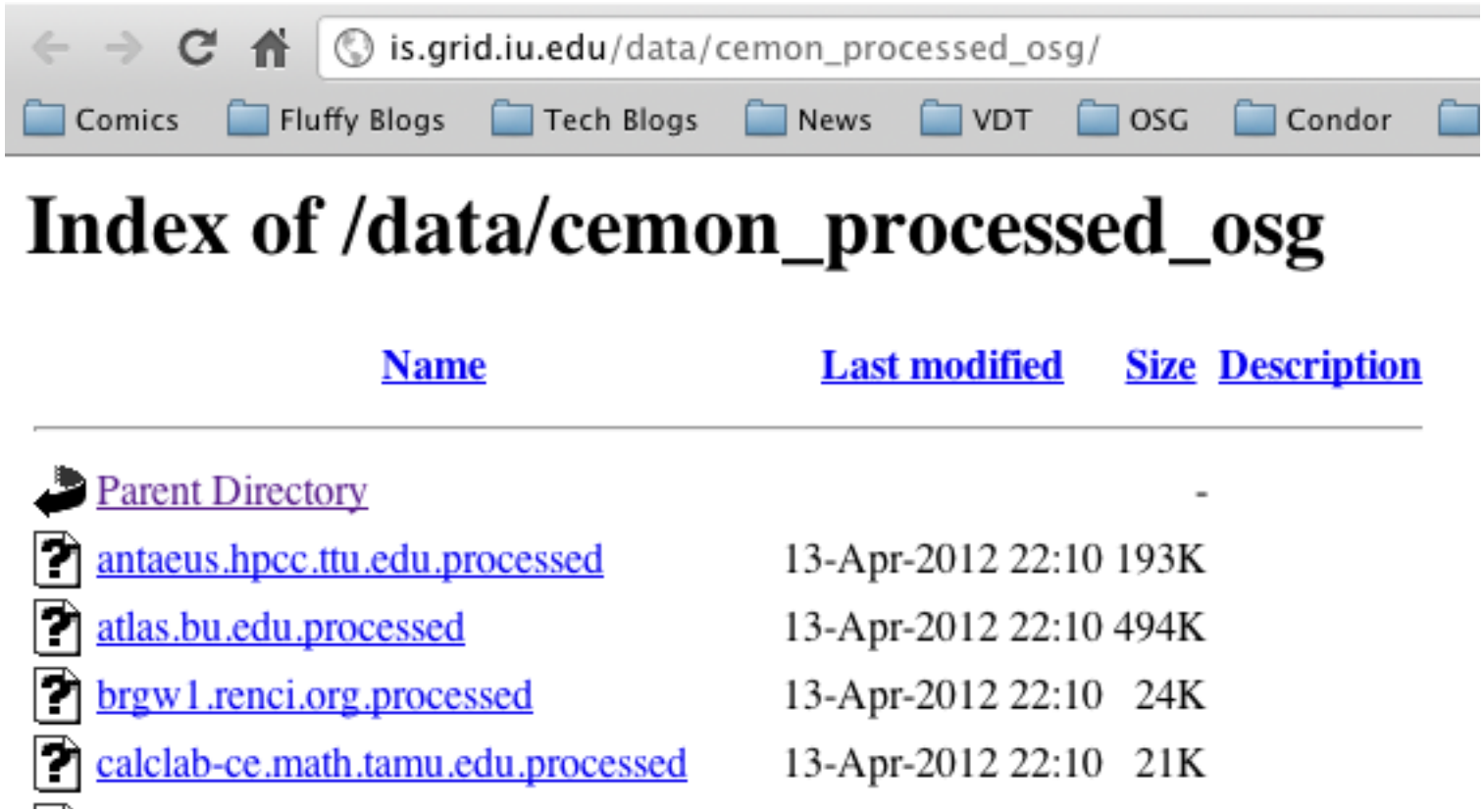
`http://is.grid.iu.edu/data/cemon_raw_incoming/`



Data being accepted (2)?

- Data is processed & may be discarded & is written in web-accessible directory:

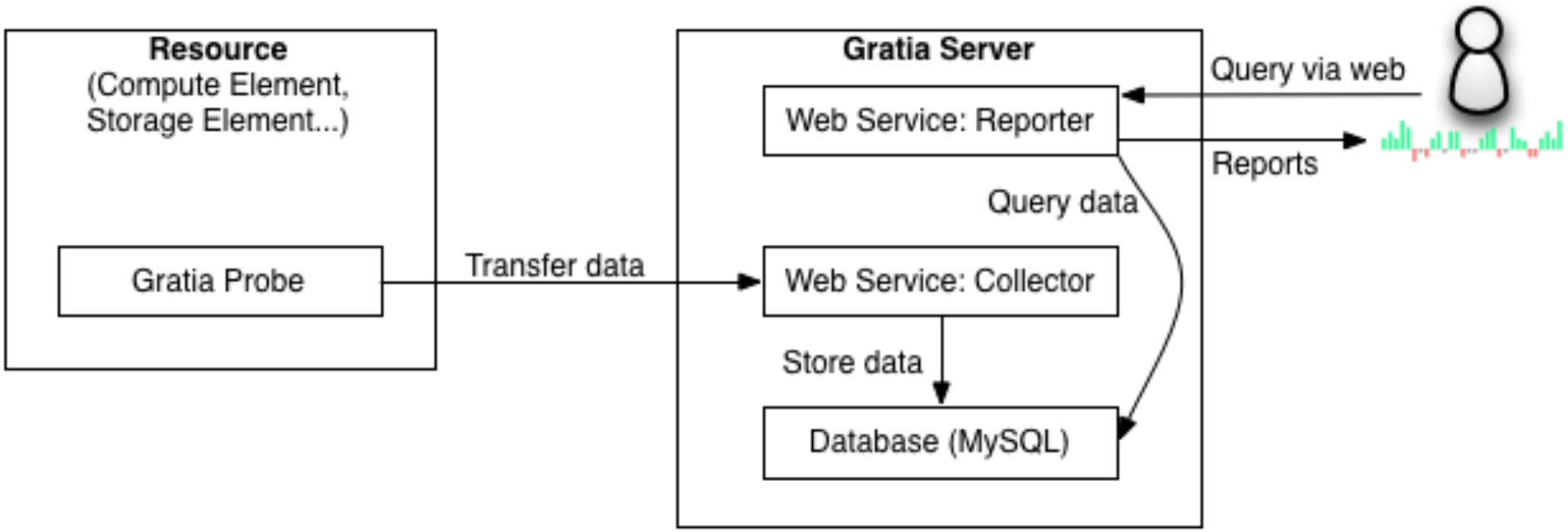
  `http://is.grid.iu.edu/data/cemon_processed_osg/`



Open Science Grid

Questions? Comments?

Let's debug Gratia



How do Gratia probes work?

- The probe is run by cron.
- It reads its configuration
  - `/etc/gratia/PROBE-NAME/ProbeConfig`.
- It collects the accounting information
  - Condor: PER_JOB_HISTORY_DIR, usually /var/lib/gratia/data.
- It transforms the data into Gratia records and saves them:
  - `/var/lib/gratia/tmp/gratiafiles/`
- When there are sufficient Gratia records, or when sufficient time has passed, it and removes.
- All progress is logged to /var/log/gratia.
- If there are failures in uploading the files to the Gratia server
  - Files are not removed from gratiafiles until they are successfully uploaded.
  - Errors are logged to log files in /var/log/gratia.
  - The uploads will be tried again later.

Is a site reporting data?

- Check the Gratia web site
  - `http://gratia-osg-prod-reports.opensciencegrid.org/gratia-reporting/`
- Click on "Daily Usage by Site" in the navigation bar on the left.
- In the "Selection Type" menu, change from "Exclude" to "Include".
- Select the site name from the list of sites.
- Click "Display Report Below".

Are Gratia probes enabled?

/etc/osg/config.d/30-gratia.ini

```
...
probes = %(osg-jobmanager-gratia)s,%(osg-gridftp-gratia)s
...
```

/etc/gratia/PROBE/ProbeConfig
On a CE, `osg-configure` edits this.

```
# grep Enable /etc/gratia/condor/ProbeConfig
    EnableProbe="1"
```

Start the probes?

They run in cron, but users enable/disable them with the *init* interface:

```
# service gratia-probes-cron start
Enabling gratia probes cron:                               [  OK  ]

# ls -l /var/lock/subsys/gratia-probes-cron
-rw-r--r-- 1 root root 0 Apr 13 17:28 /var/lock/subsys/gratia-probes-
cron

# /sbin/service gratia-probes-cron status
gratia probes cron is enabled.
```

Is Condor collecting data?

- Is the Condor configuration right?

```
% condor_config_val -v PER_JOB_HISTORY_DIR
PER_JOB_HISTORY_DIR: /var/lib/gratia/data
  Defined in '/etc/condor/config.d/99_gratia.conf', line 5.
```

- If it was wrong and fixed, collect old data:

```
% /usr/share/gratia/condor/condor_meter --history --verbose
2012-04-04 13:35:28 CDT Gratia: Using config file: /etc/gratia/condor/
ProbeConfig
```

Was the Gratia hostname wrong?

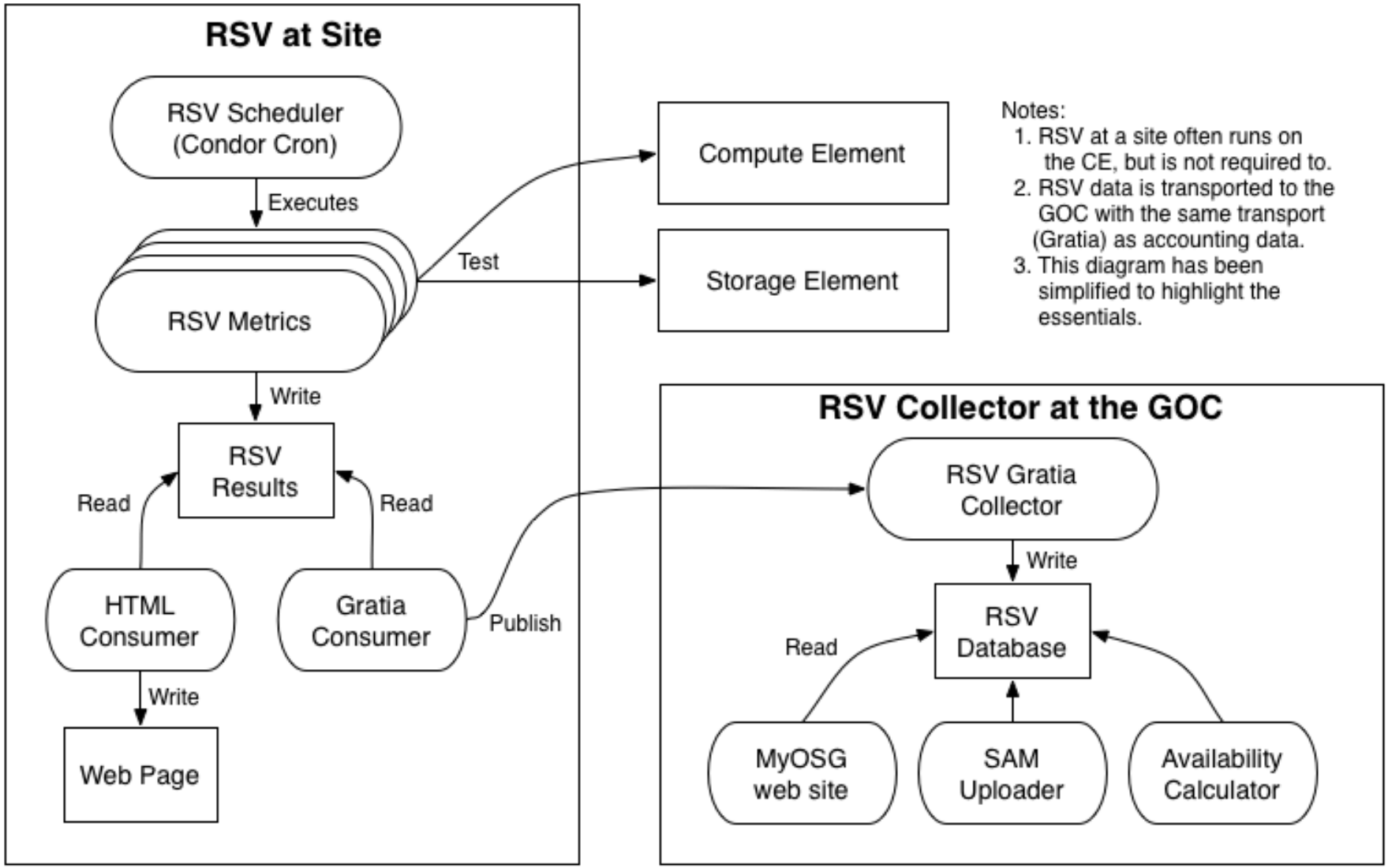
```
% cd /var/log/gratia/
% cat 2012-04-03.log
...
15:06:55 CDT Gratia: Failed to send xml to web service due to an error
of type "socket.gaierror": (-2, 'Name or service not known')
...
15:06:55 CDT Gratia: Response indicates failure, the following files
will not be deleted:
15:06:55 CDT Gratia:    /var/lib/gratia/tmp/gratiafiles/
    subdir.condor_fermicloud084.fnal.gov_ggratia-osg-
itb.opensciencegrid.org_80/
    outbox/r.30604.condor_fermicloud084.fnal.gov_ggratia-osg-
itb.opensciencegrid.org_80.gratia.xml__wfIgi30606
```

This is complex to fully recover from, especially if it was this way for a long time. See the troubleshooting document or ask for help.

Let's debug RSV

- By and large, most RSV problems are not *RSV* problems. RSV is just the messenger, not the problem.

RSV Architecture



What is Condor Cron?

- Cron is “fire and forget”
  - Run a job, ignore it forever
  - If last cron job is still running, that’s okay, launch another
  - If cron jobs are overloading system, that’s okay
- Condor:
  - Knows how to run jobs without overlapping them
  - Allows sysadmins to apply limits to prevent overload
- Condor Cron:
  - Run jobs on local machine, like cron, but prevent overlapping and overloading.

How do we provide Condor Cron?

- By default:
  - Install Condor on system
  - Install secondary Condor configuration that does not conflict with base configuration
  - Install wrapper commands that know how to use this configuration
    - `condor_cron_submit`
    - `condor_cron_q`
    - …
- Can use user's Condor instead if preferred.

How do we start RSV jobs?

- RSV jobs are simply Condor cron jobs
- Condor cron has to be running

```
# /sbin/service condor-cron start
```

- RSV has init script:
  - Does *not* start a service
  - Submits jobs to Condor cron

```
# /sbin/service rsv start
```