



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

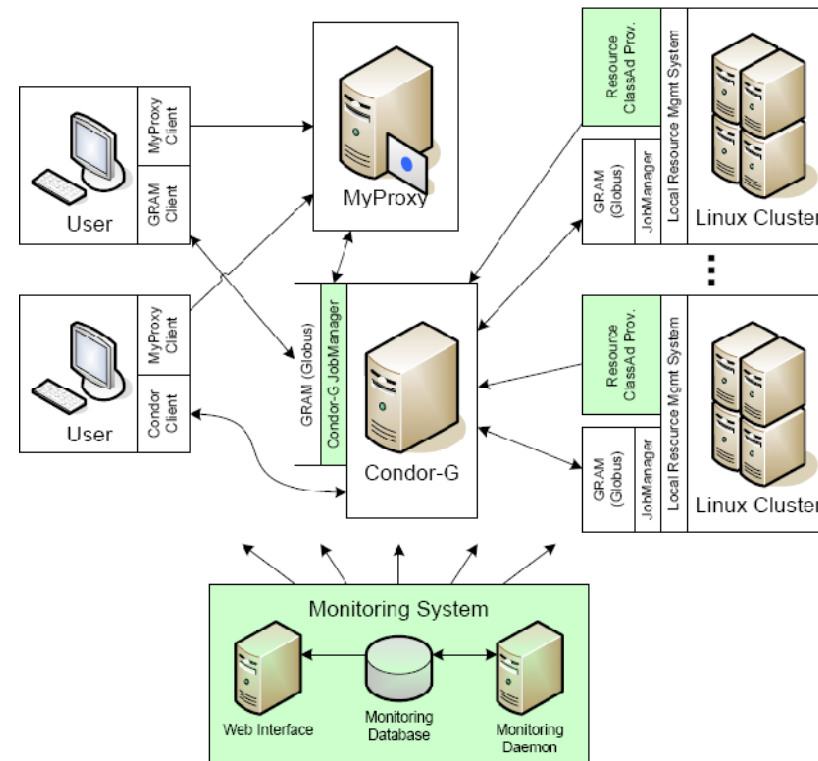
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Sydney Schaffer, Cameron Sobie, Randall Sobie,
Tristan Sullivan, Daniel Vanderster**

University of Victoria



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

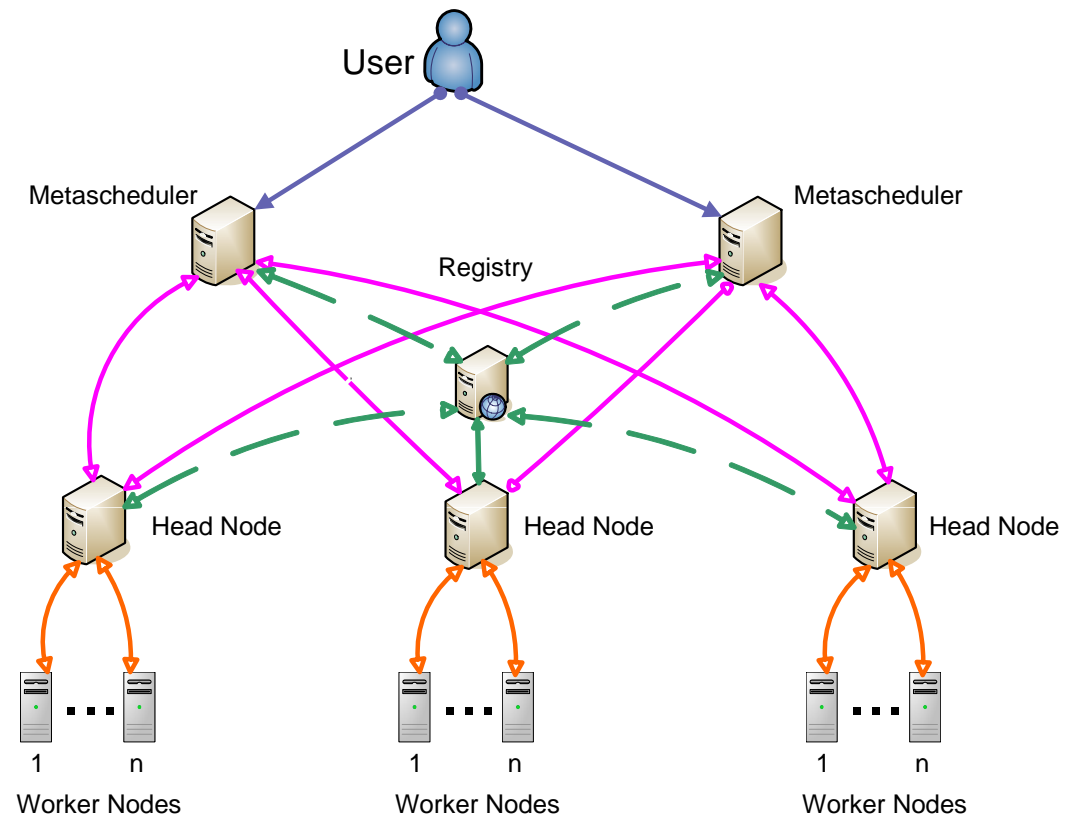
- WSRF solves the 4 key problems with GridX1
 1. Easy to extend
 - One common protocol (SOAP)
 - Easy to develop new WSRF services
 2. Seamless upgrade support
 - Changes to service interfaces are described in WSDL
 3. Reduced firewall problems
 - Fewer ports (the service container)
 - Non-privileged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



WSRF-Based Grid

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

Proposed WSRF-based grid

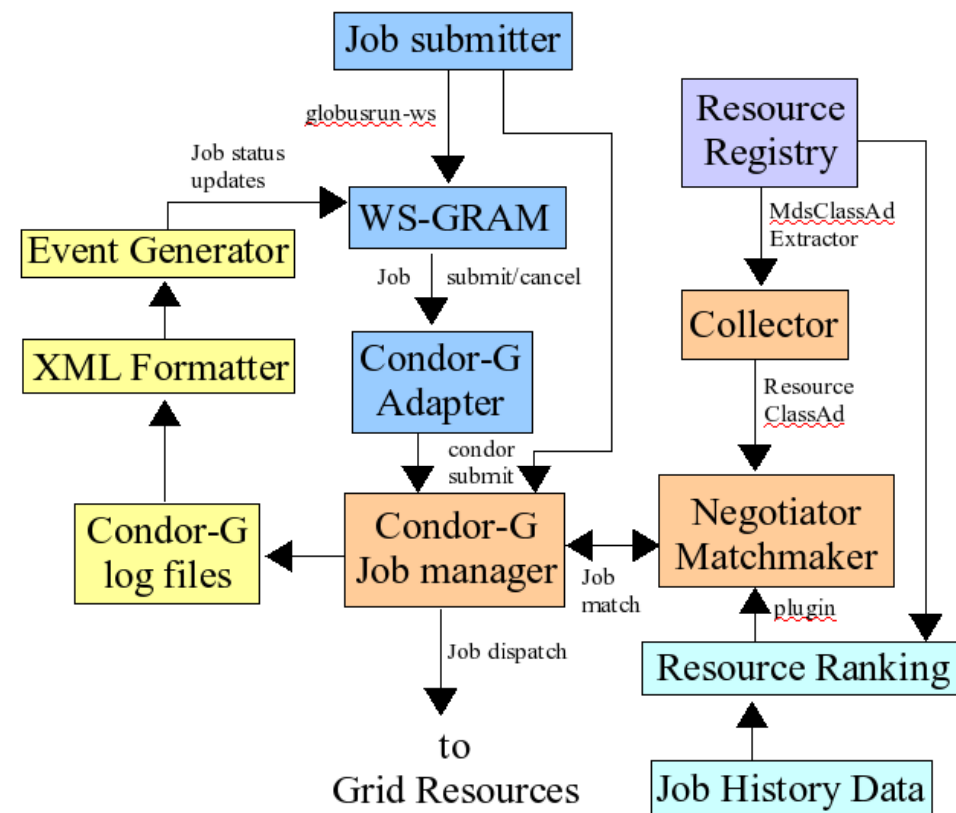




Important Features

- 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

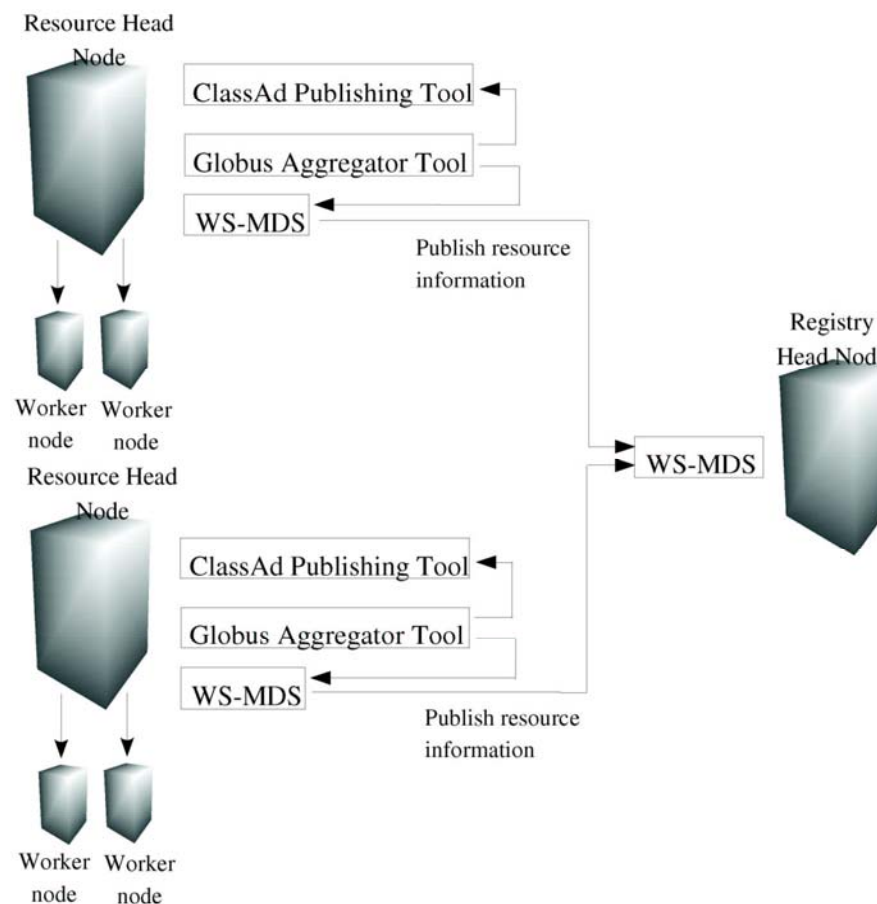




Publishing Tool

- 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

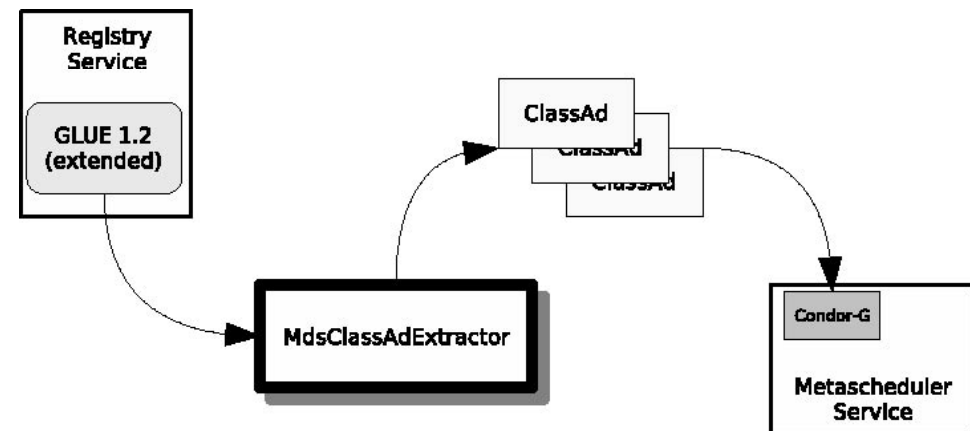




ClassAd Extractor

- 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



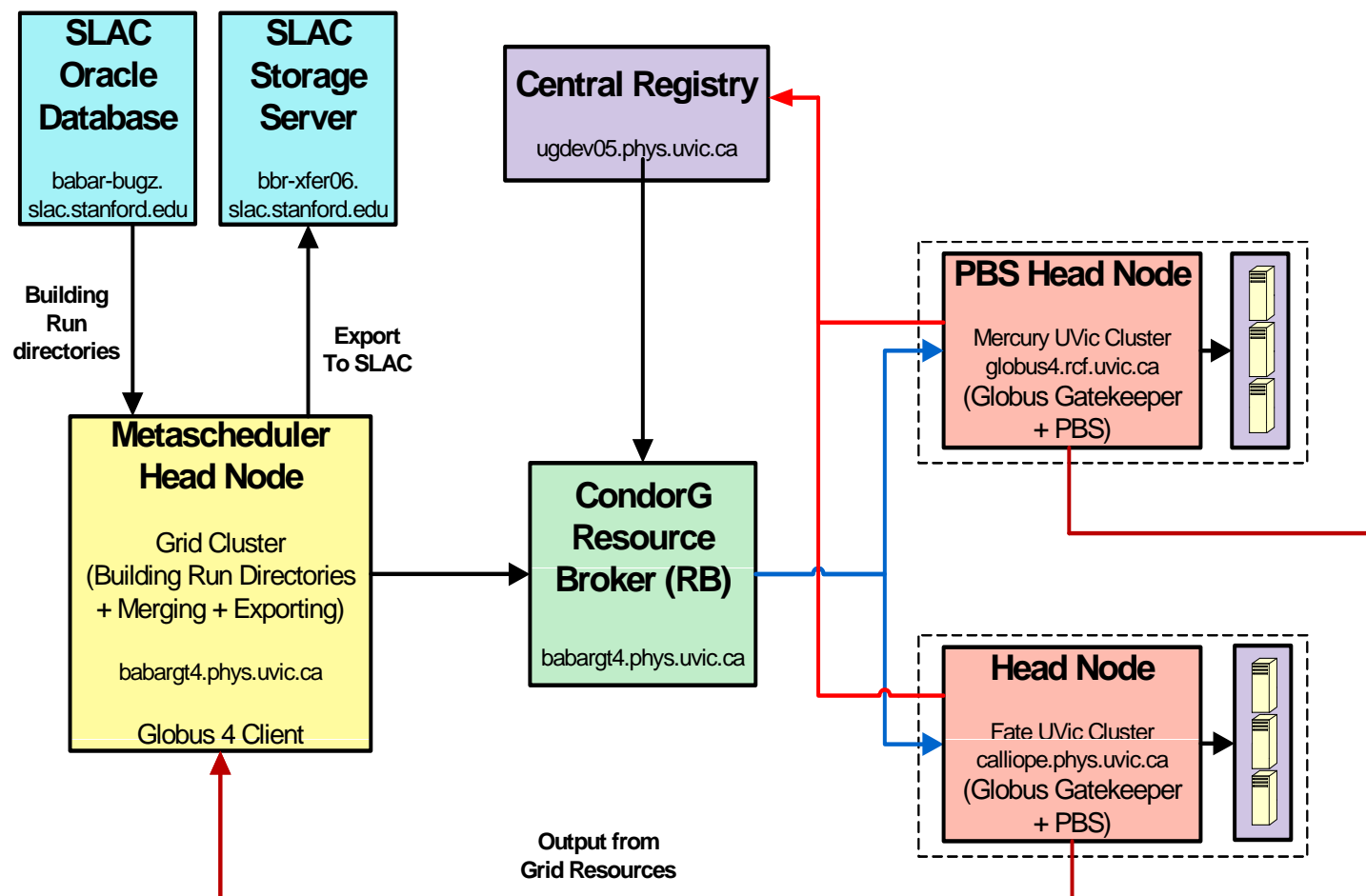


BaBar MC Grid Requirements

- 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

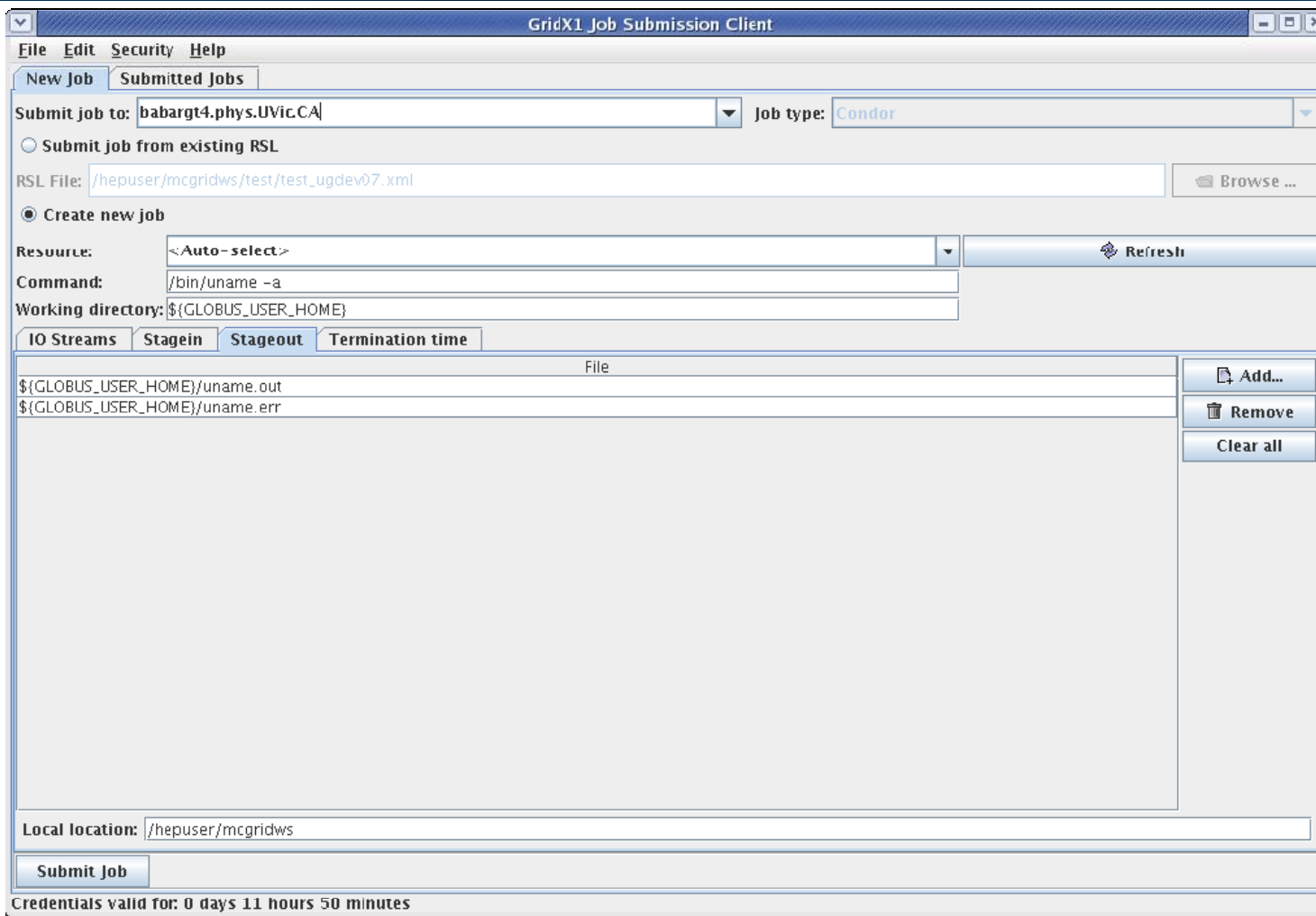
Comparison of CPU time and percent efficiency (% Eff)

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				
gridx1	atlas	babar	kg				
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

home	monitor	documentation	contact
gridx1	atlas	babar	kg
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		
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

University of Victoria

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