



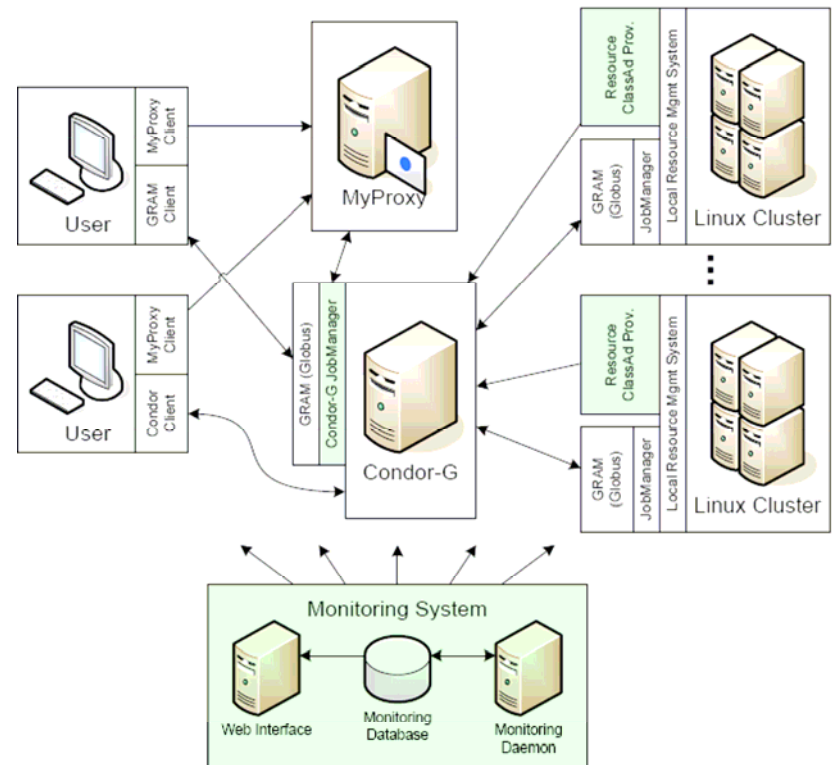
# BaBar MC Production on the Canadian Grid using a Web Services Approach

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# Overview of GridX1 – A GT2 Grid

- Use Canadian resources
  - calliope, mercury, mcgill
- Clusters: standard Globus Toolkit 2 (GT2)
- Resource Mgmt:
  - CondorG-based MS
  - Condor Brokering
  - MyProxy credential repo
- Central monitoring and accounting with web GUI





# Limitations of GridX1

- Due to numerous service-specific protocols
  - e.g. GRAM, MyProxy, Condor
- 1. Difficult to extend:
  - Adding a new service involves modifying protocol, or developing a new one
- 2. Compatibility issues:
  - Lack of protocol standardization
  - Backwards compatibility is not perfect (protocols modified between releases)
- 3. Firewall problems:
  - Each service uses its own TCP port
  - Many ports must be opened by each institution
    - this may conflict with local policies
- 4. Security vulnerabilities:
  - The GRAM job service runs as root, which could lead to a compromised resource
  - Access is often limited to trusted hosts, limiting usefulness of the service

**Solution: Web Services Resource Framework (WSRF)  
Globus Toolkit v.4**



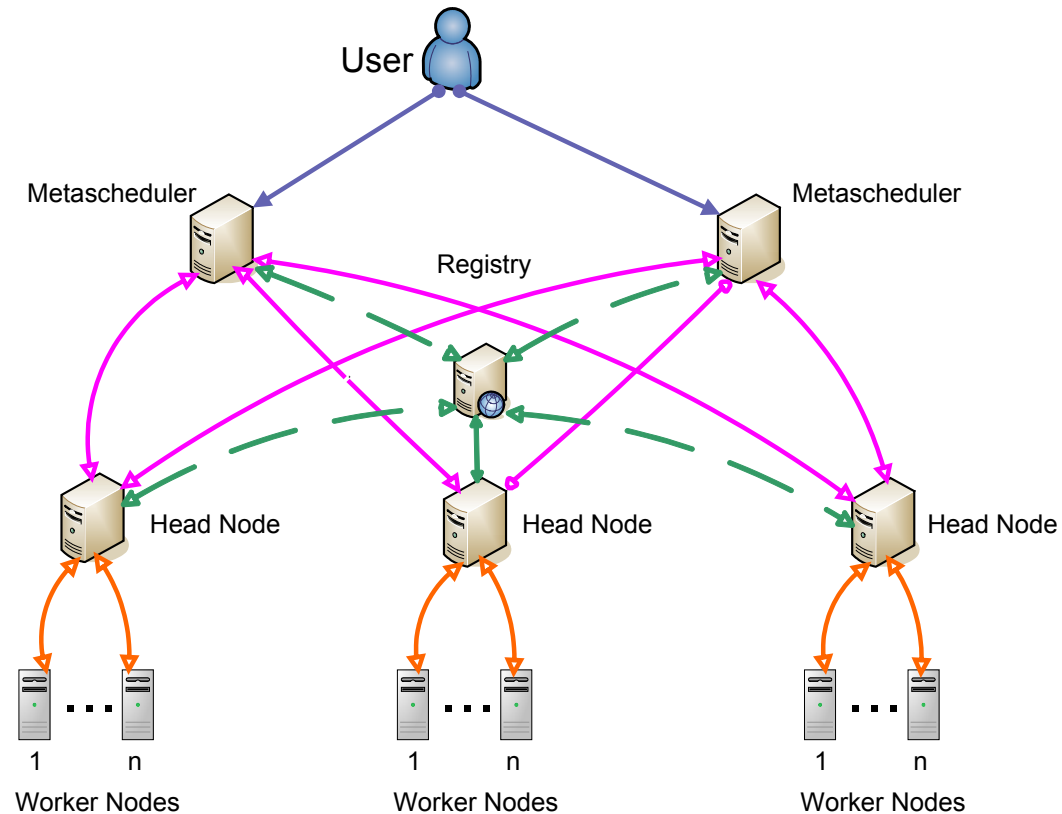
# Globus Toolkit v.4 Advantages

- WSRF solves the 4 key problems with GridX1
  1. Easy to extend
    - One common protocol (SOAP)
    - Easy to develop new WSRF services
  2. Seamless upgrade support
    - Changes to service interfaces are described in WSDL
  3. Reduced firewall problems
    - Fewer ports (the service container)
    - Non-privileged ports
  4. Good security
    - Service container runs as non-privileged user

# WSRF-Based Grid

- Consists of multiple metaschedulers
- Central resource registry to store the resource attributes, RFT and LRMS
- Having multiple metaschedulers and registries gives high scalability and reliability of the grid

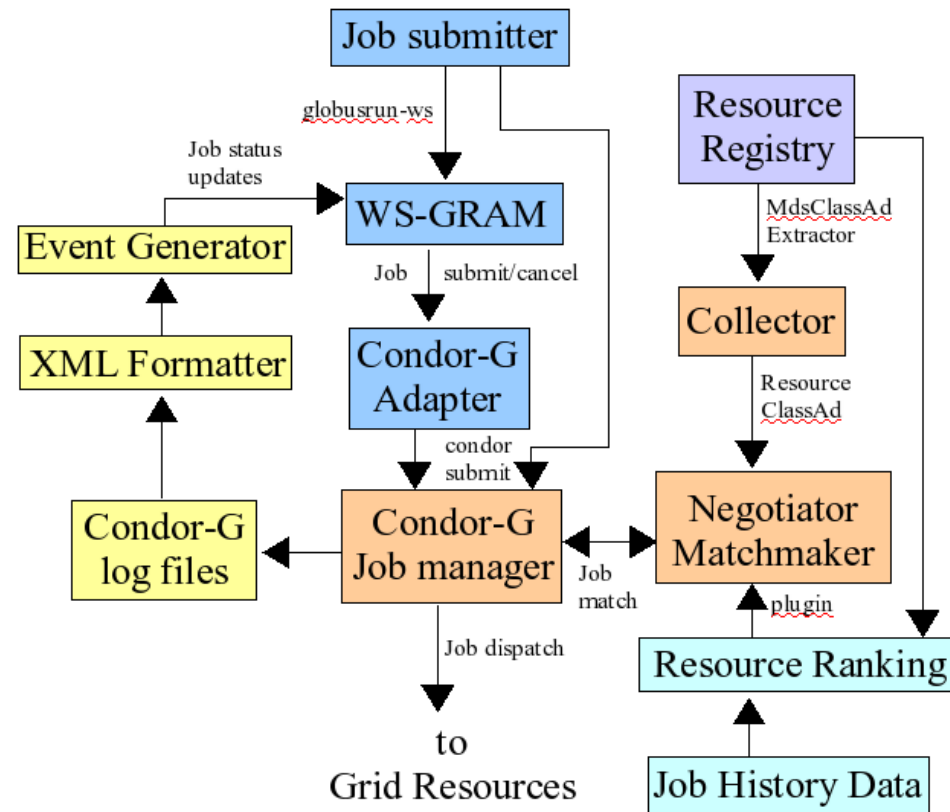
## Proposed WSRF-based grid



# Important Features

- Condor-G used as the metascheduler
- Automatic registering of resource ClassAds to the central registry
- Automatic ClassAds extraction from the registry to the metascheduler for matchmaking
- Incorporation of input/output file staging
- Job submission using WS-GRAM or Condor\_Submit
- Web-based monitoring

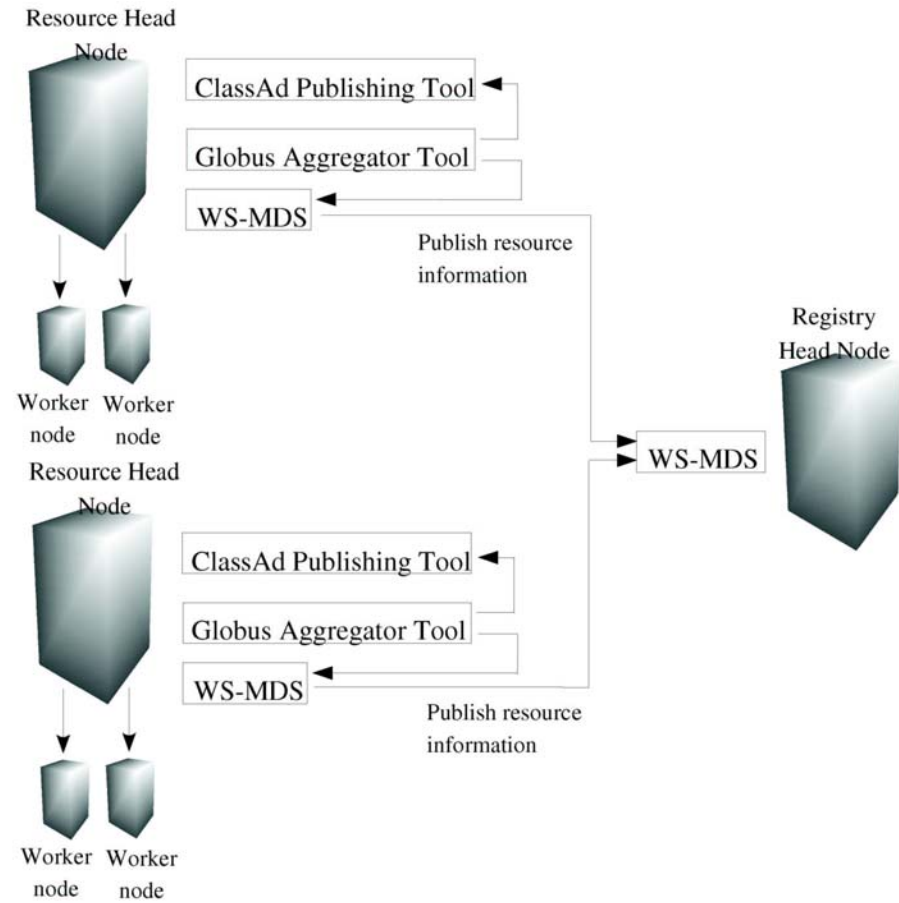
## Metascheduler Service



# Publishing Tool

- An information provider script runs on every Grid resource and generates the resource ClassAd in GLUE 1.2 scheme
- Inserts the resource information in the form of XML-formatted Condor ClassAds into the local WS-MDS
- Publishes the resource information into the WS-MDS of the central registry

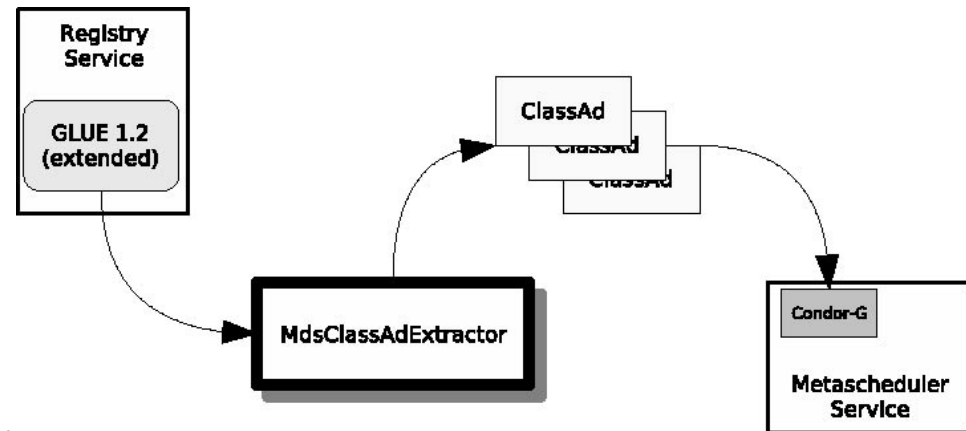
## ClassAd Publishing Tool



# ClassAd Extractor

- Java application software
- Runs periodically on the metascheduler
- Extracts compute resources ClassAds in GLUE 1.2 scheme
- Converts the XML data into the Condor ClassAds for each resource
- Publishes these ClassAds to the Condor collector for jobs matchmaking

## MdsClassAdExtractor Tool





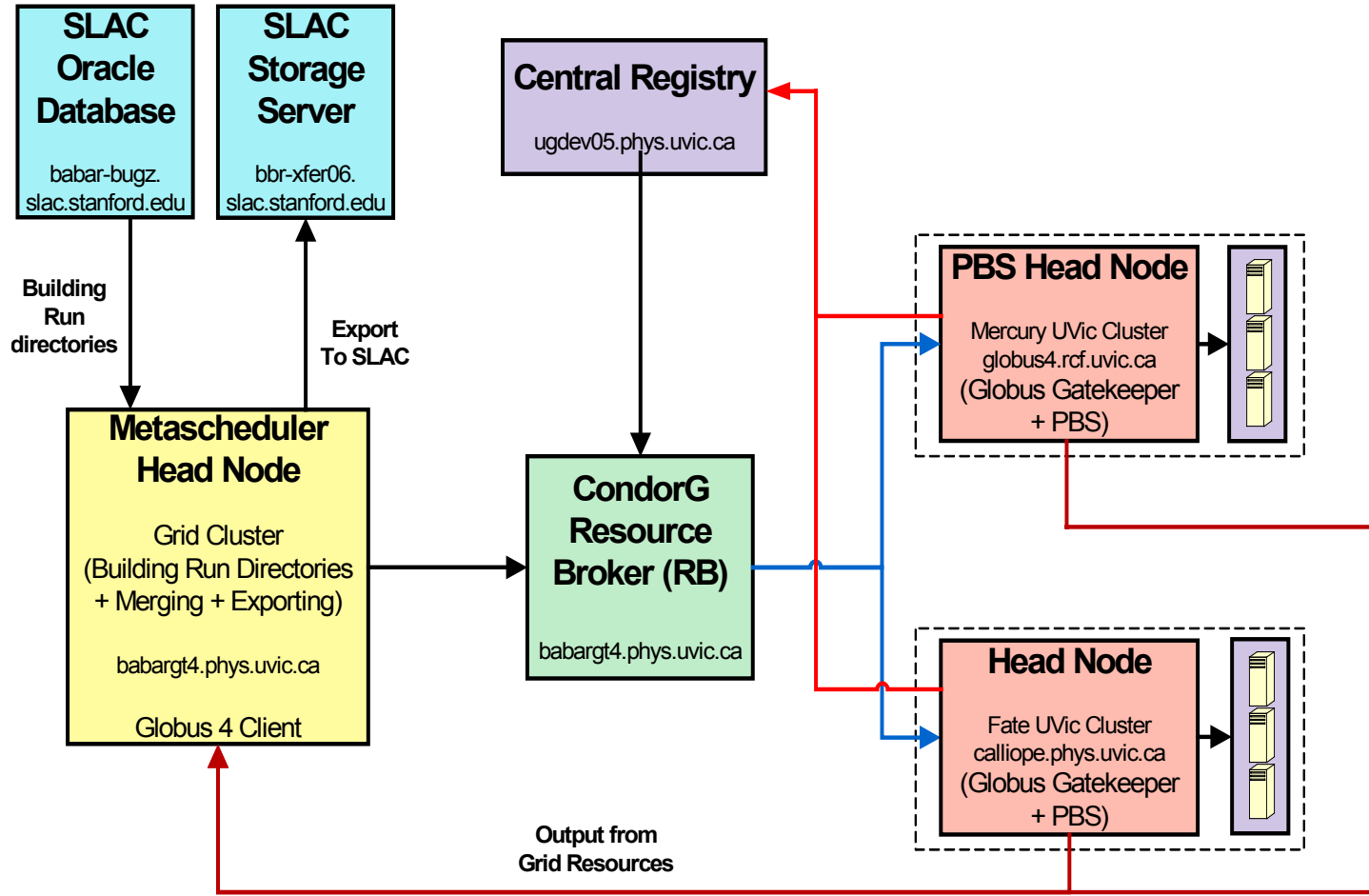


# BaBar MC Grid Requirements

- Metascheduler head node
  - Install Condor-G and GT4
  - Install BaBar software
  - Set up metascheduler
  - Set up ClassAd extraction tool
- Grid Resources Head Node
  - Set up Portable Batch System (PBS) to act as the local resource management system
  - Install BaBar software
  - Set up classad.pm to advertise the local resource information
  - Set up ClassAd publishing tool



# BaBar MC Production Setup Using Resource Broker





# Performance Test

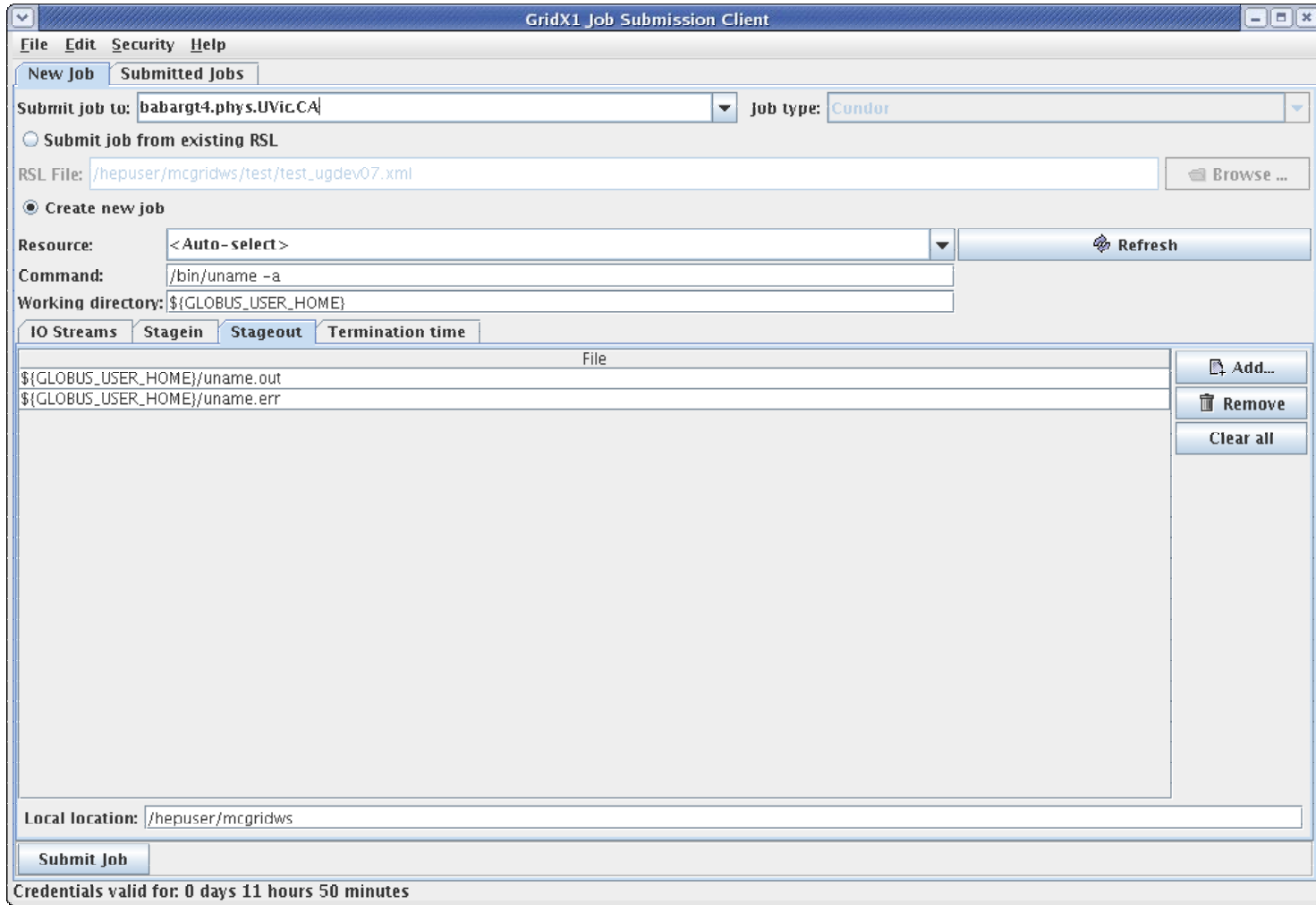
## Comparison of CPU time and percent efficiency (% Eff)

Sr. No.	SP8 Validation Run Number	Globus Toolkit 4				Globus Toolkit 2			
		Fate		Mercury		Fate		Mercury	
		CPU Time (HH:MM)	% Eff	CPU Time (HH:MM)	% Eff	CPU Time (HH:MM)	% Eff	CPU Time (HH:MM)	% Eff
1	9941582	4:26	99	4:59	85	4:23	99	4:06	98
2	9941585	4:24	99	5:01	80	4:40	98	4:08	98
3	9941587	4:31	98	4:55	84	4:26	99	4:14	97
4	9941589	4:09	98	4:40	85	4:41	98	4:20	97

$$\% \text{ Eff} = \text{CPU Time} / \text{Wall Time}$$



# JSAM: Job Submission Tool





# GridX1 Condor-G Monitoring

home monitor documentation contact

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you are here: home » grid monitor » babargrid monitoring » babargrid jobs

### Babar Job Info

job id	user id	owner	command	resource	status	run time	time submitted
8763.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	ACTIVE	2:22:22	2 Nov, 12:15
8764.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	ACTIVE	4:08:48	2 Nov, 12:15
8770.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:15
8771.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	ACTIVE	0:25:14	2 Nov, 12:15
8772.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	ACTIVE	2:08:22	2 Nov, 12:16
8773.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	ACTIVE	4:23:23	2 Nov, 12:16
8780.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8781.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	ACTIVE	2:07:22	2 Nov, 12:16
8782.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	ACTIVE	3:57:52	2 Nov, 12:16
8790.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	ACTIVE	2:04:47	2 Nov, 12:16
8791.0	mcgrid	Ashok Agarwal	run.csh 6845 ...	callope.phys.uvic.ca	ACTIVE	3:50:48	2 Nov, 12:16
8800.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	ACTIVE	0:30:20	2 Nov, 12:16
8801.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8802.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8803.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8804.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8805.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8806.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8807.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	ACTIVE	0:15:19	2 Nov, 12:16
8808.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	ACTIVE	1:20:51	2 Nov, 12:16
8810.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8811.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8812.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16
8813.0	mcgrid	Ashok Agarwal	run.csh 6846 ...	callope.phys.uvic.ca	PENDING		2 Nov, 12:16

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you are here: home » grid monitor » callope.phys.uvic.ca » site info - callope.phys.uvic.ca

### GridX1 - callope.phys.uvic.ca

Site info and current status for callope.phys.uvic.ca.

Current Status: **Up** Nov 4, 2005 15:01:01

Active CPUs: 48 IP Address: 142.104.60.164

Max Grid CPUs: 50 Administrator: Ryan Enge

Grid Jobs: 16

Local Jobs: 22

Idle CPUs: 10

Generated: Fri Nov 4 15:01:01

[View past monitoring test results](#) for callope.phys.uvic.ca.

The current status of jobs and resources can be viewed on the [Condor-G Monitoring](#) page.

### babargrid.phys.uvic.ca resource

Site	Active + Pending	Waiting Time
callope.phys.uvic.ca:2119/jobmanager-pbs-gc-production	16+260	00:00:00
sl-gw.physics.mcgill.ca:2119/jobmanager-pbs-workq	13+66	00:00:00
mercury2.uvic.ca:2119/jobmanager-pbs-gc-production	6+0	00:00:00
Unsubmitted:	0	
Total:	35+326	



# WSRF-Based Grid Monitoring

## Globus-4 Test Grid Monitoring

Please use the tree menu on the left for navigation.

**Navigation**

- BaBar Graphs
  - Yearly Graph
  - Monthly Graph
  - Weekly Graph
- Monitoring
  - Job Submission
  - GridFTP
- Alerts
  - Ping Level

**babargt4.phys.uvic.ca**

Job Submission: **Up**

Grid FTP: **Up**

Last Updated: Thu Aug 23 13:07:52 PDT 2007

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# Conclusion

- With the WSRF (GT4), we have developed
  - A metascheduling service using Condor-G
  - Resource information provider
  - Automatic ClassAd extraction tool
  - Job submission client tool
- Execution of BaBar jobs is successful on the GT4 grid
- Web-based monitoring is useful for providing the status of grid resources and the jobs
- Monitoring is based on Condor\_history. Work is in progress to improve monitoring using condor\_quill.
- Production will start soon on this WSRF-based grid