

# Primer for Site Debugging

This talk introduces key concepts and tools used in the following talk on site debugging

By Jeff Dost (UCSD)

# Overview

- Monitoring and Reports
- Logs
- Tools

# Overview

- **Monitoring and Reports**
- Logs
- Tools

# factoryStatusNow

Select a view:  Active only  Troubleshoot  Period

Total (Default) ▾

Update Table

Reset All Selections

XML last update: Wed Jun 25 03:19:07 2014

Entry Name		Status:								Requested:		Claimed	User run here
		Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle		
CMS_T2_US_Caltech_cit	↑	1254	319	0	319	0	0	0	1	2588	313	980	978
CMS_T1_US_FNAL_ce	↑	869	153	0	153	0	0	0	0	2568	150	847	845
CMS_T2_US_Florida_jogw1	↑	761	118	0	118	0	2	0	668	5293	151	824	824

# factoryStatusNow

XML last update: Wed Jun 25 03:19:07 2014

Entry Name		Status:								Requested:		Claimed	User run here
		Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle		
CMS_T2_US_Caltech_cit	↑	1254	319	0	319	0	0	0	1	2588	313	980	978
CMS_T1_US_FNAL_ce	↑	869	153	0	153	0	0	0	0	2568	150	847	845
CMS_T2_US_Florida_logw1	↑	761	118	0	118	0	2	0	668	5293	151	824	824

- **Waiting** and **Pending** are 2 categories of **Idle**  
Idle = Waiting + Pending

# factoryStatusNow

XML last update: Wed Jun 25 03:19:07 2014

Entry Name		Status:								Requested:		Claimed	User run here
		Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle		
CMS_T2_US_Caltech_cit	↑	1254	319	0	319	0	0	0	1	2588	313	980	978
CMS_T1_US_FNAL_ce	↑	869	153	0	153	0	0	0	0	2568	150	847	845
CMS_T2_US_Florida_logw1	↑	761	118	0	118	0	2	0	668	5293	151	824	824

- **Waiting** – the glidein never left the factory  
(only on our local queue)

# factoryStatusNow

XML last update: Wed Jun 25 03:19:07 2014

Entry Name		Status:								Requested:		Claimed	User run here
		Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle		
CMS_T2_US_Caltech_cit	↑	1254	319	0	319	0	0	0	1	2588	313	980	978
CMS_T1_US_FNAL_ce	↑	869	153	0	153	0	0	0	0	2568	150	847	845
CMS_T2_US_Florida_logw1	↑	761	118	0	118	0	2	0	668	5293	151	824	824

- **Pending** – the glidein made it to the site batch system, but it has not been assigned to a worker node yet  
(made it to the site queue)

# factoryStatusNow

XML last update: Wed Jun 25 03:19:07 2014

Entry Name		Status:								Requested:		Claimed	User run here
		Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle		
CMS_T2_US_Caltech_cit	↑	1254	319	0	319	0	0	0	1	2588	313	980	978
CMS_T1_US_FNAL_ce	↑	869	153	0	153	0	0	0	0	2568	150	847	845
CMS_T2_US_Florida_logw1	↑	761	118	0	118	0	2	0	668	5293	151	824	824

- If either **Waiting** or **Pending\*** are high but **Running**  $\approx 0$  we should investigate

\* High Pending and 0 Running is not necessarily a problem unless no jobs start for a significant period of time (~24 hrs or more)



# factoryStatusNow

4

Status:								Requested:		Client Monitor:						
Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle	Claimed	User run here	User running	Unmatched	User idle	Registered	Info age
1254	319	0	319	0	0	0	1	2588	313	980	978	129526	16	128883	997	265
869	153	0	153	0	0	0	0	2568	150	847	845	78081	31	120723	879	534
761	118	0	118	0	2	0	668	5293	151	824	824	65730	2	109394	826	431

- **Requested Idle** – number the frontend is requesting (pressure value)

# factoryStatusNow

4

Status:								Requested:		Client Monitor:						
Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle	Claimed	User run here	User running	Unmatched	User idle	Registered	Info age
1254	319	0	319	0	0	0	1	2588	313	980	978	129526	16	128883	997	265
869	153	0	153	0	0	0	0	2568	150	847	845	78081	31	120723	879	534
761	118	0	118	0	2	0	668	5293	151	824	824	65730	2	109394	826	431

- A well behaved entry should have\*

Req Idle ~= Idle

\* An exception is when we significantly limit max idle in the factory config

# factoryStatusNow

7 2014

	Status:								Requested:		Client Monitor:						
	Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle	Claimed	User run here	User running	Unmatched	User idle	Registered	Info age
↑	1254	319	0	319	0	0	0	1	2588	313	980	978	129526	16	128883	997	265
↑	869	153	0	153	0	0	0	0	2568	150	847	845	78081	31	120723	879	534
↑	761	118	0	118	0	2	0	668	5293	151	824	824	65730	2	109394	826	431

- The Frontend reports back stats about its User Collector
- **Registered** is the number of glideins actually connected to the Collector
- **Registered** should roughly be equal to **Running**

# factoryStatusNow

7 2014

	Status:								Requested:		Client Monitor:						
	Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle	Claimed	User run here	User running	Unmatched	User idle	Registered	Info age
↑	1254	319	0	319	0	0	0	1	2588	313	980	978	129526	16	128883	997	265
↑	869	153	0	153	0	0	0	0	2568	150	847	845	78081	31	120723	879	534
↑	761	118	0	118	0	2	0	668	5293	151	824	824	65730	2	109394	826	431

- We define **Rundiff** as:  
Running – Registered
- Rundiff >> 0 should be investigated

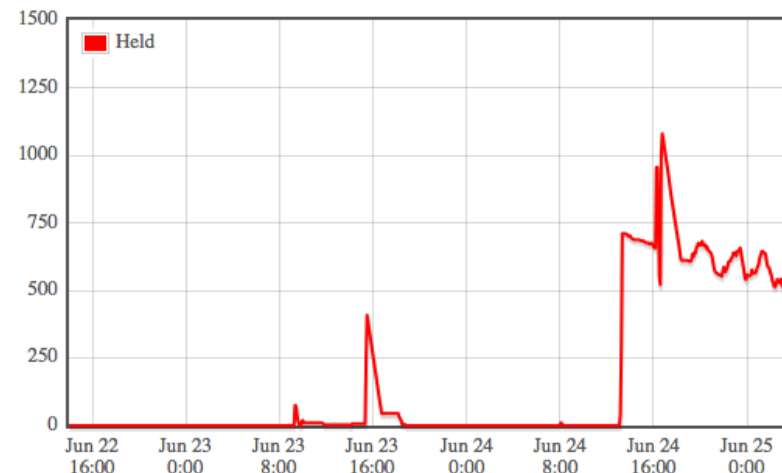
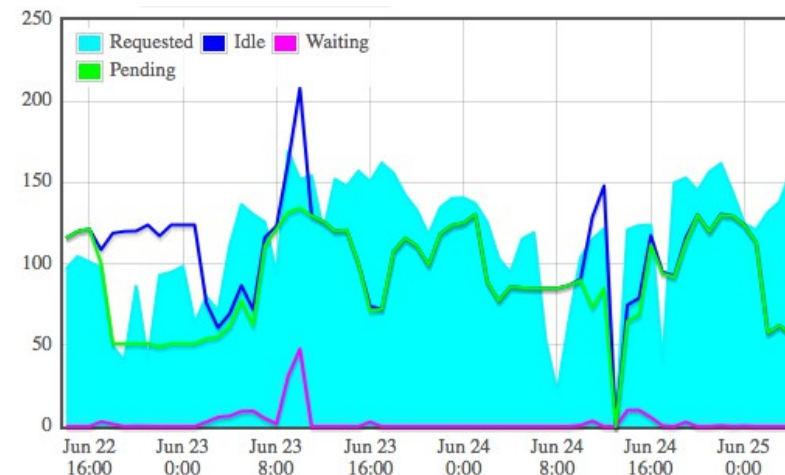
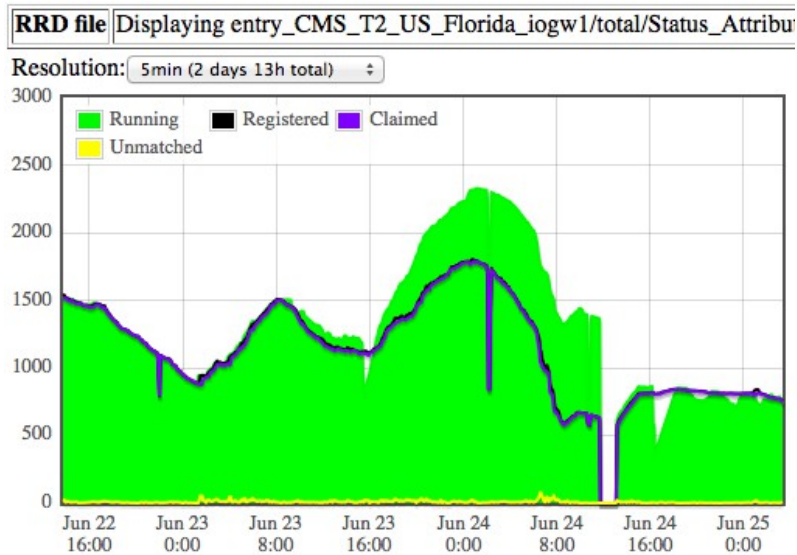
# factoryStatusNow

Status:								Requested:		Client Monitor:						
Running	Idle	Waiting	Pending	Staging in	Staging out	Unknown	Held	Max glideins	Idle	Claimed	User run here	User running	Unmatched	User idle	Registered	Info age
254	319	0	319	0	0	0	1	2588	313	980	978	129526	16	128883	997	265
69	153	0	153	0	0	0	0	2568	150	847	845	78081	31	120723	879	534
61	118	0	118	0	2	0	668	5293	151	824	824	65730	2	109394	826	431

- Frontend subcategories of **Registered**:
  - **Claimed** – glideins running user jobs
  - **Unmatched** – glideins available, but 0 jobs match their requirements
  - Registered = Claimed + Unmatched
  - Unmatched >> Claimed should also be investigated

# factoryStatus

- Same stats as factoryStatusNow but plotted over time:



# analyze\_entries

- Report excerpt:

```
frontend_UCSDCMS_cmspilot:
```

	strt	fval	0job		val	idle	wst	badp		waste	time	total
Total/Average	8%	0%	16%		0%	1%	2%	37%		6930	280120	23370
-----	---	---	---		---	---	---	---		---	---	---
CMS_T3_US_PuertoRico_grid0	4%	0%	45%		16%	22%	25%	52%		210	811	165
CMS_T2_US_Purdue_hadoop	64%	23%	72%		23%	10%	34%	70%		199	575	672
CMS_T3_UK_SGrid_0xford_ce06_medium	1%	1%	86%		2%	57%	60%	69%		30	50	73

- Legend:

```
strt - % of jobs where condor failed to start
fval - % of glideins that failed to validate (hit 1000s limit)
0job - % 0 jobs/glidein
-----
val - % of time used for validation
idle - % of time spend idle
wst - % of time wasted (Lasted - JobsLasted)
badp - % of badput (Lasted - JobsGoodput)
-----
waste - wallclock time wasted (hours) (Lasted - JobsLasted)
time - total wallclock time (hours) (Lasted)
total - total number of glideins
-----
Lasted      - total wallclock time
JobsLasted  - wallclock time used to run jobs
JobsGoodput - wallclock time used by jobs terminatig with exit code 0
```

# analyze\_entries

- All of the following are counted as **Waste**:
  - Condor failing startup
  - Failing validation
  - 0job
  - Idle

**NOTE** in this report, idle refers to time glidein spent running but not running user jobs, e.g. Unmatched
- We want to investigate whenever waste is high for an entry

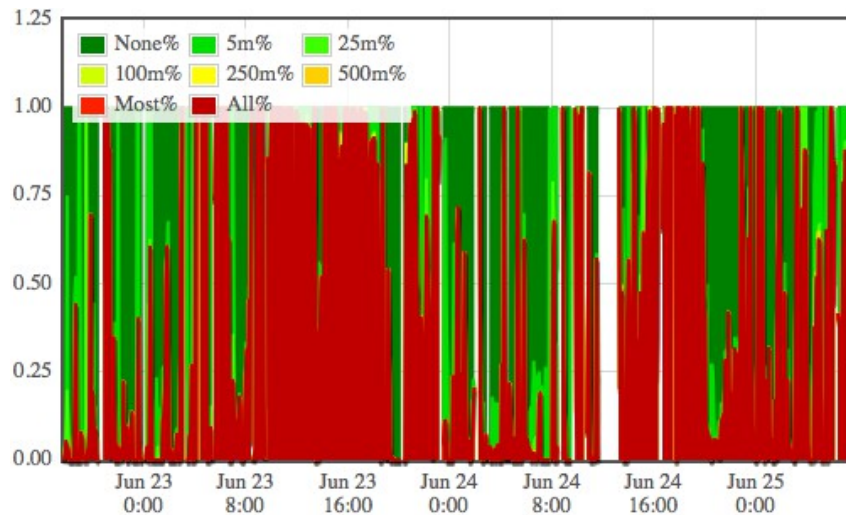


# factoryCompletedStats

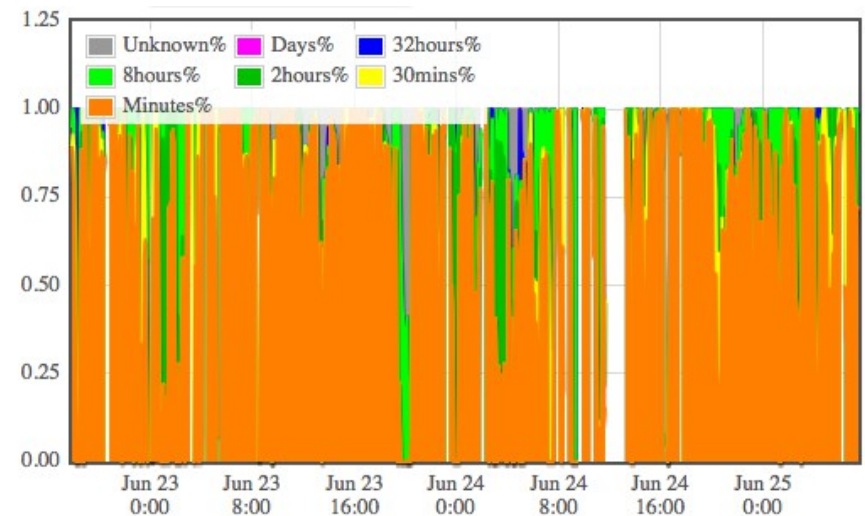
- Useful to see validation over time and short running glideins:

CMS\_T2\_US\_Purdue\_hadoop (has problems!)

Fraction wasted due to node validation



Wallclock time per glidein



# Overview

- Monitoring and Reports
- **Logs**
- Tools

# Logs

- Glidiens have three logs associated with them, job.\*.out, job.\*.err, condor\_activity
- \*.err logs contain compressed condor daemon logs, as well as an XML report containing statistics
- Tools provided to extract the compressed logs:
  - cat\_MasterLog.py
  - cat\_StartdLog.py
  - cat\_StartdHistoryLog.py
  - cat\_StarterLog.py
  - cat\_XMLResult.py

# Logs

- `job.*.out` and `job.*.err` logs contain lots of diagnostic info, and also include any stdout or stderr written by validation scripts
- If a validation script provides an XML report, it is often enough to read the summary to discover validation errors

# Logs

```
$ cat_XMLResult.py job.2106335.3.out
<?xml version="1.0"?>
<OSGTestResult logname="job.2106335.3.out" id="glidein_startup.sh" version="4.3.1">
  <operatingenvironment>
    <env name="client_name">UCSD-o1_0.MIT</env>
    <env name="client_group">MIT</env>
    <env name="user">cuser13</env>
    <env name="arch">x86_64</env>
    <env name="os">CentOS release 6.4 (Final)</env>
    <env name="hostname">cabinet-8-8-11.t2.ucsd.edu</env>
    <env name="cwd">/data1/condor_local/execute/dir_16146</env>
  </operatingenvironment>
  <test>
    <tStart>2014-06-19T23:48:08-07:00</tStart>
    <tEnd>2014-06-19T23:49:22-07:00</tEnd>
  </test>
  <result>
    <status>ERROR</status>
    <metric name="TestID" ts="2014-06-19T23:49:21-07:00" uri="local">main/validate_node.sh</metric>
    <metric name="failure" ts="2014-06-19T23:49:21-07:00" uri="local">WN_Resource</metric>
    <metric name="CwdFreeKb" ts="2014-06-19T23:49:21-07:00" uri="local">751952</metric>
    <metric name="CwdMinKb" ts="2014-06-19T23:49:21-07:00" uri="local">1048576</metric>
  </result>
  <detail>
    Validation failed in main/validate_node.sh.

    Space on '.' not enough.
    At least 1024 MBs required, found 751952 KBs
  </detail>
</OSGTestResult>
```

# Logs

- The condor\_activity log contains state transitions for each glidein during its lifetime:

```
000 (2118175.001.000) 06/24 13:16:44 Job submitted from host: <169.228.38.36:46438>
...
017 (2118175.001.000) 06/24 13:16:57 Job submitted to Globus
RM-Contact: osg-gw-6.t2.ucsd.edu:2119/jobmanager-condor
JM-Contact: osg-gw-6.t2.ucsd.edu:2119/jobmanager-condor
Can-Restart-JM: 1
...
027 (2118175.001.000) 06/24 13:16:57 Job submitted to grid resource
GridResource: gt5 osg-gw-6.t2.ucsd.edu:2119/jobmanager-condor
GridJobId: gt5 osg-gw-6.t2.ucsd.edu:2119/jobmanager-condor https://osg-gw-
6.t2.ucsd.edu:46762/16362101895480626811/7675377755575312265/
...
001 (2118175.001.000) 06/24 13:26:57 Job executing on host: gt5 osg-gw-6.t2.ucsd.edu:2119/jobmanager-condor
...
005 (2118175.001.000) 06/25 01:32:12 Job terminated.
    (1) Normal termination (return value 0)
        Usr 0 00:00:00, Sys 0 00:00:00 - Run Remote Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Run Local Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Total Remote Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Total Local Usage
    0 - Run Bytes Sent By Job
    0 - Run Bytes Received By Job
    0 - Total Bytes Sent By Job
    0 - Total Bytes Received By Job
...
```

# Logs

- condor\_activity for a site with problems:

```
000 (2212350.000.000) 06/30 16:27:16 Job submitted from host: <169.228.38.36:51626>
...
017 (2212350.000.000) 06/30 16:27:29 Job submitted to Globus
  RM-Contact: mwt2-gk.campuscluster.illinois.edu:2119/jobmanager-condor
  JM-Contact: mwt2-gk.campuscluster.illinois.edu:2119/jobmanager-condor
  Can-Restart-JM: 1
...
027 (2212350.000.000) 06/30 16:27:29 Job submitted to grid resource
  GridResource: gt5 mwt2-gk.campuscluster.illinois.edu:2119/jobmanager-condor
  GridJobId: gt5 mwt2-gk.campuscluster.illinois.edu:2119/jobmanager-condor https://mwt2-
gk.campuscluster.illinois.edu:22191/16434107832055453976/10682067833090772881/
...
029 (2212350.000.000) 07/03 14:15:32 The job's remote status is unknown
...
030 (2212350.000.000) 07/03 14:26:54 The job's remote status is known again
...
012 (2212350.000.000) 07/07 16:29:25 Job was held.
  Globus error 31: the job manager failed to cancel the job as requested
  Code 2 Subcode 31
...
026 (2212350.000.000) 07/09 06:43:03 Detected Down Grid Resource
  GridResource: gt5 mwt2-gk.campuscluster.illinois.edu:2119/jobmanager-condor
...
```

# Overview

- Monitoring and Reports
- Logs
- **Tools**

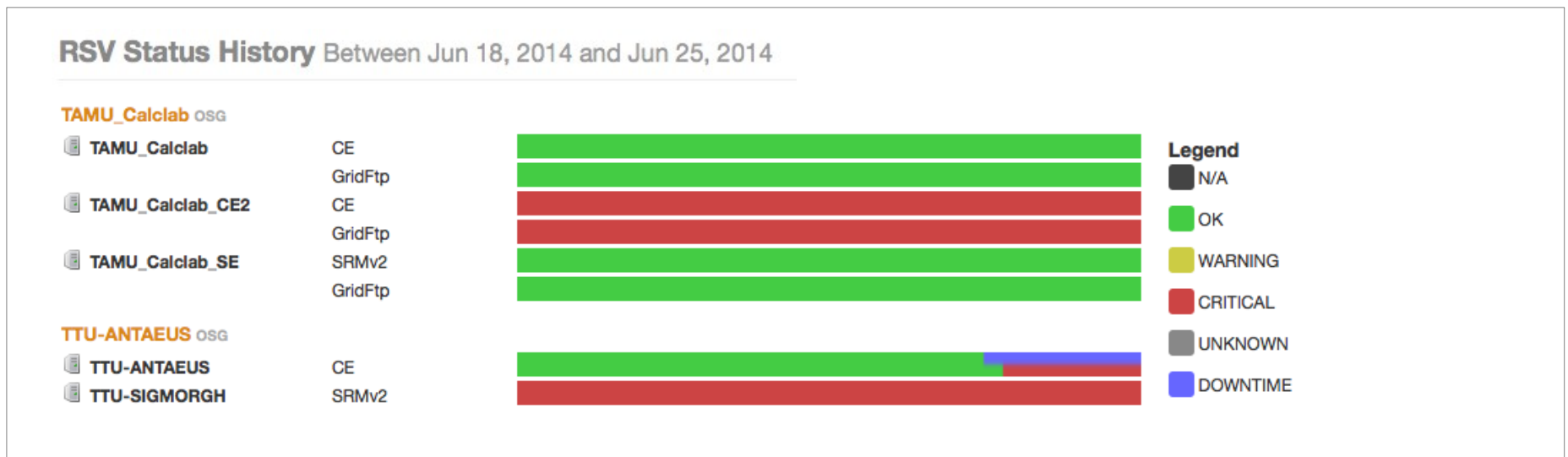


# Tools

- Summary of tools cited in next talk:
  - **entry\_q** – convenience wrapper for condor\_q to filter by entry name
  - **entry\_ls** – list all .err or .out logs for a particular entry, FE, date combination
  - **get\_wns** – extracts workernode hostnames from glidein XML reports
  - **proxy\_info** – obtain information about a given glidein pilot proxy

# OSG Status Website

- All OSG Sites report to RSV:



- It is useful to check here when a CE is unreachable, to see if the Site is down for maintenance
  - <http://myosg.grid.iu.edu/about>