



Overview on monitoring tools for Grid Systems

Biomed Grid School
Varenna 2007, 14 May

Antonio Pierro
INFN-BARI (Italy)
Antonio.pierro <at> ba.infn.it

- Why Monitoring
 - Resources observability is necessary for an optimized Grid utilization
 - To reduce time spent waiting for **Resource Availability**
 - Grid resources are subject to failures
- Overview of EGEE/LCG monitoring tools
 - SAM (Service Availability Monitoring)
 - GStat (Global Grid Information Monitoring System)
 - GridView
 - GridICE (infrastructure and application monitoring)

- Service Availability Monitoring (SAM) - “extension” of SFT
- Service Availability Monitoring framework (SAM) :
 - Monitoring **all grid services** not only CE
 - It is used in the validation process of sites and services
 - It allows calculation of availability metrics
 - SAM wiki : <http://goc.grid.sinica.edu.tw/gocwiki/SAM>
 - SAM portal : <https://lcg-sam.cern.ch:8443/sam/sam.py>
- Service and Site status are recorded (several snapshots per day)
- Daily, weekly, monthly availability is calculated using integration (averaging) over the given period
- Availability metrics tools in development
- Official evaluation of T0,T1 and T2 sites.

<input type="radio"/>	BDII	Top-level BDII
<input type="radio"/>	sBDII	Site BDII
<input type="radio"/>	FTS	File Transfer Service
<input type="radio"/>	gCE	gLite Computing Element
<input type="radio"/>	LFC	Global LFC
<input type="radio"/>	VOMS	VOMS
<input checked="" type="radio"/>	CE	Computing Element
<input type="radio"/>	SRM	SRM
<input type="radio"/>	gRB	gLite Resource Broker
<input type="radio"/>	MyProxy	MyProxy
<input type="radio"/>	RB	Resource Broker
<input type="radio"/>	VOBOX	VO BOX
<input type="radio"/>	SE	Storage Element
<input type="radio"/>	RGMA	RGMA Registry

Regions:

- Unknown
- CERN**
- France
- UK_Ireland
- GermanySwitzerland
- Italy
- CentralEurope

VOs:

- ops**
- egrid
- aegis
- alice
- cms
- dteam
- atlas

Sorting Order:

- SiteName
- RegionName
- SiteName**
- NodeName

ShowSensorTests

No	RegionName	SiteName	NodeName	Status	ops					
					js	ca	csh	votag	swdir	gfal
1	CERN	ALBERTA-LCG2	lcgce02.nic.ualberta.ca	ERROR	ok	ok	ok	warn	ok	ok
2	CERN	BEIJING-CNIC-LCG2-IA64	ce-lcg.sdg.ac.cn	OK	ok	ok	ok	warn	ok	ok
3	CERN	BEIJING-LCG2	lcg002.ihep.ac.cn	OK	ok	ok	ok	ok	ok	ok
4	CERN	CERN-PROD	ce101.cern.ch	OK	ok	ok	ok	warn	ok	ok
5	CERN	CERN-PROD	ce102.cern.ch	OK	ok	ok	ok	warn	ok	ok
6	CERN	CERN-PROD	ce106.cern.ch	OK	ok	ok	ok	warn	ok	ok
7	CERN	CERN-PROD	ce107.cern.ch	OK	ok	ok	ok	warn	ok	ok
8	CERN	CERN-PROD	ce108.cern.ch	OK	ok	ok	ok	warn	ok	ok
9	CERN	CERN-PROD	ce113.cern.ch	OK	ok	ok	ok	warn	ok	ok
10	CERN	CERN-PROD	ce114.cern.ch	OK	ok	ok	ok	warn	ok	ok
11	CERN	CERN-PROD	ce115.cern.ch	OK	ok	ok	ok	warn	ok	ok
12	CERN	CERN-PROD	ce116.cern.ch	OK	ok	ok	ok	warn	ok	ok
13	CERN	CERN-PROD	ce117.cern.ch	OK	ok	ok	ok	warn	ok	ok
14	CERN	CERN-PROD	ce118.cern.ch	OK	ok	ok	ok	warn	ok	ok
15	CERN	USCMS-FNAL-WC1	cmslsgce.fnal.gov	ERROR	ok	ok	ok	warn	ok	ok
16	CERN	USCMS-FNAL-WC1	cmslsgce2.fnal.gov	ERROR	ok	ok	ok	warn	ok	ok
17	CERN	Umontreal-LCG2	lcg-ce.lps.umontreal.ca	OK	ok	ok	ok	warn	ok	ok

OK:
normal
status

subject
may fail
soon

*** Running R-GMA client test on alifarm57.ct.infn.it ***
Inserting tuple: ERROR: Could not contact R-GMA server at grid005.ct.infn.it:8443 – (104, 'Connection reset by peer')
ERROR: Could not contact R-GMA server at grid005.ct.infn.it:8443 – (104, 'Connection reset by peer') Failed Timeout when executing test CE-sft-rgma after 600 seconds!

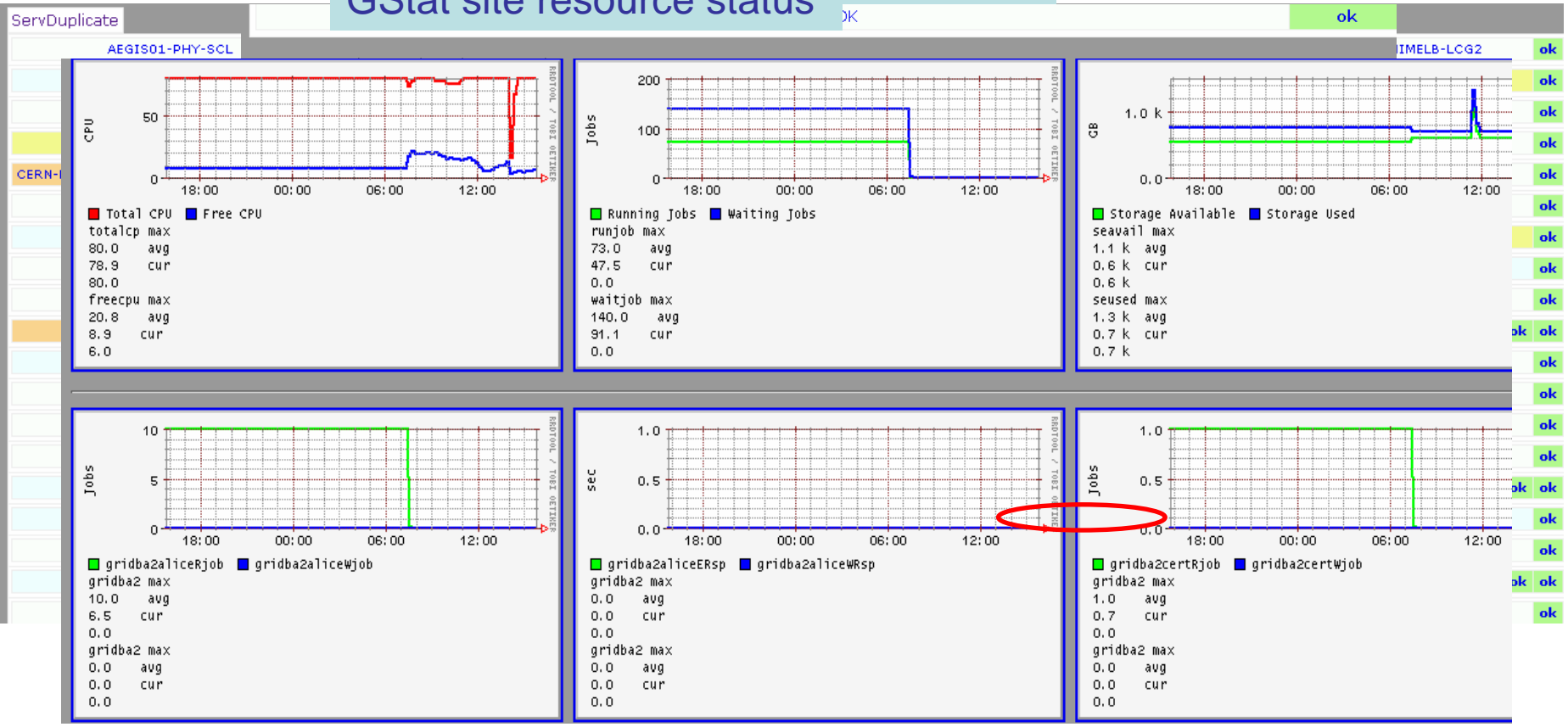
Error: subject has
failed and problem is
localized

- CE, gCE
 - job submission - UI->RB->CE->WN chain
 - version of CA certificates installed (on WN!) and software middleware (on WN!)
 - broker info - checking *edg-brokerinfo* command
 - replica management tests-using *lcg-utils*, *default SE* defined on WN and a selected “central” SE
 - accessibility of experiments software directory - environment variable, directory existence
 - accessibility of VO tag management tools
 - other tests: R-GMA client check, Apel accounting records
- SE, SRM
 - storing file from the UI - using *lcg-cr* command with LFC registration
 - getting file back to the UI - using *lcg-cp* command
 - removing file - using *lcg-del* command with LFC de-registration
- LFC
 - directory listing - using *lfc-ls* command on /grid
 - creating file entry in /grid/<VO> area
- FTS
 - checking if FTS is published correctly in the BDII
 - channel listing - using *glite-transfer-channel-list* command with ChannelManagement service
 - transfer test (in development):
- Standalone tests
 - GSTAT, RB

Feature

- GStat is constructed using Python scripts that generate web based reports used by Grid site administrators to trouble shoot Information System issues or access usage information.
- GStat scripts are executed periodically to query and collect the information published by each site in the Grid Infrastructure.
- The information published is then processed by extensible analysis framework that checks for IS failures and errors.
- Target:
 - Grid operators
 - Site administrators

The main page of GStat shows a detailed report of statistic for each site.
GStat site resource status



Visualization system for viewing monitoring information

- Approach:
 - Collections monitoring information from different sources, e.g.:
 - GridFTP monitor
 - SFT
 - RB Logs
 - Archival of monitoring information in a central Oracle database at CERN
 - Visualizations of summary data through Web interface
- Target:
 - Grid operators
 - Site administrators
 - VO managers

Statistic of data transfert
jobs running
service availability

Gridview: SC3 Monitoring - Opera

File Edit View Bookmarks Tools Window Help

Open Save Print Find Home New Reload

http://gridview.cern.ch/GRIDVIEW/

Find in page search Find next

Voice Author mode Show images Fit to window width 100%

Grid View

Analysis of GridFTP Log for Service Challenge 3

Hourly Report

What do you want?

Average Throughput
 Aggregate Data X-fer

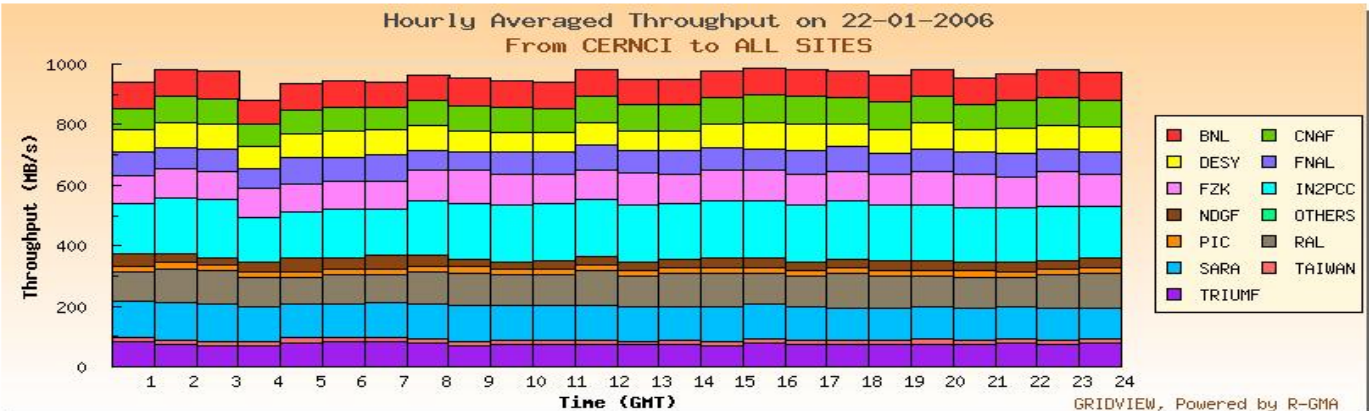
From Site: CERNCI
To Site(s): ALL

Current Summary
 Hourly Report
 Daily Report
 Weekly Report
 Full Report

From: 22/1/2006
To: 6/2/2006

Display Graphs

[Sites Abbreviations](#)
[Latest Gridftp Records](#)



Hourly Averaged Throughput on 22-01-2006
From CERNCI to ALL SITES

Throughput (MB/s)

Time (GHT)

GRIDVIEW, Powered by R-GMA

(OTHERS: Sites giving throughput less than 5% of max, [click here for names](#))

Show Site-wise Data X-fer Show VO-wise Data X-fer Go Back

Graphs for Individual Sites:-
[BNL](#) | [CNAF](#) | [DESY](#) | [FNAL](#) | [FZK](#) | [IN2PCC](#) | [NDGF](#) | [OTHERS](#) | [PIC](#) | [RAL](#) | [SARA](#) | [TAIWAN](#) | [TRIUMF](#)

New page Gridview: SC3 Monitoring

- **GridICE:**
 - a distributed monitoring tool for Grid systems
 - started in late 2002 (EU-DataTAG project)
 - is evolving in the context of EU-EGEE and many other EU Grid projects
 - 100% open source
 - fully integrated with the gLite-3.x Middleware
 - Metering and publishing of data can be configured via gLite standard installation mechanisms
 - Self-configurable collection and presentation
 - just give the URL of the root Grid Information Service (GIS)
 - Installed servers are monitoring Grid resources in the scope of:

EGEE	EGEE-SWE	RDIG	EGEE-SEE	Grid.it
GILDA	CMS	EUMedGrid		EUChinaGrid
EUIndiaGrid	BalticGrid	EELA		BeGrid

We focus on the following categories of users:

- **VO manager**
 - *actual set of resources accessible to VO members*
 - *“How many jobs submitted by my users are running or queued?”* (with details of the VOMS groups and/or single user)
- **Grid operator**
 - all resources under responsibility of a Grid Operator Center
 - “How many resources are available?”
- **Site administrator**
 - site resources offered to a Grid
 - “Is there any service down?”
- **Grid users**
 - The status of their jobs on a grid.
- **How do we identify users?**
 - The users identify with the digital certificate installed in its browser
 - The related role (e.g., site manager, vo manager, none) can be retrieved by the GOC database.



Geo view Site view VO view Help About

GridICE >> Site::ALL

General	Gris	Host			Job			Charts			Network			Others								
		All	Broker	BDEI	CE	SE	GC	Total	✘	⚠	Total	✘	⚠	Total	✘	⚠	Total	✘	⚠			
Site ▼		Total	✘	⚠	Total	✘	⚠	Total	✘	⚠	Total	✘	⚠	Total	✘	⚠	Total	✘	⚠	Total	✘	⚠
ALL SITES		775	26	42	14	1	1	15	0	0	44	21	3	47	0	3	38	0	3	617	4	32
CNR-ILC-PISA		6	1	-	-	-	-	-	-	-	1	1	-	1	-	-	1	-	-	3	-	-
ENEA-INFO		5	1	-	-	-	-	-	-	-	2	1	-	1	-	-	1	-	-	1	-	-
ESA-ESRIN		10	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	-	7	-	-
INAF-Trieste		11	1	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	-	8	1	-
INFN-BARI		44	1	-	-	-	-	-	-	-	2	1	-	5	-	-	1	-	-	36	-	-
INFN-BOLOGNA		9	1	-	-	-	-	-	-	-	1	1	-	1	-	-	1	-	-	6	-	-
INFN-BOLOGNA-CMS		9	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	-	-	6	-	-
INFN-CAGLIARI		16	2	-	-	-	-	-	-	-	1	1	-	1	-	-	1	-	-	13	1	-
INFN-CATANIA		93	1	2	1	-	-	-	-	-	1	1	-	1	-	-	1	-	-	89	-	2
INFN-CNAF		34	3	1	10	1	1	12	-	-	3	2	-	1	-	-	1	-	-	7	-	-
INFN-FERRARA		19	1	-	-	-	-	1	-	-	1	1	-	1	-	-	1	-	-	14	-	-
INFN-FIRENZE		21	1	-	-	-	-	-	-	-	1	1	-	1	-	-	1	-	-	18	-	-

GridICE >> Site::ALL >> Site::INFN-CNAF & Role::broker

CE	SE	Gris	Host	Job	Charts						
Hostname	Site ▼	Role	Procs	Load15Min	CPU Usage	RAM Free	RAM Usage	Virtual Free	Virtual Usage	Last Check	
egee-rb-01.cnaf.infn.it	INFN-CNAF	RB	✓	0.27	2%	25 MB	99%	2 GB	4%	0h10m17s	
egee-rb-02.cnaf.infn.it	INFN-CNAF	RB	✓	0	0%	69 MB	97%	2.1 GB	4%	0h10m17s	
egee-rb-03.cnaf.infn.it	INFN-CNAF	RB	✓	0.11	3%	125 MB	94%	2.1 GB	4%	0h10m17s	
egee-rb-07.cnaf.infn.it	INFN-CNAF	RB	✘	0	3%	1.8 GB	5%	3.8 GB	35%	46h30m7s	
egee-rb-08.cnaf.infn.it	INFN-CNAF	RB	✓	1.42	10%	208 MB	79%	1.2 GB	4%	0h10m17s	
euchina-rb-1.cnaf.infn.it	INFN-CNAF	RB	✓	0	1%	2.8 GB	28%	4.8 GB	18%	0h10m17s	
eumed-rb-1.cnaf.infn.it	INFN-CNAF	RB	✓	0.05	1%	2.9 GB	24%	4.9 GB	16%	0h10m17s	
gridit-cert-rb.cnaf.infn.it	INFN-CNAF	RB	✓	0.44	4%	77 MB	92%	2 GB	31%	0h10m17s	
gridit-rb-01.cnaf.infn.it	INFN-CNAF	RB	✓	0.1	4%	31 MB	98%	2 GB	4%	0h10m17s	
ibm139.cnaf.infn.it	INFN-CNAF	RB	✘	2.04	58%	27 MB	97%	1.9 GB	37%	0h10m17s	

Generated: Wed, 8 Mar 2006 10:27:42 +0100

GridICE Homepage

Grid User

Finding information about jobs

GridICE >> Site::ALL // Site::ALL

CE SE Gris Host Job Charts

Site: VO: Global ID: Exec-host:
 From: Status: LocalID: Local-user:
 To: Jobs x page: (max 200) Personal Jobs: (Request a browser certificate)
 Time interval:

578 Entries in 25 Pages

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Next | Last

#	LocalID	VO	Site	Status	Creation	GlobalID
1	547976	biomed	INFN-BARI	W	2007-05-04 13:57	https://grid09.lal.in2p3.fr:9000/oLr7XHskVhu6x2d7rgx9Sg
2	547975	biomed	INFN-BARI	W	2007-05-04 13:57	https://node04.datagrid.cea.fr:9000/Rgehv_l_rwf7deuzz9_3Atw
3	547974	biomed	INFN-BARI	W	2007-05-04 13:57	https://grid09.lal.in2p3.fr:9000/cv5HqtWwqzOtn9gyW9vyPg
4	547973	biomed	INFN-BARI	W	2007-05-04 13:57	https://grid09.lal.in2p3.fr:9000/yq4H6U_XT9cfJoGzcrJ_Cg
5	547972	biomed	INFN-BARI	W	2007-05-04 13:56	https://grid09.lal.in2p3.fr:9000/TO9_I08r5h3nT-ZCk-U2Aw
6	547971	biomed	INFN-BARI	W	2007-05-04 13:56	https://grid09.lal.in2p3.fr:9000/tHaM9074jcuLwRzoH-iAGg
7	547970	biomed	INFN-BARI	W	2007-05-04 13:55	https://node04.datagrid.cea.fr:9000/6hGEkpWPwTD4dG9J33GSpQ
8	547968	biomed	INFN-BARI	W	2007-05-04 13:55	https://grid09.lal.in2p3.fr:9000/Qn3-oXUv6iKU2taqqW4mmg
9	547969	biomed	INFN-BARI	W	2007-05-04 13:55	https://grid09.lal.in2p3.fr:9000/qauNKCLRIqtk-KQ1k6RDJQ
10	547966	biomed	INFN-BARI	W	2007-05-04 13:54	https://grid09.lal.in2p3.fr:9000/GtVgLVu3vOD2LR45PHP6oA
11	547965	biomed	INFN-BARI	W	2007-05-04 13:54	https://grid09.lal.in2p3.fr:9000/QC0C_aeV9ldFXVrXb5DtxQ
12	68842	biomed	INFN-ROMA3	R	2007-05-04 13:53	https://grid09.lal.in2p3.fr:9000/q_icUbqjrhwLcB9wG6ZQkQ
	CPU/Wall: -	Exit: -	RAM: 0	VM: 0	RB: grid09.lal.in2p3.fr	LocalUser: biomed002 Queue: biomed
13	68841	biomed	INFN-ROMA3	R	2007-05-04 13:53	https://grid09.lal.in2p3.fr:9000/taRtF5QHmQcND6bJHCFlgA

GridICE >> Charts:Group/voManager

CE SE **Gris** Host Job **Charts**

Single-Charts

Chart for User: **Site Manager** (circled), VO Manager (circled)

Choose your preferred Site/VO: [dropdown] VO: **biomed** Local Owner (optional) [input]

Time intervals: [dropdown] Ending in: **May 2, 2007** filter only for: **AllTime** View Chart

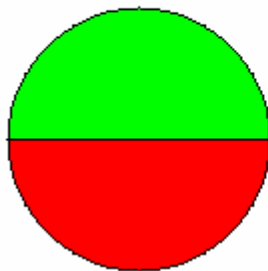
startTime: 29 Apr 2007 00:00
endTime: 02 May 2007 18:33

VO: ALL Site: ITB-BARI

Jobs status

Waiting Jobs

50.0%



50.0%

Executed Jobs

52.0%



40.3%

VO Name	Running	Waiting	Executed	Lost	Deleted by user	Batch system error code	Total
ops	-	1	102	-	-	-	103
dtean	-	1	1	-	-	-	2
bioned	-	-	79	-	-	-	79
enbrace	-	-	10	-	-	-	10
infngriid	-	-	2	-	-	-	2
-	-	-	1	-	-	-	1
cns	-	-	1	-	-	-	1
Total:	0	2	196	0	0	0	198



Geo view Site view VO view Help About

GridICE >> Site::ALL >> Site::INFN-BARI

CE SE Gris Host Job Charts XML

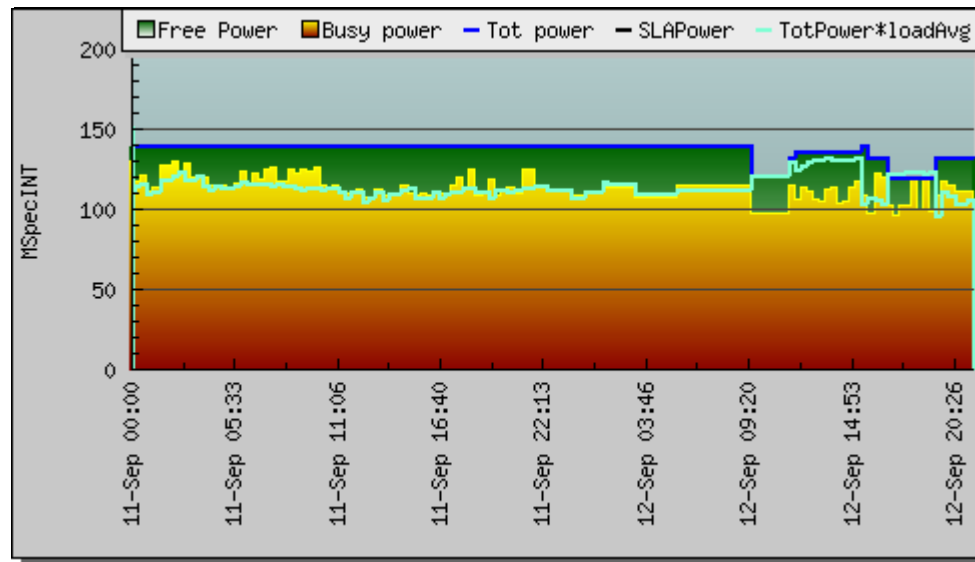
Queues Resources

CE Name ▼	CPUTotal	CPUFree	RunJobs	WaitJobs	CPUloadAvg	RAMTotal	RAMUsed	TotNodes	NotAvailNodes	Log	LastCheck
gridba2.ba.infn.it	127	20	107	982	0.8	127.7 GB	43.5 GB	35	1	-	0h2m39s

Charts related to the Local Resource Manager Service

Plot a period of 1 Day Ending in September 12, 2006 View Charts

The LRMS Info sensor provides aggregated information of the Local Resource Manager System



- Integration of a new version of Lemon (v.2.13.x)
 - The upgraded version of gridice sensors is under testing at INFN-BARI
- Displaying some data on web page (for example chart) can take several minutes
 - We are studying two solutions
 - The table partitioning (data is divided across multiple storage objects)
 - A new DB schema (All required data will be retrieved from a unique table)
- Handling the VOMS information (groups and roles of user submitting the jobs)
 - Will be available in new releases

- **SAM:** http://goc.grid.sinica.edu.tw/gocwiki/SAME_Planning
- **GStat:** <http://goc.grid.sinica.edu.tw/gstat/>
- **GridView:** <http://gridview.cern.ch/GRIDVIEW/>
- **GridICE:** <http://gridice.forge.cnaf.infn.it/>