Grid Accounting & Monitoring

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Grids & e-science, UIMP, June 2009

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Agenda

- **Objectives & introduction**
- **Monitoring tools**
  - GSTAT
  - SAM
  - GridICE
  - Regional Nagios
- **Accounting tools**
  - APEL
  - EGEE/WLCG Accounting Portal
  - CPU Normalization
  - Storage Accounting Portal

Objectives

- **Monitoring**
  - Who is doing what?
  - Sites properly configured?
  - Jobs running correctly
  - sites/server down. How much time?
  - How many resources are (not) available?
- **Accounting:**
  - Who is using the grid (user/VO)?
  - How much is the grid used
  - Which computational resources are used?
  - How much time jobs wait in queue before running
  - Are computational resources enough?

Monitoring vs. Accounting

- **What is "Monitoring"?**

  "Job Monitoring is concerned with the instantaneous job status on the grid, e.g., total number of jobs currently running per V.O."

  Not only jobs, but other metrics like site availability

- **What is "Accounting"?**

  "Accounting concerns information about completed jobs on the grid, e.g., the total amount of CPU used per VO per month"

- **"Monitoring" vs "Accounting"?**
  - "Monitoring" -> grid status "photo" with minimal delay
  - "Accounting" exact resource use until now. No data should be lost. Historical view, some delay is acceptable (1 day)

Monitoring tools

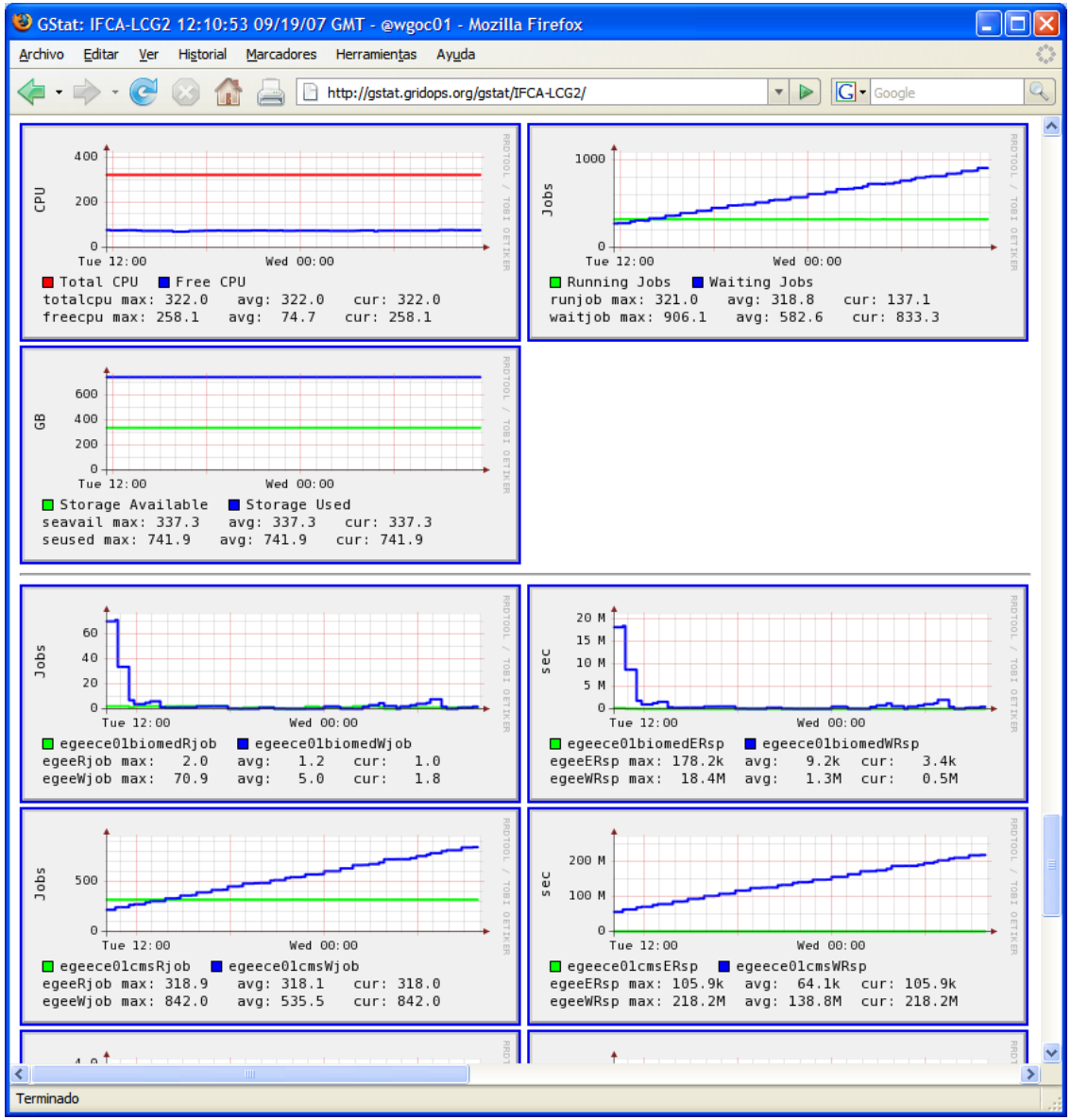
- GSTAT
- SAM
- GridICE
- Regional Nagios

GSTAT

http://goc.grid.sinica.edu.tw/gstat/

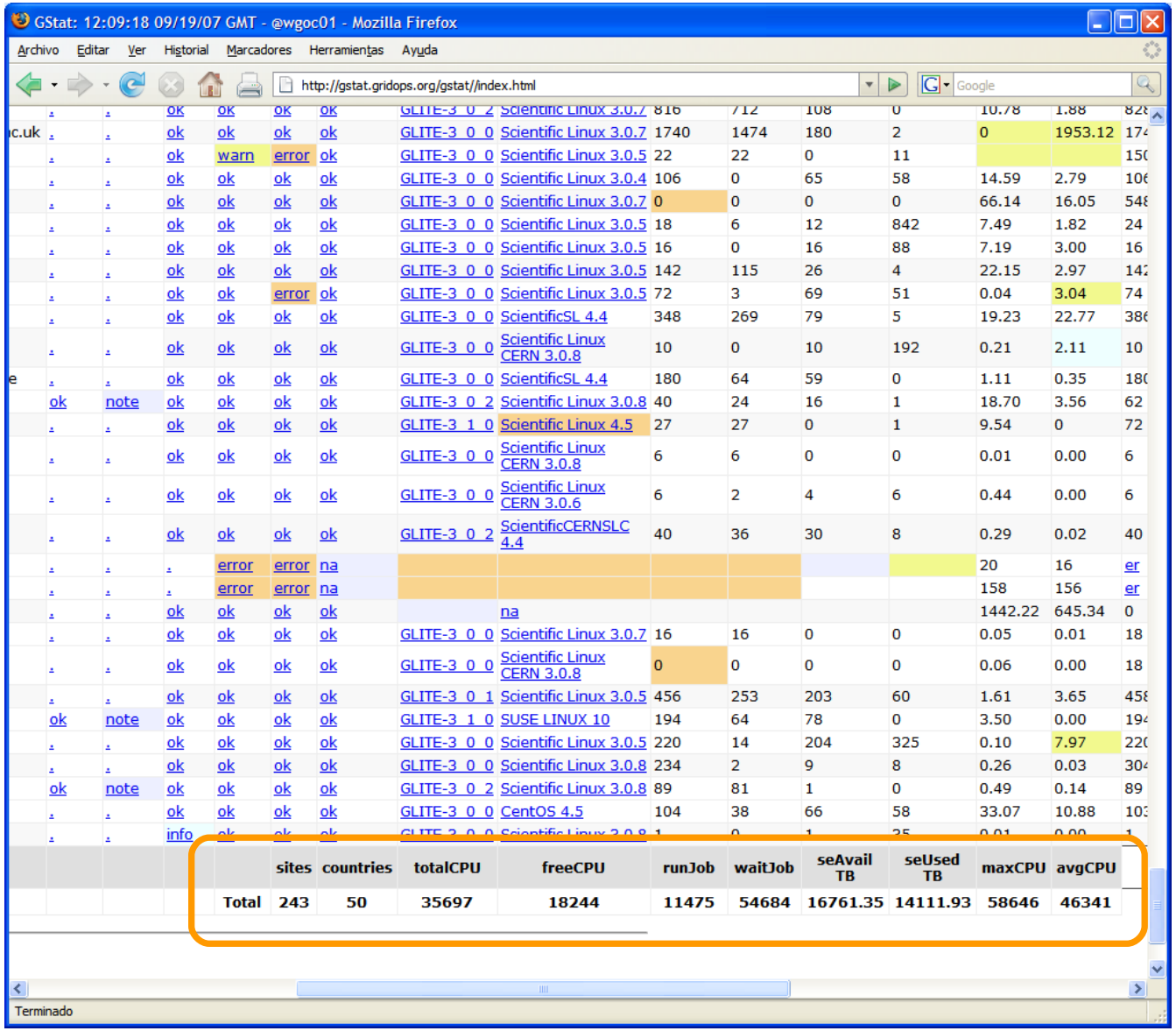
GSTAT

- Checks BDII information every 30 min.
- Stores results in DB
- Metrics graphs & stats by time:
- CPUs Sum/free
- Running/waiting jobs
- Available/used storage
- Jobs by VO



Global stats

- # Sites
- # CPUs
- Storage



	sites	countries	totalCPU	freeCPU	runJob	waitJob	seAvail TB	seUsed TB	maxCPU	avgCPU
Total	243	50	35697	18244	11475	54684	16761.35	14111.93	58646	46341

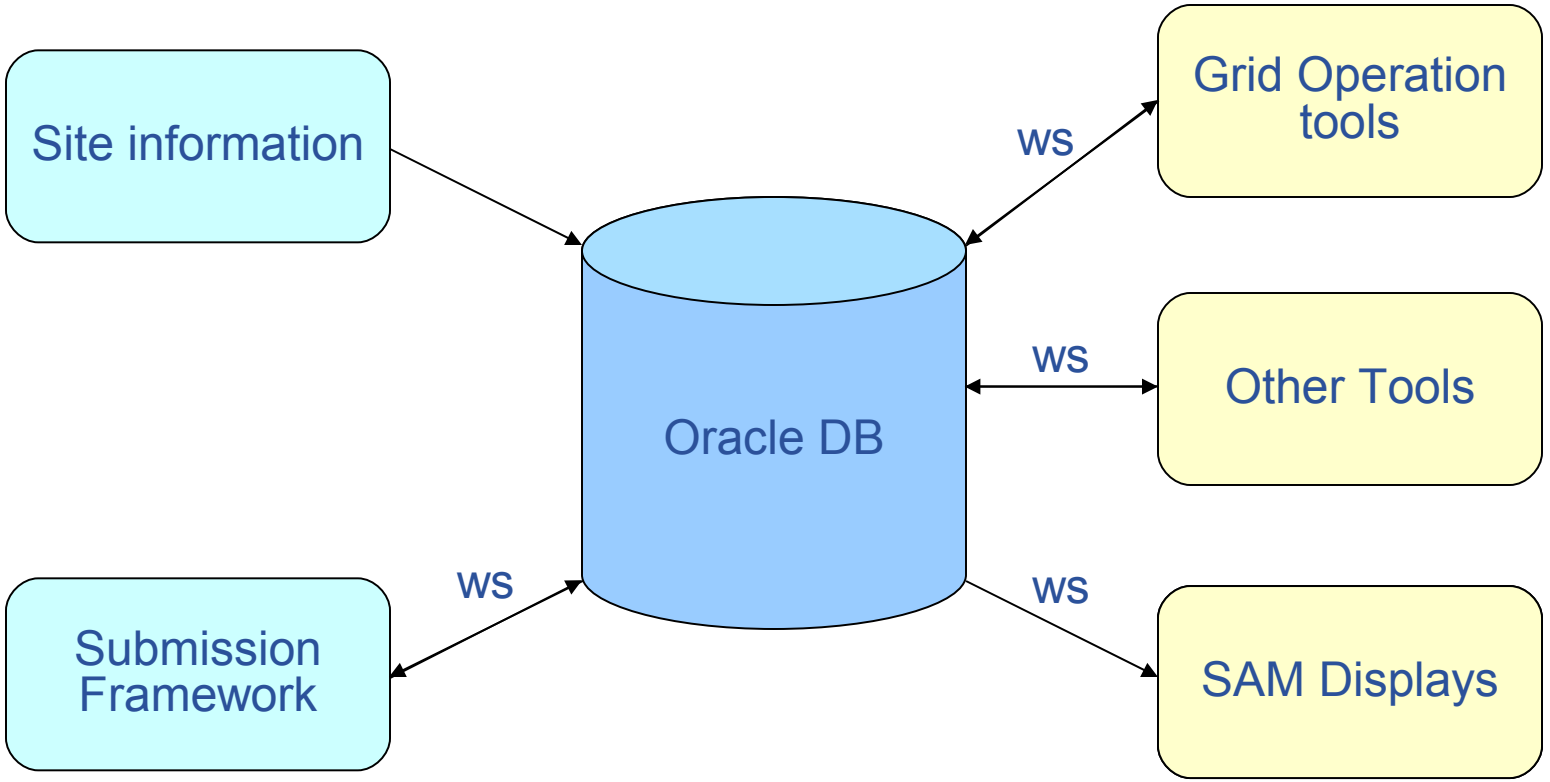
SAM

- EGEE: https://lcg-sam.cern.ch:8443/sam/sam.py
- Int.eu.grid: https://sam.cyfronet.pl/i2g-sam/sam.py

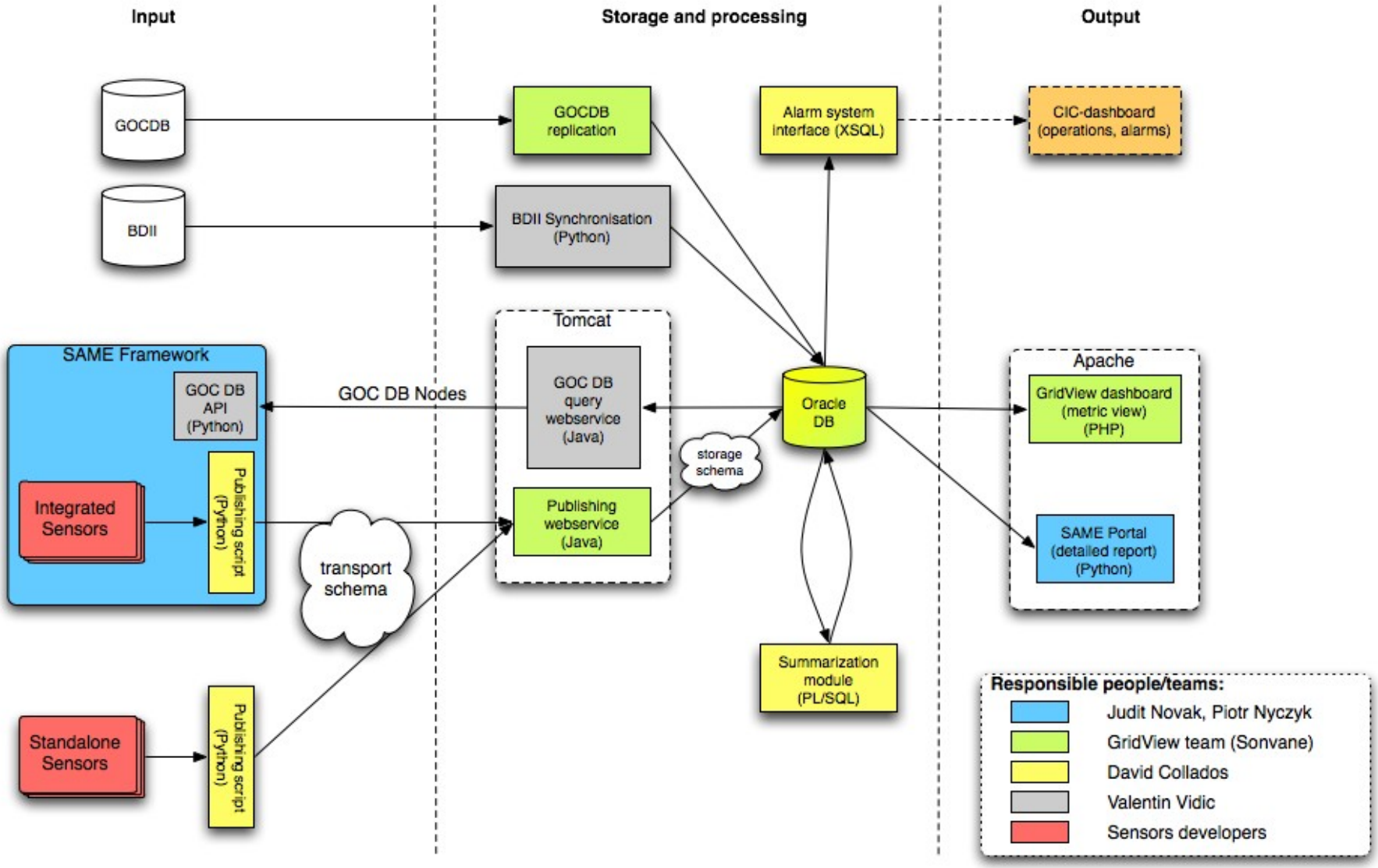
SAM

- SAM = Service Availability Monitoring
- Platform to monitor all the services WLCG/EGEE: BDII, SE, RB, LFC, FTS, SRM, etc.
- Most of the sensors run remotely
- Availability (and functionality) of services is checked with tests in every site
- Nothing has to be installed in the monitored systems
- Certificate needed to access SAM Portal
- Tests are sent every hour

SAM: Architecture



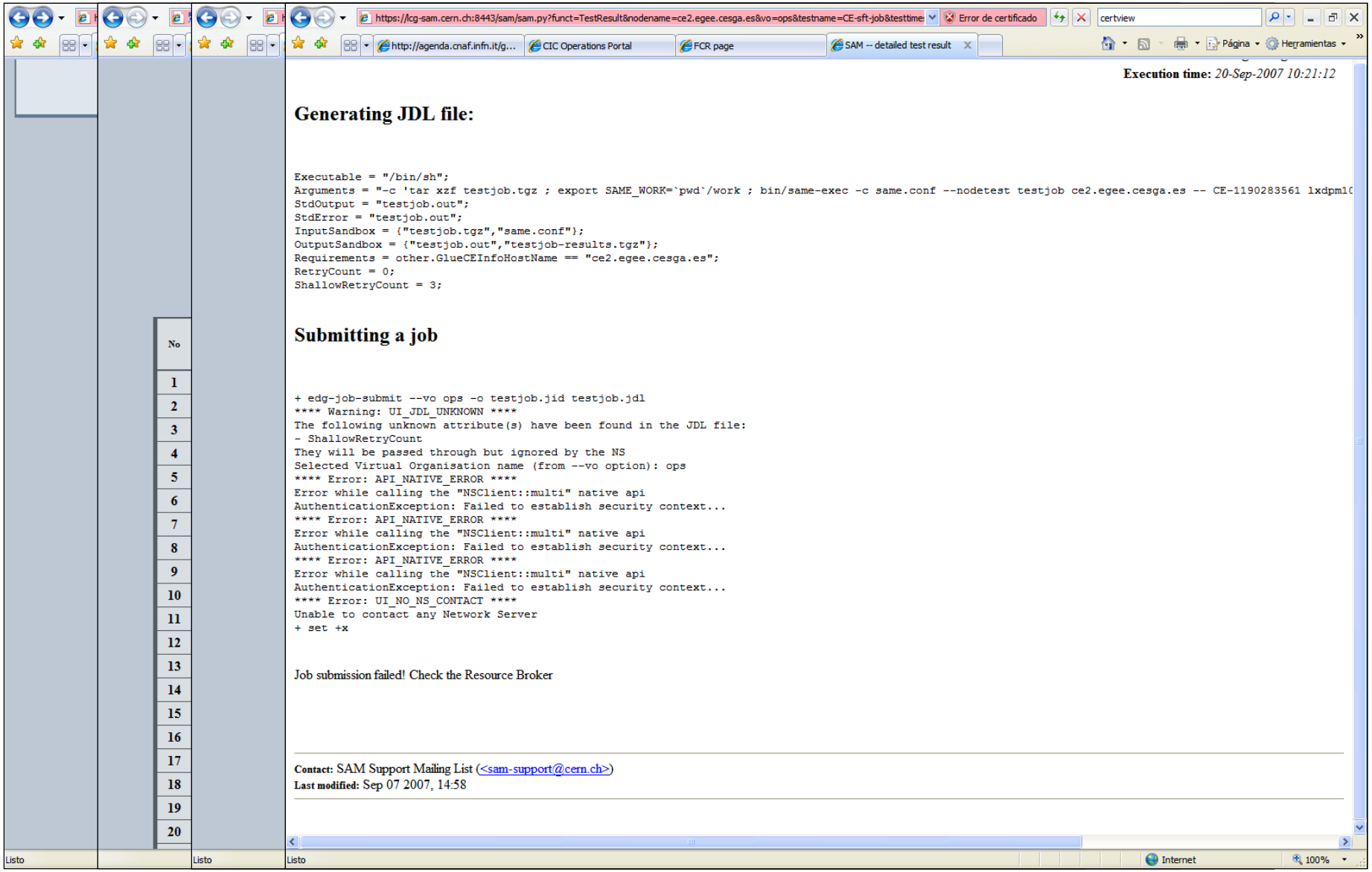
SAM: Architecture



SAM: Services monitored

- **CE, gCE:**
  - Jobs submission, certificates, middleware version, replica management, experiments software, …
- **SE, SRM:**
  - UI file storage (*lcg-cr*), UI file download (*lcg-cp*), file removal (*lcg-del*).
- **LFC:**
  - Directory list (*lfc-ls*), Store a file in /grid/<VO>
- **FTS:**
  - Check FTS publishing to BDII, …
- **RB:**
  - RBs job submission, wainting time to find a CE suitable for a job

SAM Portal


https://lcg-sam.cern.ch:8443/sam/sam.py?funct=TestResult&nodename=ce2.egee.cesga.es&vo=ops&testname=CE-sft-job&testtime
Error de certificado
certview
http://agenda.cnaf.infn.it/g...
CIC Operations Portal
FCR page
SAM -- detailed test result
Página
Herramientas
Execution time: 20-Sep-2007 10:21:12
Generating JDL file:
Executable = "/bin/sh";
Arguments = "-c 'tar xzf testjob.tgz ; export SAME_WORK=`pwd`/work ; bin/same-exec -c same.conf --nodetest testjob ce2.egee.cesga.es -- CE-1190283561 lxdpm1
StdOutput = "testjob.out";
StdError = "testjob.out";
InputSandbox = {"testjob.tgz","same.conf"};
OutputSandbox = {"testjob.out","testjob-results.tgz"};
Requirements = other.GlueCEInfoHostName == "ce2.egee.cesga.es";
RetryCount = 0;
ShallowRetryCount = 3;
Submitting a job
+ edg-job-submit --vo ops -o testjob.jid testjob.jdl
**** Warning: UI_JDL_UNKNOWN ****
The following unknown attribute(s) have been found in the JDL file:
- ShallowRetryCount
They will be passed through but ignored by the NS
Selected Virtual Organisation name (from --vo option): ops
**** Error: API_NATIVE_ERROR ****
Error while calling the "NSClient::multi" native api
AuthenticationException: Failed to establish security context...
**** Error: API_NATIVE_ERROR ****
Error while calling the "NSClient::multi" native api
AuthenticationException: Failed to establish security context...
**** Error: API_NATIVE_ERROR ****
Error while calling the "NSClient::multi" native api
AuthenticationException: Failed to establish security context...
**** Error: UI_NO_NS_CONTACT ****
Unable to contact any Network Server
+ set +x
Job submission failed! Check the Resource Broker
Contact: SAM Support Mailing List (<sam-support@cern.ch>)
Last modified: Sep 07 2007, 14:58
No
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Listo
Listo
Listo
Internet
100%

GridICE

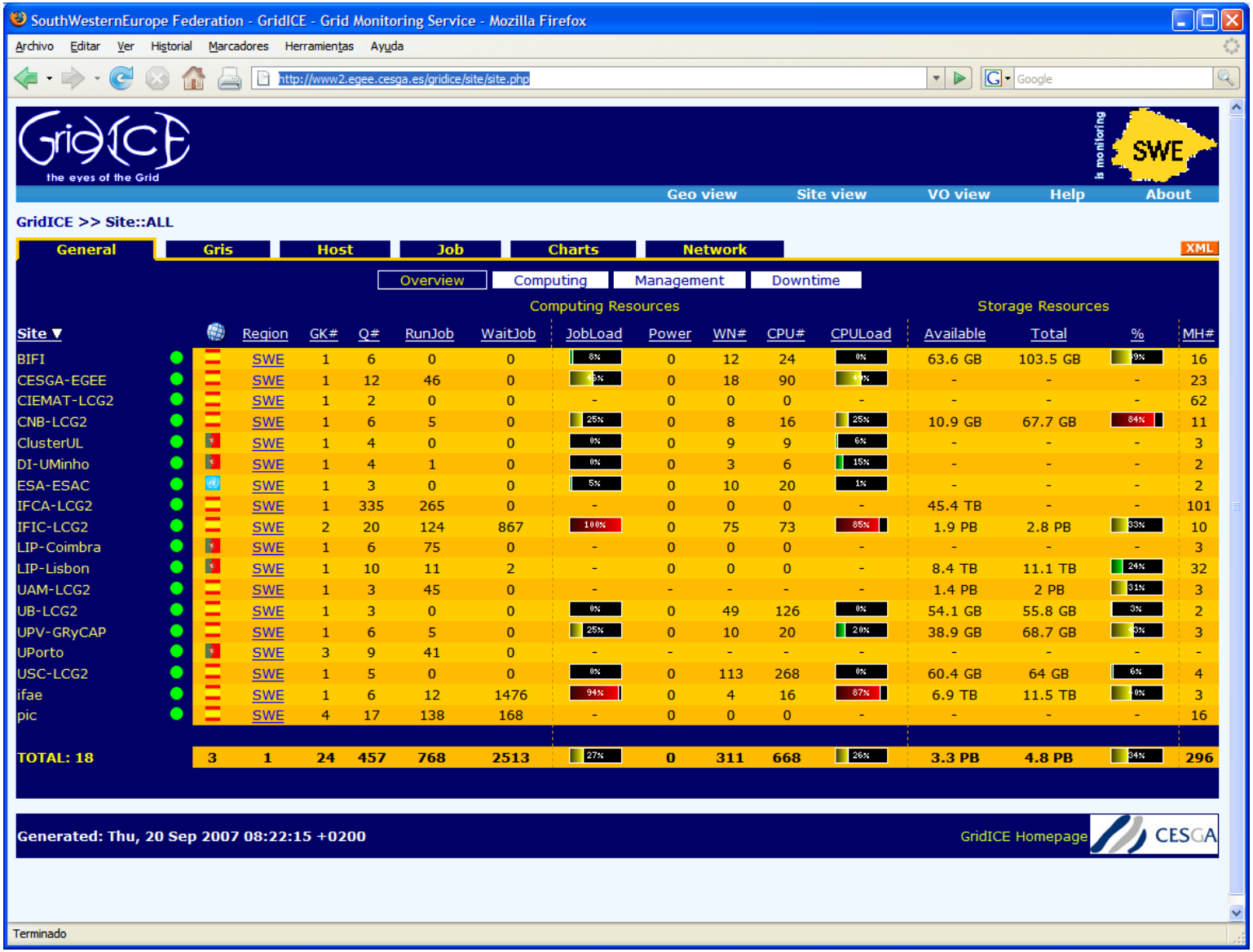
- EGEE: http://gridice2.cnaf.infn.it:50080/gridice/
- SWE: http://www2.egee.cesga.es/gridice/

GridICE: Architecture

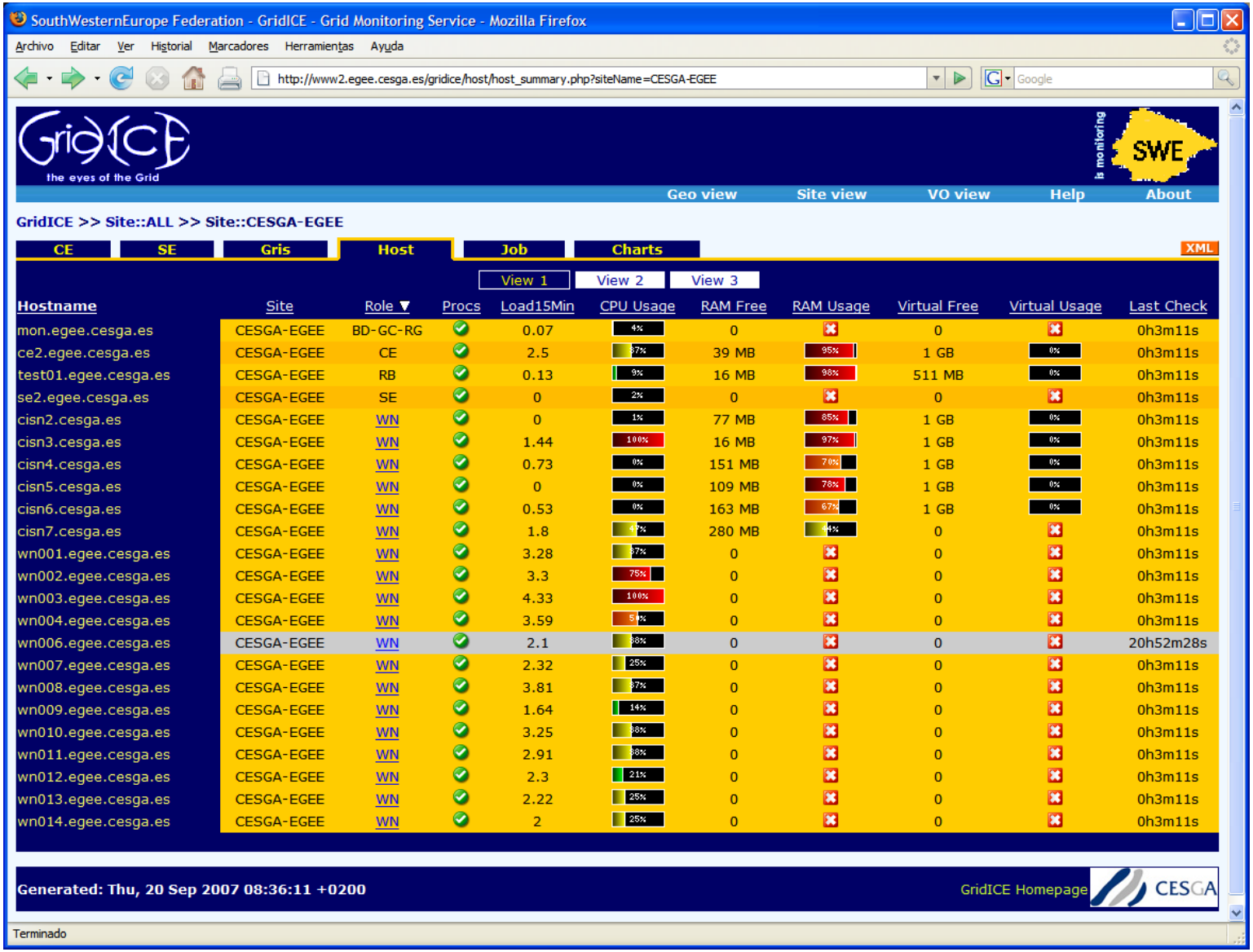
- NAGIOS based
- **Low level adquisition***: LEMON to get metrics
- **Publishing service***: collector node (usually SE or MON)to send LEMON information to the EXtended GRIS
- **Discovery and high level adquisition:** based on the BDII stores information in a **RDBMS** (*postgresql*) to analyse and show.

*only needed to publish extended information

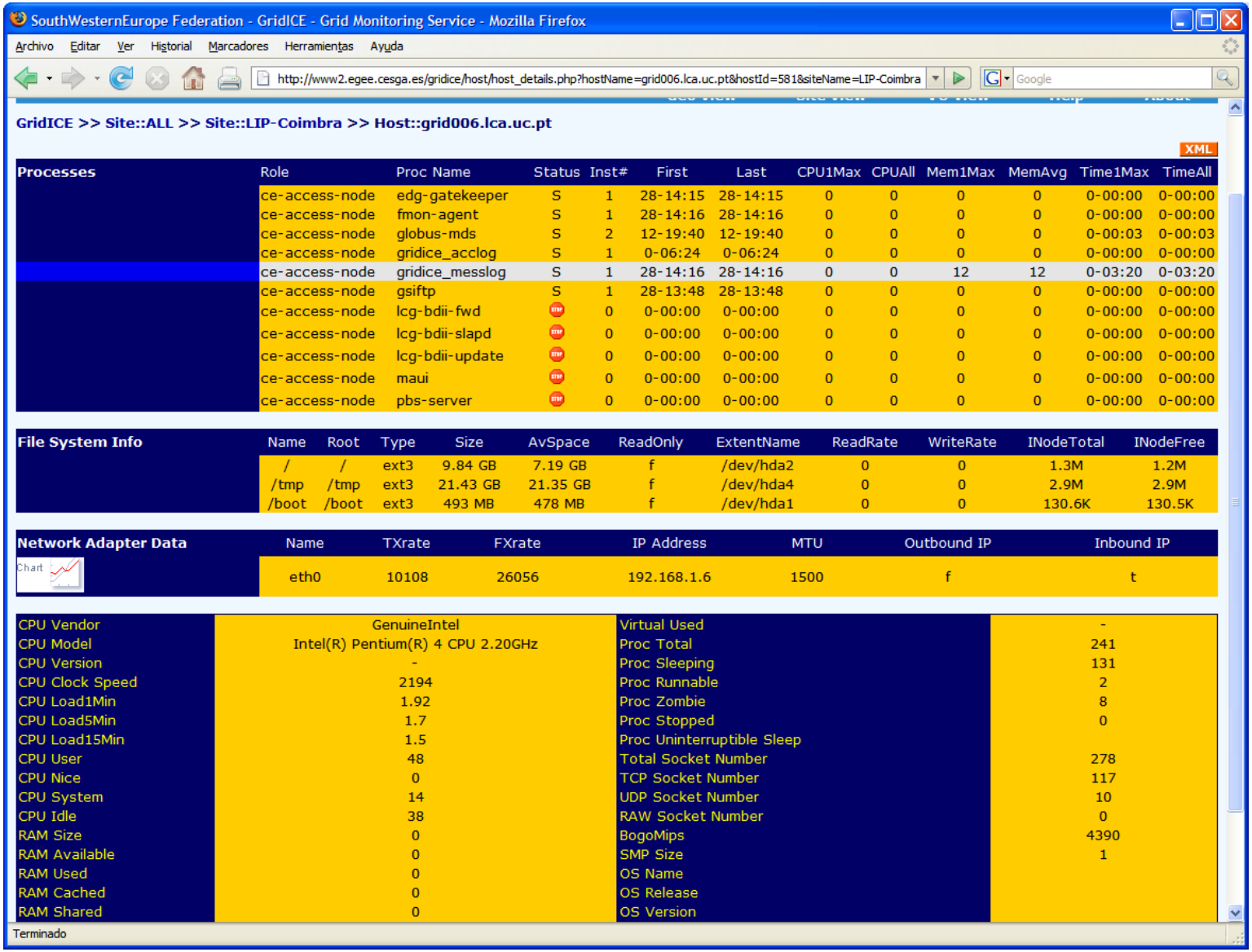
GridICE: Global view



GridICE: Site view



GridICE: CE view



SouthWesternEurope Federation - GridICE - Grid Monitoring Service - Mozilla Firefox

Archivo Editar Ver Historial Marcadores Herramientas Ayuda

http://www2.egee.cesga.es/gridice/host/host_details.php?hostName=grid006.lca.uc.pt&hostId=581&siteName=LIP-Coimbra

GridICE >> Site::ALL >> Site::LIP-Coimbra >> Host::grid006.lca.uc.pt

XML

Processes	Role	Proc Name	Status	Inst#	First	Last	CPU1Max	CPUAll	Mem1Max	MemAvg	Time1Max	TimeAll
	ce-access-node	edg-gatekeeper	S	1	28-14:15	28-14:15	0	0	0	0	0-00:00	0-00:00
	ce-access-node	fmon-agent	S	1	28-14:16	28-14:16	0	0	0	0	0-00:00	0-00:00
	ce-access-node	globus-mds	S	2	12-19:40	12-19:40	0	0	0	0	0-00:03	0-00:03
	ce-access-node	gridice_acclog	S	1	0-06:24	0-06:24	0	0	0	0	0-00:00	0-00:00
	ce-access-node	gridice_messlog	S	1	28-14:16	28-14:16	0	0	12	12	0-03:20	0-03:20
	ce-access-node	gsiftp	S	1	28-13:48	28-13:48	0	0	0	0	0-00:00	0-00:00
	ce-access-node	lcg-bdii-fwd	STOP	0	0-00:00	0-00:00	0	0	0	0	0-00:00	0-00:00
	ce-access-node	lcg-bdii-slapd	STOP	0	0-00:00	0-00:00	0	0	0	0	0-00:00	0-00:00
	ce-access-node	lcg-bdii-update	STOP	0	0-00:00	0-00:00	0	0	0	0	0-00:00	0-00:00
	ce-access-node	maui	STOP	0	0-00:00	0-00:00	0	0	0	0	0-00:00	0-00:00
	ce-access-node	pbs-server	STOP	0	0-00:00	0-00:00	0	0	0	0	0-00:00	0-00:00

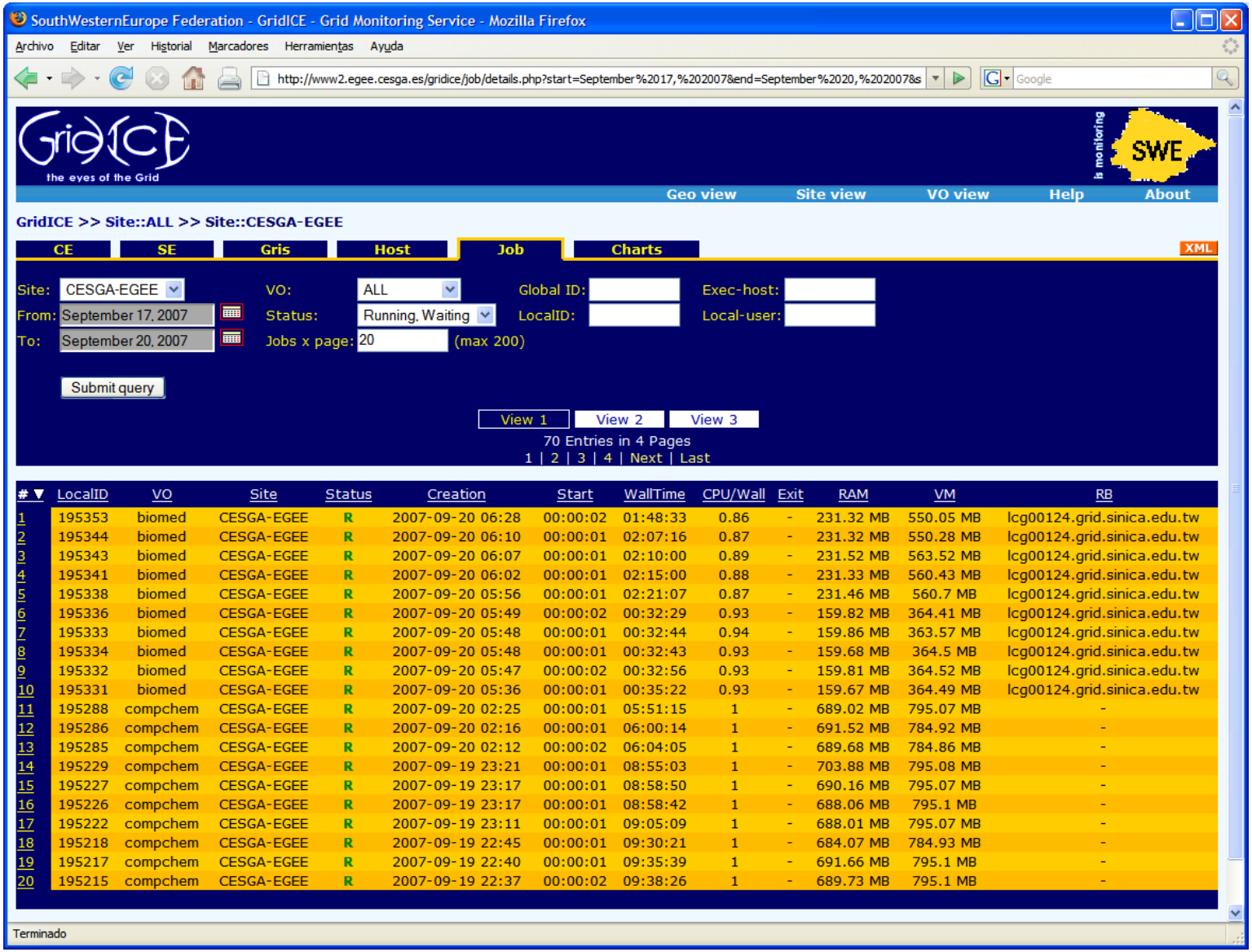
File System Info	Name	Root	Type	Size	AvSpace	ReadOnly	ExtentName	ReadRate	WriteRate	INodeTotal	INodeFree
	/	/	ext3	9.84 GB	7.19 GB	f	/dev/hda2	0	0	1.3M	1.2M
	/tmp	/tmp	ext3	21.43 GB	21.35 GB	f	/dev/hda4	0	0	2.9M	2.9M
	/boot	/boot	ext3	493 MB	478 MB	f	/dev/hda1	0	0	130.6K	130.5K

Network Adapter Data	Name	TXrate	FXrate	IP Address	MTU	Outbound IP	Inbound IP
Chart	eth0	10108	26056	192.168.1.6	1500	f	t

CPU Vendor	GenuineIntel	Virtual Used	-
CPU Model	Intel(R) Pentium(R) 4 CPU 2.20GHz	Proc Total	241
CPU Version	-	Proc Sleeping	131
CPU Clock Speed	2194	Proc Runnable	2
CPU Load1Min	1.92	Proc Zombie	8
CPU Load5Min	1.7	Proc Stopped	0
CPU Load15Min	1.5	Proc Uninterruptible Sleep	
CPU User	48	Total Socket Number	278
CPU Nice	0	TCP Socket Number	117
CPU System	14	UDP Socket Number	10
CPU Idle	38	RAW Socket Number	0
RAM Size	0	BogoMips	4390
RAM Available	0	SMP Size	1
RAM Used	0	OS Name	
RAM Cached	0	OS Release	
RAM Shared	0	OS Version	

Terminado

GridICE: Jobs information



#	LocalID	VO	Site	Status	Creation	Start	WallTime	CPU/Wall	Exit	RAM	VM	RB
1	195353	biomed	CESGA-EGEE	R	2007-09-20 06:28	00:00:02	01:48:33	0.86	-	231.32 MB	550.05 MB	lcg00124.grid.sinica.edu.tw
2	195344	biomed	CESGA-EGEE	R	2007-09-20 06:10	00:00:01	02:07:16	0.87	-	231.32 MB	550.28 MB	lcg00124.grid.sinica.edu.tw
3	195343	biomed	CESGA-EGEE	R	2007-09-20 06:07	00:00:01	02:10:00	0.89	-	231.52 MB	563.52 MB	lcg00124.grid.sinica.edu.tw
4	195341	biomed	CESGA-EGEE	R	2007-09-20 06:02	00:00:01	02:15:00	0.88	-	231.33 MB	560.43 MB	lcg00124.grid.sinica.edu.tw
5	195338	biomed	CESGA-EGEE	R	2007-09-20 05:56	00:00:01	02:21:07	0.87	-	231.46 MB	560.7 MB	lcg00124.grid.sinica.edu.tw
6	195336	biomed	CESGA-EGEE	R	2007-09-20 05:49	00:00:02	00:32:29	0.93	-	159.82 MB	364.41 MB	lcg00124.grid.sinica.edu.tw
7	195333	biomed	CESGA-EGEE	R	2007-09-20 05:48	00:00:01	00:32:44	0.94	-	159.86 MB	363.57 MB	lcg00124.grid.sinica.edu.tw
8	195334	biomed	CESGA-EGEE	R	2007-09-20 05:48	00:00:01	00:32:43	0.93	-	159.68 MB	364.5 MB	lcg00124.grid.sinica.edu.tw
9	195332	biomed	CESGA-EGEE	R	2007-09-20 05:47	00:00:02	00:32:56	0.93	-	159.81 MB	364.52 MB	lcg00124.grid.sinica.edu.tw
10	195331	biomed	CESGA-EGEE	R	2007-09-20 05:36	00:00:01	00:35:22	0.93	-	159.67 MB	364.49 MB	lcg00124.grid.sinica.edu.tw
11	195288	compchem	CESGA-EGEE	R	2007-09-20 02:25	00:00:01	05:51:15	1	-	689.02 MB	795.07 MB	-
12	195286	compchem	CESGA-EGEE	R	2007-09-20 02:16	00:00:01	06:00:14	1	-	691.52 MB	784.92 MB	-
13	195285	compchem	CESGA-EGEE	R	2007-09-20 02:12	00:00:02	06:04:05	1	-	689.68 MB	784.86 MB	-
14	195229	compchem	CESGA-EGEE	R	2007-09-19 23:21	00:00:01	08:55:03	1	-	703.88 MB	795.08 MB	-
15	195227	compchem	CESGA-EGEE	R	2007-09-19 23:17	00:00:01	08:58:50	1	-	690.16 MB	795.07 MB	-
16	195226	compchem	CESGA-EGEE	R	2007-09-19 23:17	00:00:01	08:58:42	1	-	688.06 MB	795.1 MB	-
17	195222	compchem	CESGA-EGEE	R	2007-09-19 23:11	00:00:01	09:05:09	1	-	688.01 MB	795.07 MB	-
18	195218	compchem	CESGA-EGEE	R	2007-09-19 22:45	00:00:01	09:30:21	1	-	684.07 MB	784.93 MB	-
19	195217	compchem	CESGA-EGEE	R	2007-09-19 22:40	00:00:01	09:35:39	1	-	691.66 MB	795.1 MB	-
20	195215	compchem	CESGA-EGEE	R	2007-09-19 22:37	00:00:02	09:38:26	1	-	689.73 MB	795.1 MB	-

Regional Nagios

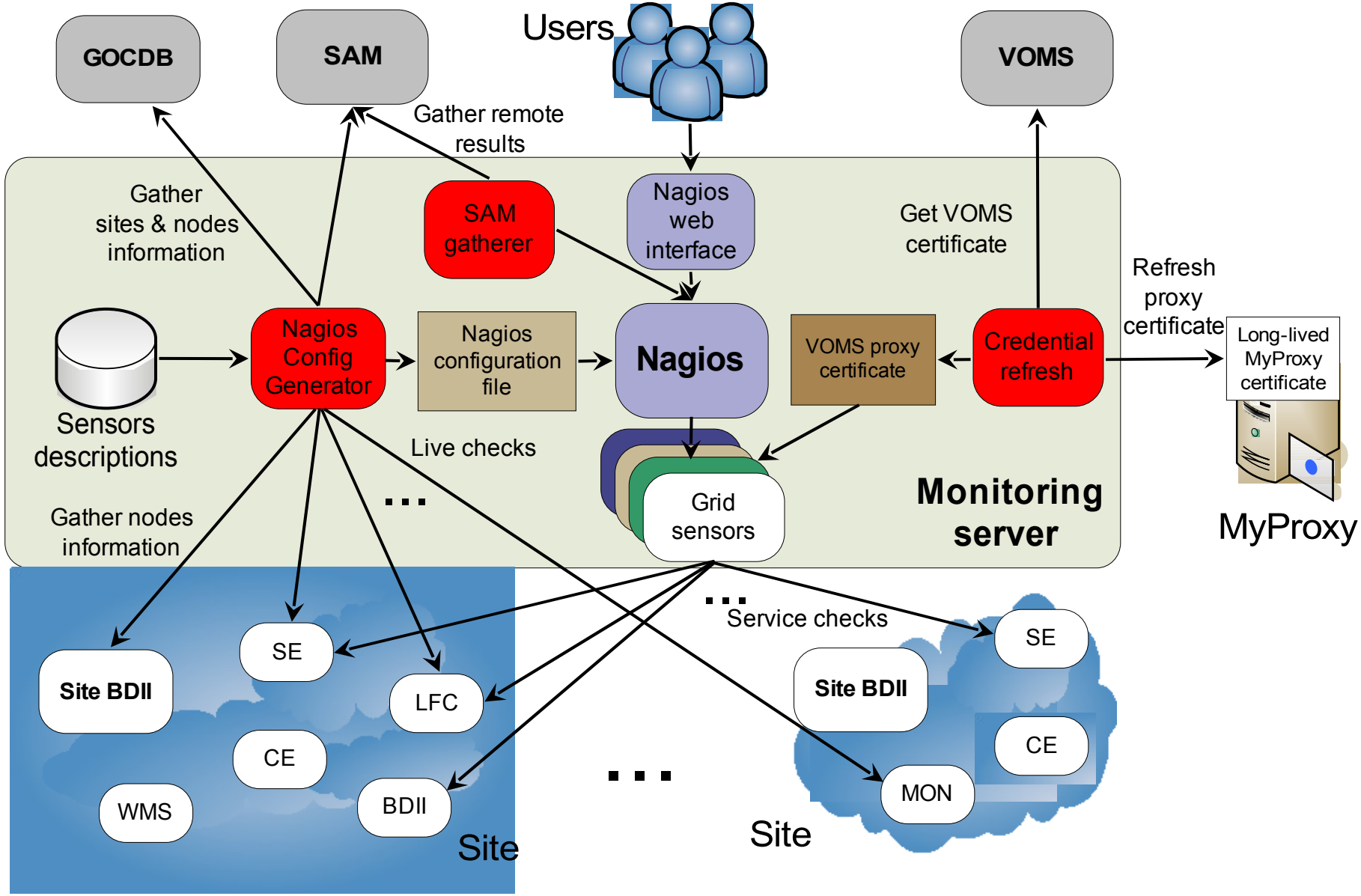
Motivation

- **Provide site admin-centric monitoring**
  - simplify grid resources operations
- **Enable better resource availability**
  - issue notifications as soon as problem appears
- **Achieve complex sensor's dependencies**
  - enables problem isolation
  - only relevant notifications are issued
- **Visualization & management interface**
  - grid resources status
- **Report generation**
  - availability, problem history

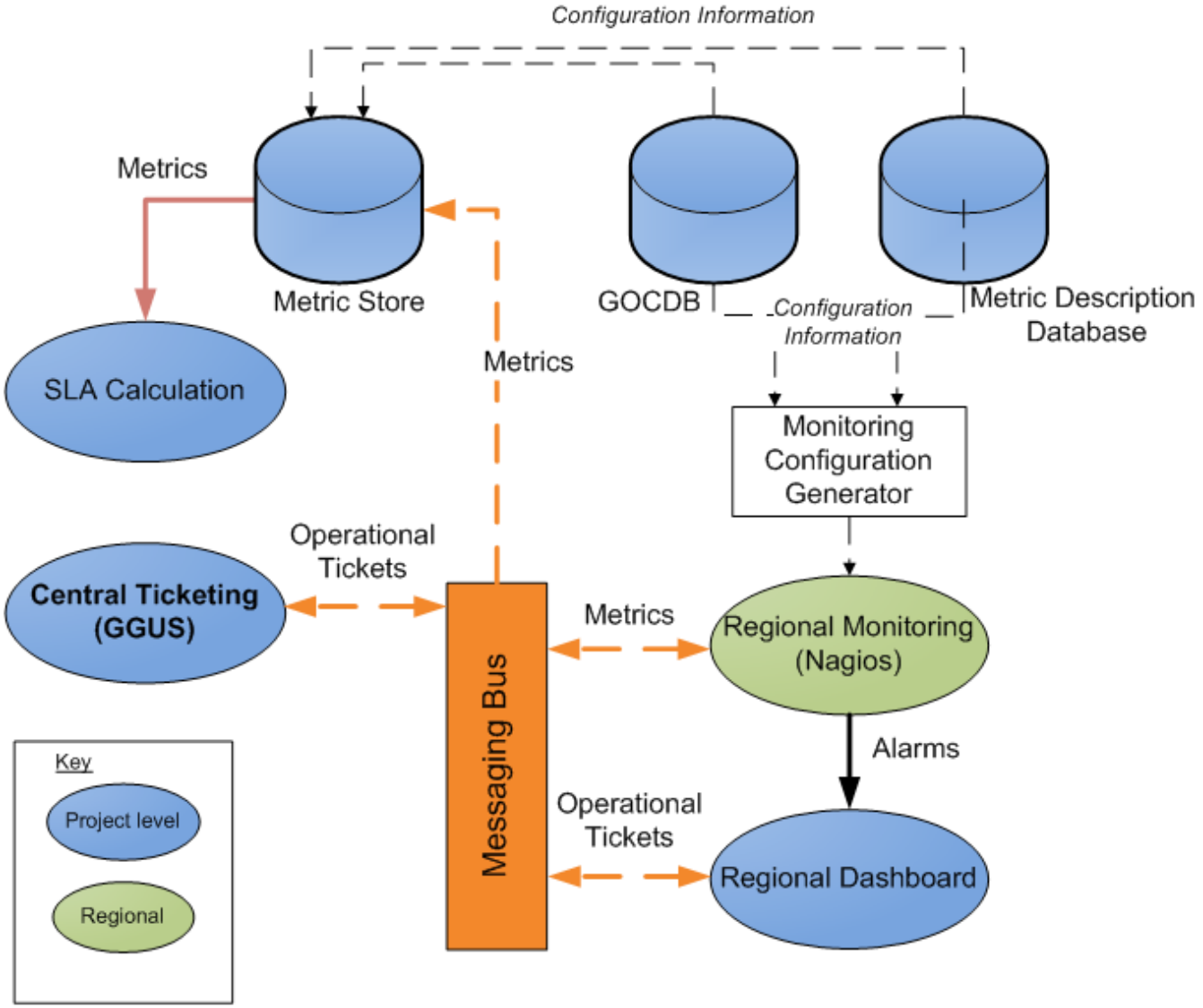
Nagios Framework

- **Open source monitoring framework**
  - widely used & actively developed
- **Host and service problems detection and recovery**
- **Provides wide set of basic sensors**
  - easy to develop custom sensors
- **Centralized vs. distributed deployment**
- **High configurability**
  - service dependencies, fine-grained notification options
- **Web interface**
  - status view, administration

Architecture



Regional Nagios Interactions

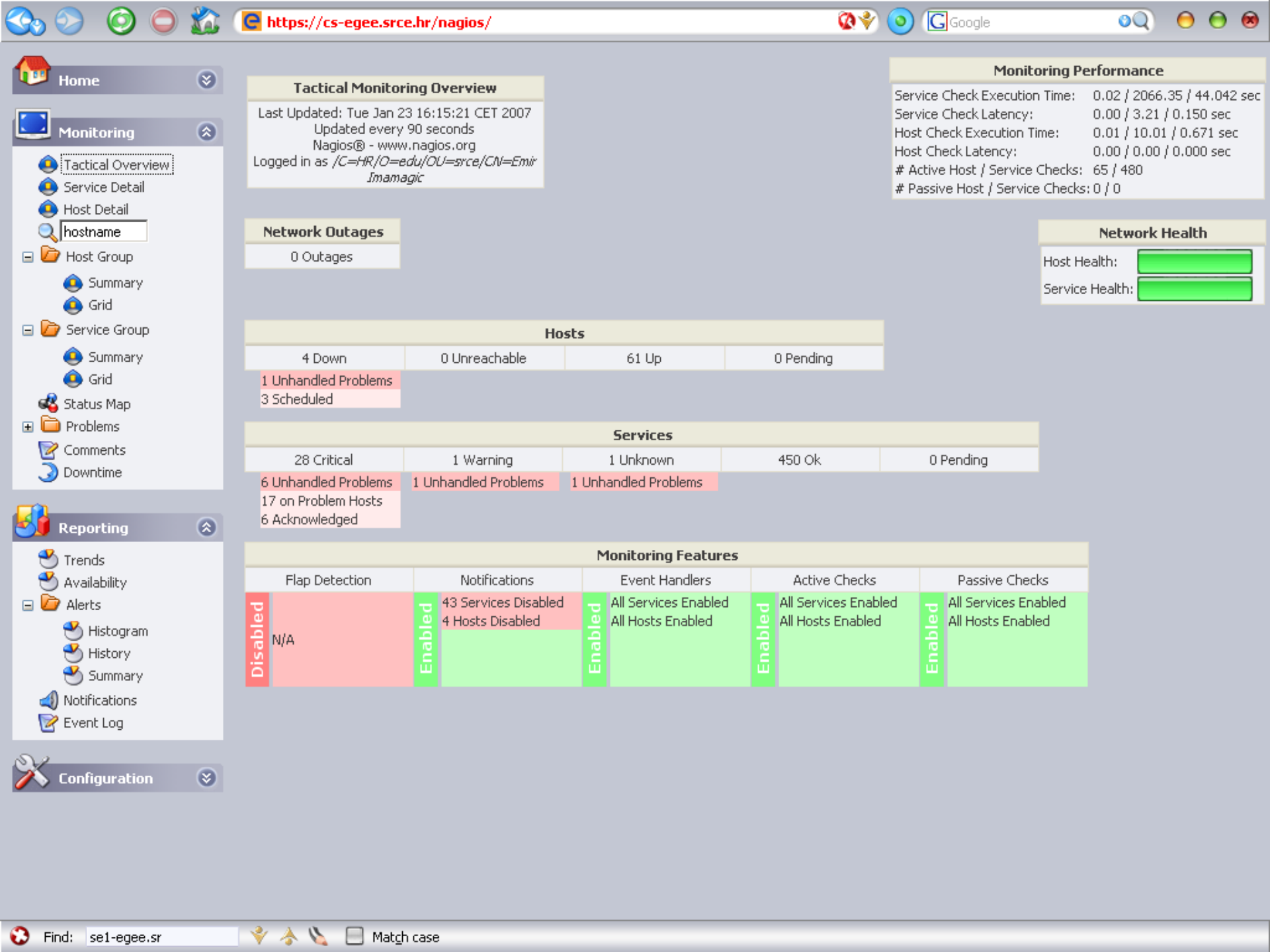


Interactions between EGEE Operational Monitoring Components

Grid Extensions

- **Grid sensors**
  - Security facilities & services
    - CA distribution, Certificate lifetime, MyProxy, VOMS, VOMS Admin
  - Monitoring & information services
    - R-GMA, BDII, MDS, GridICE
  - Job management services
    - Globus Gatekeeper, RB, WMS, WMProxy, Job matching
  - File management services
    - GridFTP, SRM, DPNS, LFC
- **Sensor hierarchy**
- **Automatic recovery**
  - both local and remote services
- **Certificate based authentication for the web interface**

EGEE implementation web interface


https://cs-egee.srce.hr/nagios/
Google
Home
Monitoring
Tactical Overview
Service Detail
Host Detail
hostname
Host Group
Summary
Grid
Service Group
Summary
Grid
Status Map
Problems
Comments
Downtime
Reporting
Trends
Availability
Alerts
Histogram
History
Summary
Notifications
Event Log
Configuration
Tactical Monitoring Overview
Last Updated: Tue Jan 23 16:15:21 CET 2007
Updated every 90 seconds
Nagios® - www.nagios.org
Logged in as /C=HR/O=edu/OU=srce/CN=Emir Imamagic
Monitoring Performance
Service Check Execution Time: 0.02 / 2066.35 / 44.042 sec
Service Check Latency: 0.00 / 3.21 / 0.150 sec
Host Check Execution Time: 0.01 / 10.01 / 0.671 sec
Host Check Latency: 0.00 / 0.00 / 0.000 sec
Active Host / Service Checks: 65 / 480
Passive Host / Service Checks: 0 / 0
Network Outages
0 Outages
Network Health
Host Health:
Service Health:
Hosts
4 Down
0 Unreachable
61 Up
0 Pending
1 Unhandled Problems
3 Scheduled
Services
28 Critical
1 Warning
1 Unknown
450 Ok
0 Pending
6 Unhandled Problems
17 on Problem Hosts
6 Acknowledged
1 Unhandled Problems
1 Unhandled Problems
Monitoring Features
Flap Detection
Disabled
N/A
Notifications
Enabled
43 Services Disabled
4 Hosts Disabled
Event Handlers
Enabled
All Services Enabled
All Hosts Enabled
Active Checks
Enabled
All Services Enabled
All Hosts Enabled
Passive Checks
Enabled
All Services Enabled
All Hosts Enabled
Find:
se1-egee.sr
Match case

Current Network Status
Last Updated: Tue Jan 23 13:55:09 CET 2007 Updated every 90 seconds Nagios® - www.nagios.org Logged in as */C=HR/O=edu/OU=srce/CN=Emir Imamagic*
View History For This Host View Notifications For This Host View Service Status Detail For All Hosts

Host Status Totals

Up	Down	Unreachable	Pending
1	0	0	0

All Problems	*All Types*
0	1

Service Status Totals

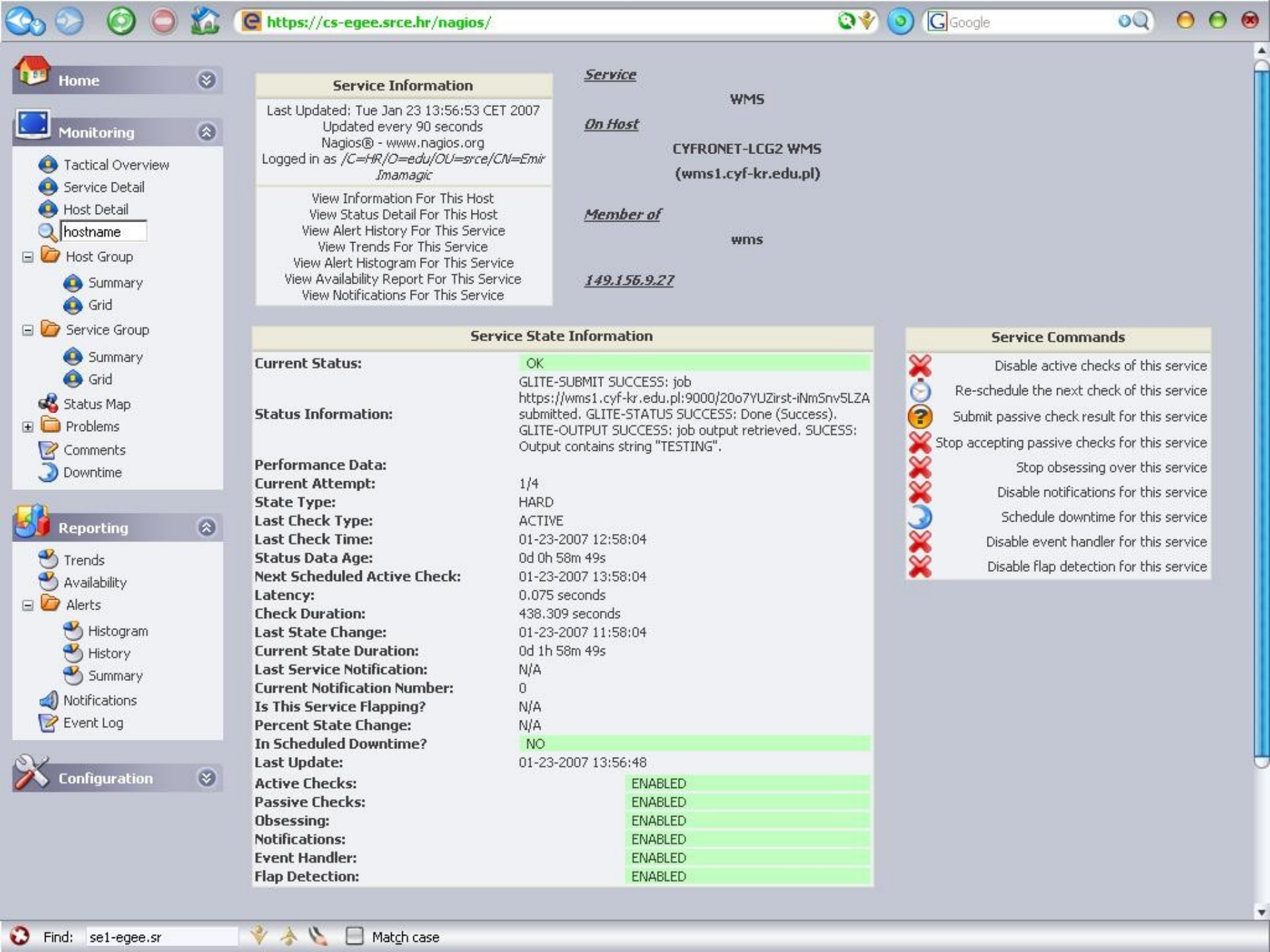
Ok	Warning	Unknown	Critical	Pending
12	0	0	0	0

All Problems	*All Types*
0	12

Service Status Details For Host 'se1-egee.srce.hr'

Host	Service	Status	Last Check	Duration	Attempt	Status Information
se1-egee.srce.hr	CA distribution	OK	01-23-2007 12:36:56	10d 12h 55m 20s	1/3	CA DIST OK: Official IGTF version is 1.11. Valid distribution version found. All CA certificates versions are valid.
	Certificate lifetime	OK	01-23-2007 12:36:56	76d 20h 27m 59s	1/3	CERT OK: Certificate will expire in 55 days (Mar 20 08:02:00 2007 GMT).
	DPNS	OK	01-23-2007 13:36:56	6d 5h 46m 25s	1/4	DPNS OK: Listing content of /dpm succeeded. Directory contains domain srce.hr subdirectory.
	DPNS ping	OK	01-23-2007 13:51:56	36d 21h 42m 44s	1/4	TCP OK - 0.433 second response time on port 5010
	Globus GridFTP	OK	01-23-2007 13:51:56	6d 6h 31m 24s	1/4	FTP OK - 0.013 second response time on port 2811 [220 se1-egee.srce.hr DPM GridFTP Server 1.12 GSSAPI type Globus/GSI wu-2.6.2 (gcc32dbg, 1069715860-42) ready.]
	Globus GridFTP transfer	OK	01-23-2007 13:36:56	153d 4h 23m 18s	1/4	GridFTP OK: Transfer from local to remote computer succeeded. Transfer from remote to local computer succeeded. Received file is valid. File successfully removed from remote computer.
	Globus MDS GRIS	OK	01-23-2007 13:51:56	36d 21h 39m 6s	1/4	LDAP OK - 0.152 seconds response time
	GridICE MDS	OK	01-23-2007 13:51:56	36d 21h 42m 44s	1/4	LDAP OK - 0.706 seconds response time
	MyProxy	OK	01-23-2007 13:51:56	6d 6h 31m 23s	1/4	MYPROXY_INIT SUCCESS: proxy created. MYPROXY_INFO SUCCESS: proxy info retrieved. MYPROXY_DESTROY SUCCESS: proxy was destroyed.
	R-GMA Tomcat	OK	01-23-2007 13:51:56	6d 6h 31m 23s	1/4	HTTPS OK: HTTP/1.1 200 OK - 0.154 seconds response time
	SRMv1 ping	OK	01-23-2007 13:51:56	36d 21h 39m 7s	1/4	SRM ping successful.
	SRMv1 transfer	OK	01-23-2007 13:36:56	61d 14h 45m 28s	1/4	Transfer from local to remote computer succeeded. Transfer from remote to local computer succeeded. Received file is valid. File successfully removed from remote computer.

12 Matching Service Entries Displayed


https://cs-egee.srce.hr/nagios/
Google
Home
Monitoring
Tactical Overview
Service Detail
Host Detail
hostname
Host Group
Summary
Grid
Service Group
Summary
Grid
Status Map
Problems
Comments
Downtime
Reporting
Trends
Availability
Alerts
Histogram
History
Summary
Notifications
Event Log
Configuration
Service Information
Last Updated: Tue Jan 23 13:56:53 CET 2007
Updated every 90 seconds
Nagios® - www.nagios.org
Logged in as /C=HR/O=edu/OU=srce/CN=Emir Imamagic
View Information For This Host
View Status Detail For This Host
View Alert History For This Service
View Trends For This Service
View Alert Histogram For This Service
View Availability Report For This Service
View Notifications For This Service
Service
WMS
On Host
CYFRONET-LCG2 WMS
(wms1.cyf-kr.edu.pl)
Member of
wms
149.156.9.27
Service State Information
Current Status: OK
Status Information: GLITE-SUBMIT SUCCESS: job https://wms1.cyf-kr.edu.pl:9000/20o7YUZirst-iNmSnv5LZA submitted. GLITE-STATUS SUCCESS: Done (Success). GLITE-OUTPUT SUCCESS: job output retrieved. SUCESS: Output contains string "TESTING".
Performance Data:
Current Attempt: 1/4
State Type: HARD
Last Check Type: ACTIVE
Last Check Time: 01-23-2007 12:58:04
Status Data Age: 0d 0h 58m 49s
Next Scheduled Active Check: 01-23-2007 13:58:04
Latency: 0.075 seconds
Check Duration: 438.309 seconds
Last State Change: 01-23-2007 11:58:04
Current State Duration: 0d 1h 58m 49s
Last Service Notification: N/A
Current Notification Number: 0
Is This Service Flapping? N/A
Percent State Change: N/A
In Scheduled Downtime? NO
Last Update: 01-23-2007 13:56:48
Active Checks: ENABLED
Passive Checks: ENABLED
Obsessing: ENABLED
Notifications: ENABLED
Event Handler: ENABLED
Flap Detection: ENABLED
Service Commands
Disable active checks of this service
Re-schedule the next check of this service
Submit passive check result for this service
Stop accepting passive checks for this service
Stop obsessing over this service
Disable notifications for this service
Schedule downtime for this service
Disable event handler for this service
Disable flap detection for this service
Find: se1-egee.sr
Match case

Home
Monitoring
Tactical Overview
Service Detail
Host Detail
hostname
Host Group
Summary
Grid
Service Group
Summary
Grid
Status Map
Problems
Comments
Downtime
Reporting
Trends
Availability
Alerts
Histogram
History
Summary
Notifications
Event Log
Configuration

Service 'MyProxy' On Host 'se1-egee.srce.hr'

Service Availability Report

Last Updated: Tue Jan 23 14:01:04 CET 2007
Nagios® - www.nagios.org
Logged in as */C=HR/O=edu/OU=srce/CN=Emir Imamagic*

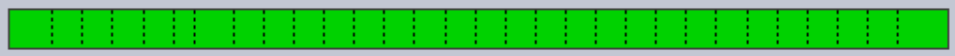
View Availability Report For This Host
View Availability Report For All Services
View Trends For This Service
View Alert Histogram For This Service
View Alert History This Service
View Notifications For This Service

12-23-2006 14:01:04 to 01-23-2007 14:01:04
Duration: 31d 0h 0m 0s

First assumed service state: Unspecified
Report period: Last 31 Days
Backtracked archives: 4
Update

[Availability report completed in 0 min 0 sec]

Service State Breakdowns:



State	Type / Reason	Time	% Total Time	% Known Time
OK	Unscheduled	30d 20h 0m 0s	99.462%	99.462%
	Scheduled	0d 3h 52m 33s	0.521%	0.521%
	Total	30d 23h 52m 33s	99.983%	99.983%
WARNING	Unscheduled	0d 0h 0m 0s	0.000%	0.000%
	Scheduled	0d 0h 0m 0s	0.000%	0.000%
	Total	0d 0h 0m 0s	0.000%	0.000%
UNKNOWN	Unscheduled	0d 0h 0m 0s	0.000%	0.000%
	Scheduled	0d 0h 0m 0s	0.000%	0.000%
	Total	0d 0h 0m 0s	0.000%	0.000%
CRITICAL	Unscheduled	0d 0h 0m 0s	0.000%	0.000%
	Scheduled	0d 0h 7m 27s	0.017%	0.017%
	Total	**0d 0h 7m 27s**	**0.017%**	**0.017%**
Undetermined	Nagios Not Running	0d 0h 0m 0s	0.000%	
	Insufficient Data	0d 0h 0m 0s	0.000%	
	Total	0d 0h 0m 0s	0.000%	
All	Total	31d 0h 0m 0s	100.000%	100.000%

Service Log Entries:
[View full log entries]

Home
Monitoring
Tactical Overview
Service Detail
Host Detail
hostname
Host Group
Summary
Grid
Service Group
Summary
Grid
Status Map
Problems
Service
Host
Network Outages
Comments
Downtime
Reporting
Trends
Availability
Alerts
Histogram
History
Summary
Notifications
Event Log
Configuration

All Host and Service Scheduled Downtime

Last Updated: Tue Jan 23 19:56:54 CET 2007
Updated every 90 seconds
Nagios® - www.nagios.org
Logged in as */C=HR/O=edu/OU=srce/CN=Emir Imamagic*

[Host Downtime | Service Downtime]

Scheduled Host Downtime

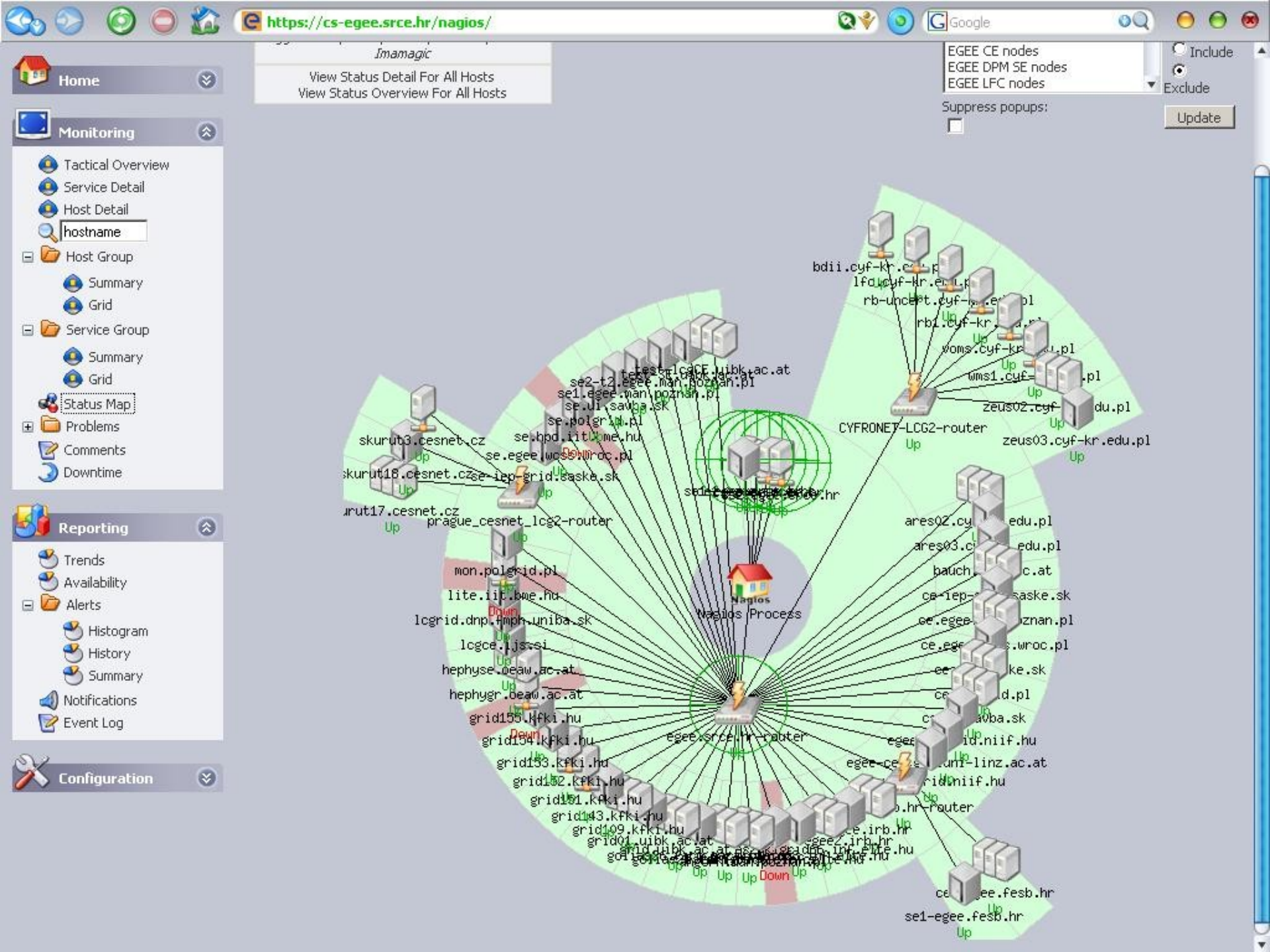
Schedule host downtime

Host Name	Entry Time	Author	Comment	Start Time	End Time	Type	Duration	Downtime ID	Trigger ID	Actions
eszakigrid66.inf.elte.hu	01-23-2007 19:54:53	Emir Imamagic	3499#Security incident on site, shutdown to investigate	01-10-2007 13:05:22	01-31-2007 12:00:00	Fixed	20d 22h 54m 38s	261	N/A	
eszakigrid68.inf.elte.hu	01-23-2007 19:54:53	Emir Imamagic	3499#Security incident on site, shutdown to investigate	01-10-2007 13:05:22	01-31-2007 12:00:00	Fixed	20d 22h 54m 38s	262	N/A	
eszakigrid69.inf.elte.hu	01-23-2007 19:54:53	Emir Imamagic	3499#Security incident on site, shutdown to investigate	01-10-2007 13:05:22	01-31-2007 12:00:00	Fixed	20d 22h 54m 38s	263	N/A	
test-lcgCE.uibk.ac.at	01-23-2007 19:54:53	Emir Imamagic	3544#nodes for the certification testbed	01-17-2007 15:10:00	02-16-2007 08:00:00	Fixed	29d 16h 50m 0s	255	N/A	
test-SE.uibk.ac.at	01-23-2007 19:54:53	Emir Imamagic	3544#nodes for the certification testbed	01-17-2007 15:10:00	02-16-2007 08:00:00	Fixed	29d 16h 50m 0s	256	N/A	
lite.iit.bme.hu	01-23-2007 19:54:53	Emir Imamagic	3567#cooling problem	01-22-2007 09:15:00	01-25-2007 18:00:00	Fixed	3d 8h 45m 0s	264	N/A	
se.hpc.iit.bme.hu	01-23-2007 19:54:53	Emir Imamagic	3567#cooling problem	01-22-2007 09:15:00	01-25-2007 18:00:00	Fixed	3d 8h 45m 0s	265	N/A	
skurut17.cesnet.cz	01-23-2007 19:54:53	Emir Imamagic	3585#Prolongued security downtime	01-23-2007 19:30:00	01-24-2007 19:30:00	Fixed	1d 0h 0m 0s	257	N/A	
skurut18.cesnet.cz	01-23-2007 19:54:53	Emir Imamagic	3585#Prolongued security downtime	01-23-2007 19:30:00	01-24-2007 19:30:00	Fixed	1d 0h 0m 0s	258	N/A	
skurut3.cesnet.cz	01-23-2007 19:54:53	Emir Imamagic	3585#Prolongued security downtime	01-23-2007 19:30:00	01-24-2007 19:30:00	Fixed	1d 0h 0m 0s	259	N/A	
se1.egee.man.poznan.pl	01-23-2007 19:54:53	Emir Imamagic	3577#Reboot needed due to instalation of new storage space	01-24-2007 10:00:00	01-24-2007 10:30:00	Fixed	0d 0h 30m 0s	260	N/A	

Scheduled Service Downtime

Schedule service downtime

Host Name	Service	Entry Time	Author	Comment	Start Time	End Time	Type	Duration	Downtime ID	Trigger ID	Actions


https://cs-egee.srce.hr/nagios/
Google
Imamagic
View Status Detail For All Hosts
View Status Overview For All Hosts
EGEE CE nodes
EGEE DPM SE nodes
EGEE LFC nodes
Include
Exclude
Suppress popups:
Update
Home
Monitoring
Tactical Overview
Service Detail
Host Detail
hostname
Host Group
Summary
Grid
Service Group
Summary
Grid
Status Map
Problems
Comments
Downtime
Reporting
Trends
Availability
Alerts
Histogram
History
Summary
Notifications
Event Log
Configuration
Nagios
Nagios Process
CYFRONET-LCG2-router
prague_cesnet_lcg2-router
egee.srce.hr-router
skurut3.cesnet.cz
skurut18.cesnet.cz
se-iep-grid.saske.sk
mon.polgrid.pl
lite.iit.bme.hu
lcgce.ijs.si
hephyse.oeaw.ac.at
hephygr.oeaw.ac.at
grid155.kfki.hu
grid154.kfki.hu
grid153.kfki.hu
grid152.kfki.hu
grid151.kfki.hu
grid143.kfki.hu
grid109.kfki.hu
grid01.uibk.ac.at
se1-egee.fesb.hr
zeus03.cyf-kr.edu.pl

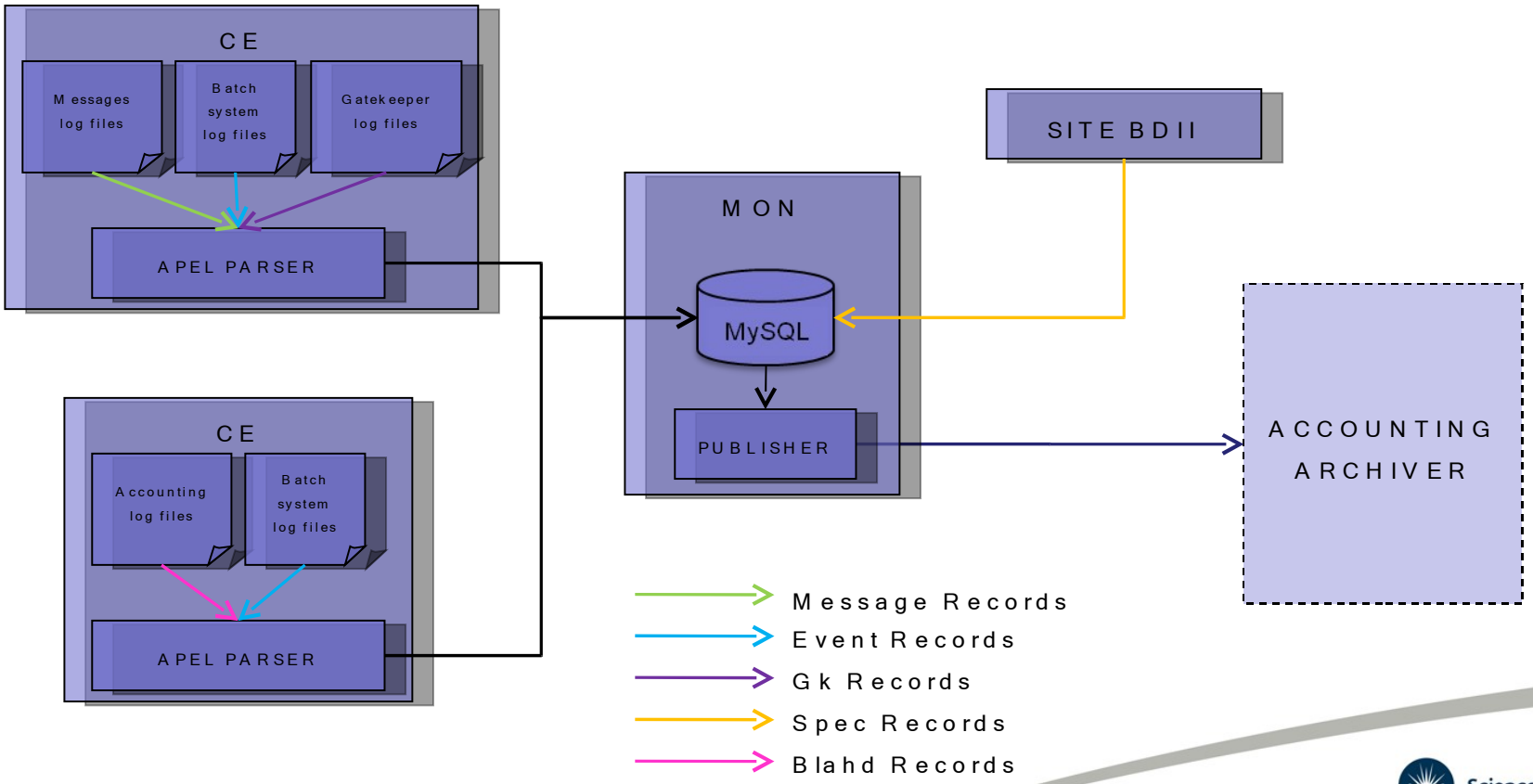
ACCOUNTING

Accounting

- **Accounting AFTER event (APEL)**
  - Data is obtained after job completion
  - Full resources usage is stored
  - Pay per use and billing services oriented
- **Real time accounting (DGAS, SGAS, GRATIA)**
  - Incremental resource usage during job execution
  - Balance reduction
  - User quotas can be applied
  - Pre-paid services oriented
  - Example: pre-paid mobile phone card

APEL: Client architecture

- Jobs Accounting from each site
- Sent to a central repository (R-GMA)
- Data collection



Science & Technology Facilities Council

APEL: LcgRecords Table

- **Based on Open Grid Forum's Usage Record Working Group**

Field	Type	Null	Key	Default	Extra
RecordIdentity	varchar(255)		PRI		
ExecutingSite	varchar(50)	YES		NULL	
LocalJobID	varchar(50)	YES		NULL	
LCGJobID	varchar(255)	YES		NULL	
LocalUserID	varchar(50)	YES		NULL	
LCGUserID	varchar(255)	YES		NULL	
LCGUserVO	varchar(255)	YES		NULL	
ElapsedTime	varchar(30)	YES		NULL	
BaseCpuTime	varchar(30)	YES		NULL	
ElapsedTimeSeconds	int(11)	YES		NULL	
BaseCpuTimeSeconds	int(11)	YES		NULL	
StartTime	varchar(30)	YES		NULL	
StopTime	varchar(30)	YES		NULL	
StartTimeUTC	varchar(30)	YES		NULL	
StopTimeUTC	varchar(30)	YES		NULL	
StartTimeEpoch	int(11)	YES		NULL	
StopTimeEpoch	int(11)	YES		NULL	
ExecutingCE	varchar(255)	YES		NULL	
MemoryReal	int(11)	YES		NULL	
MemoryVirtual	int(11)	YES		NULL	
SpecInt2000	int(11)	YES		NULL	
SpecFloat2000	int(11)	YES		NULL	
EventDate	date			0000-00-00	
EventTime	time			00:00:00	
MeasurementDate	date			0000-00-00	
MeasurementTime	time			00:00:00	

APEL: LcgRecords example

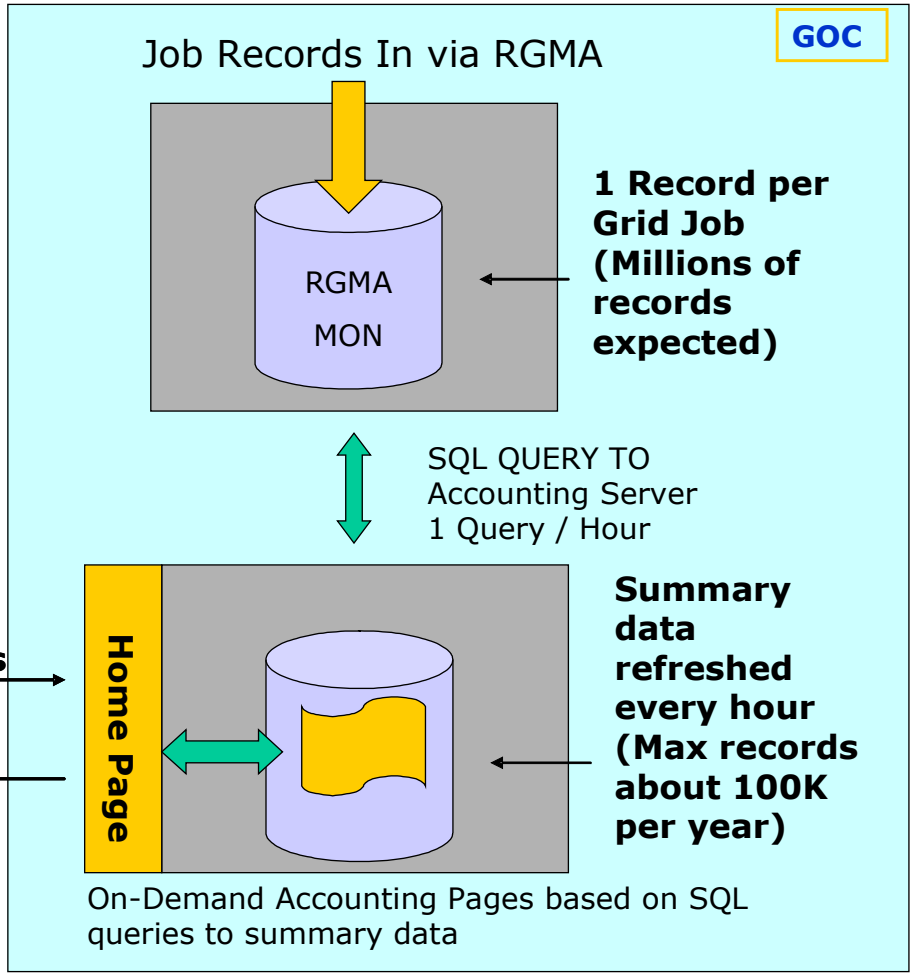
```
    RecordIdentity:  2009-02-09 12:13:47 https://wms01.ific.uv.es:9000/RB0PopWReskmLgysLwIAEw
test03.egee.cesga.es:2119/jobmanager-lcgsge-ngies 157630

     ExecutingSite:  CESGA
        LocalJobID:  157630
          LCGJobID:  NULL
       LocalUserID:  ngies036
         LCGUserID:  *APEL
V.0.2*p3qNp9vvGvMSqiifII4Ejjp/RAB4wAqboOJ+Ws6qqHujjheufLwcdqbdkizbAymf/oLjC28VVRfOxPMefFla5uTEP89E76N0pwYgNrdCL65w
4nZoHfxu81n1swber12KPPpZ7Ctywk23pihdvBiBgz82YSkZzx7ZzoRmt0f+CLw=

             LCGUserVO:  ngi-es
           UserDN:  /dc=es/dc=irisgrid/o=cesga/cn=alvarosimon
          UserFQAN:  /ngi-es/Role=NULL/Capability=NULL;
       PrimaryRole:  Role=NULL
      PrimaryGroup:  /ngi-es
       ElapsedTime:  P18M41S
       BaseCpuTime:  P0S
ElapsedTimeSeconds:  1121
BaseCpuTimeSeconds:  0
         StartTime:  2009-02-09T12:13:55Z
          StopTime:  2009-02-09T12:32:36Z
      StartTimeUTC:  2009-02-09T12:13:55Z
       StopTimeUTC:  2009-02-09T12:32:36Z
    StartTimeEpoch:  1234181635
     StopTimeEpoch:  1234182756
       ExecutingCE:  test03.egee.cesga.es:2119/jobmanager-lcgsge-ngies
            MemoryReal:  NULL
     MemoryVirtual:  NULL
       SpecInt2000:  1700
     SpecFloat2000:  1714
         EventDate:  2009-02-09
         EventTime:  2009-02-10
   MeasurementDate:  12:32:36
   MeasurementTime:  05:23:11
```

Data collection

Data is grouped by:

- **Site**
- **VO**
- **Month**
- **Year**

- **LcgRecords: 330,015,272 records**
- **SumCPU: 75,867 records**



Data collection: table

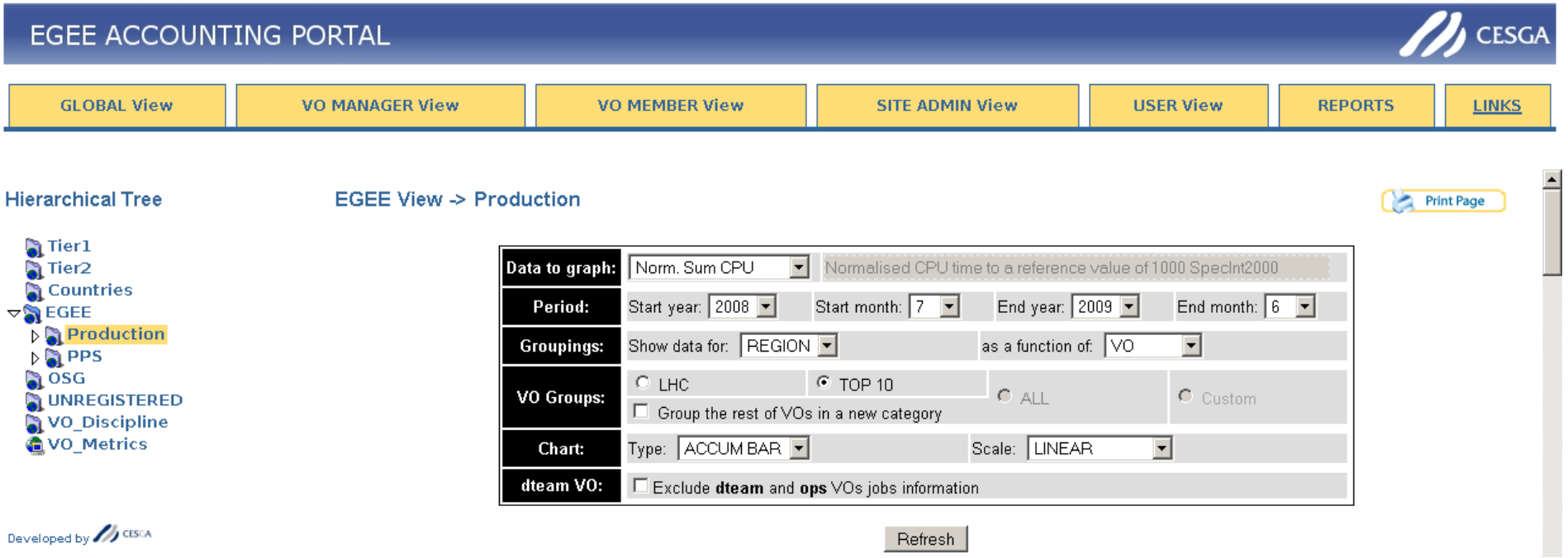
Field	Type	Null	Key	Default	Extra
ExecutingSite	varchar(50)		PRI		
LCGUserVO	varchar(255)		PRI		
Njobs	int(11)	YES		NULL	
SumCPU	decimal(10,0)	YES		NULL	
NormSumCPU	decimal(10,0)	YES		NULL	
SumWCT	decimal(10,0)	YES		NULL	
NormSumWCT	decimal(10,0)	YES		NULL	
Month	int(11)		PRI	0	
Year	int(11)		PRI	0	
RecordStart	date	YES		NULL	
RecordEnd	date	YES		NULL	

```
ExecutingSite: SITENAME
    LCGUserVO: VONAME
        Njobs: 11706
       SumCPU: 168
    NormSumCPU: 64
       SumWCT: 609
    NormSumWCT: 232
        Month: 5
         Year: 2009
  RecordStart: 2009-05-01
    RecordEnd: 2009-05-31
```

EGEE/WLCG
Accounting Portal

http://www3.egee.cesga.es/gridsite/accounting/CESGA/egee_view.php

Accounting Portal



Accounting Portal: main statistics

- Number of jobs
- (No-)Normalized used CPU time
- (No-)Normalized waiting time
- Global efficiency

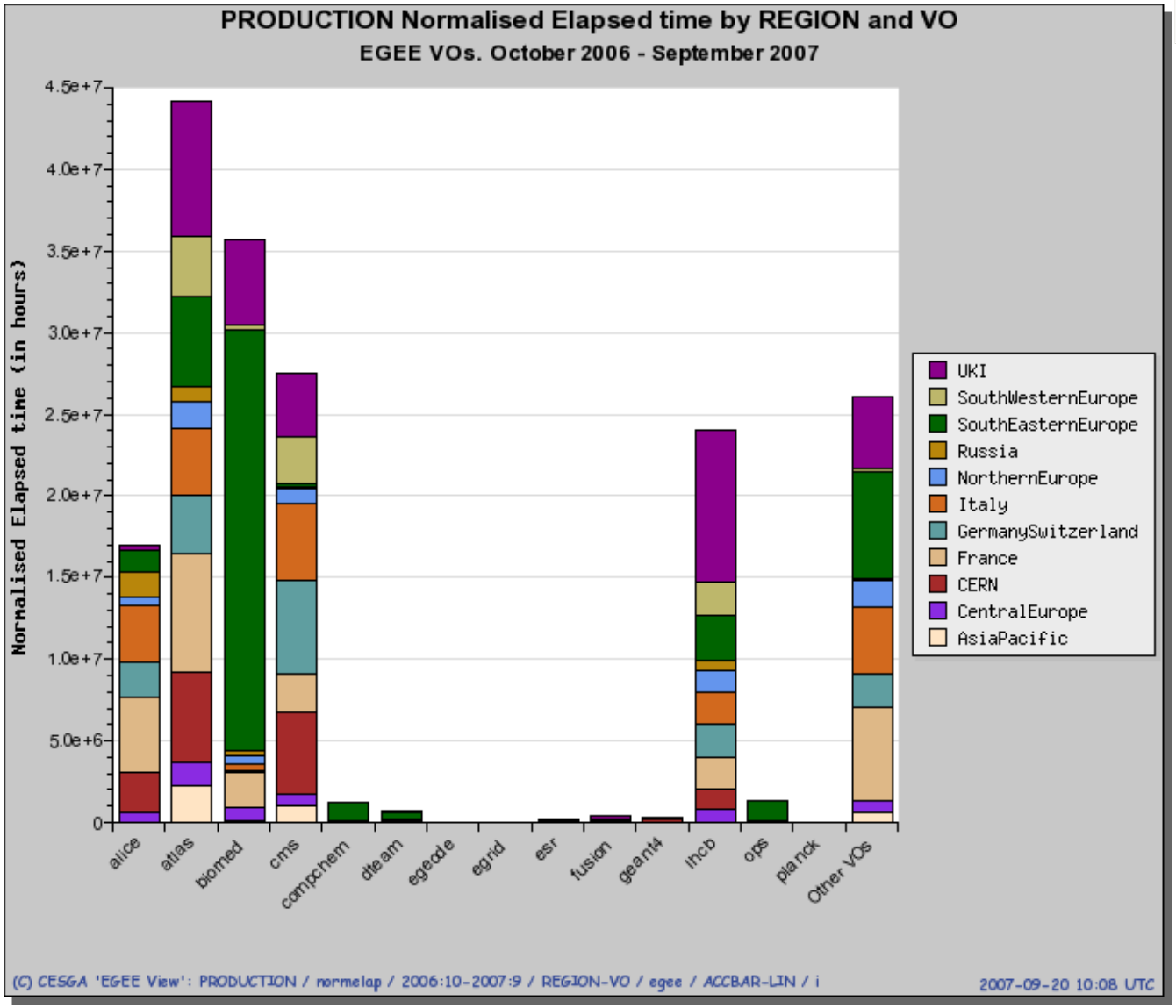
- Accumulated graphs
- Gantt charts

CPU Normalization

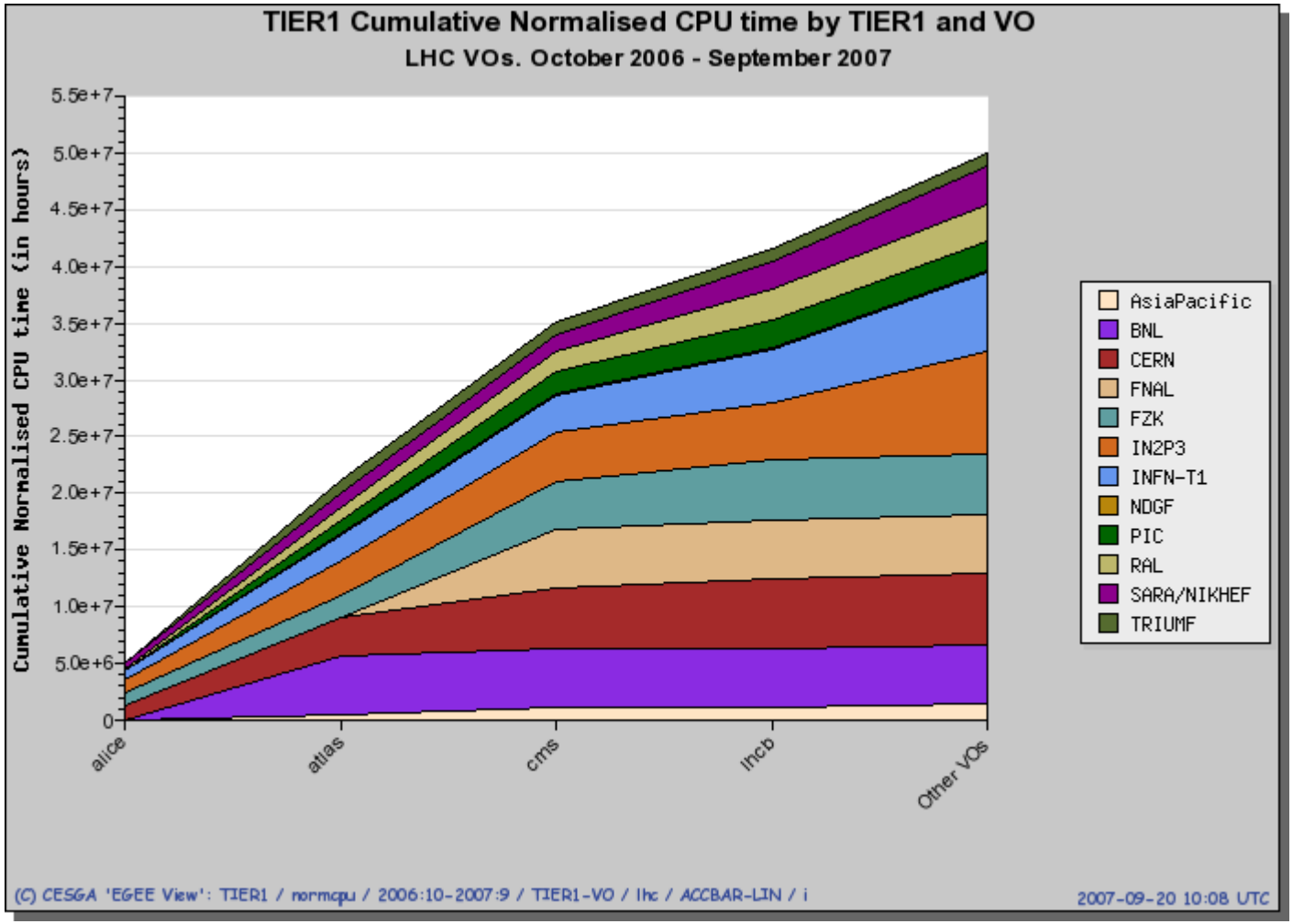
- **Each site publishes a *GlueHostBenchmarkSI00***
- **Homogeneous Sites:**
  - No problem
- **Heterogeneous Sites:**
  - Configure the values of usage scaling in each node to set weights to each node
- **Problems:**
  - Usually, the sites don't take care about whether the *SpecInt2000* is correct or they don't establish the usage scaling factors
  - Now SpecInt2006
- **Formula:**

$$Normalised_Cpu_Time = \frac{GlueHostBenchmarkSI00}{SI2000_Reference} * Base_Cpu_Time$$

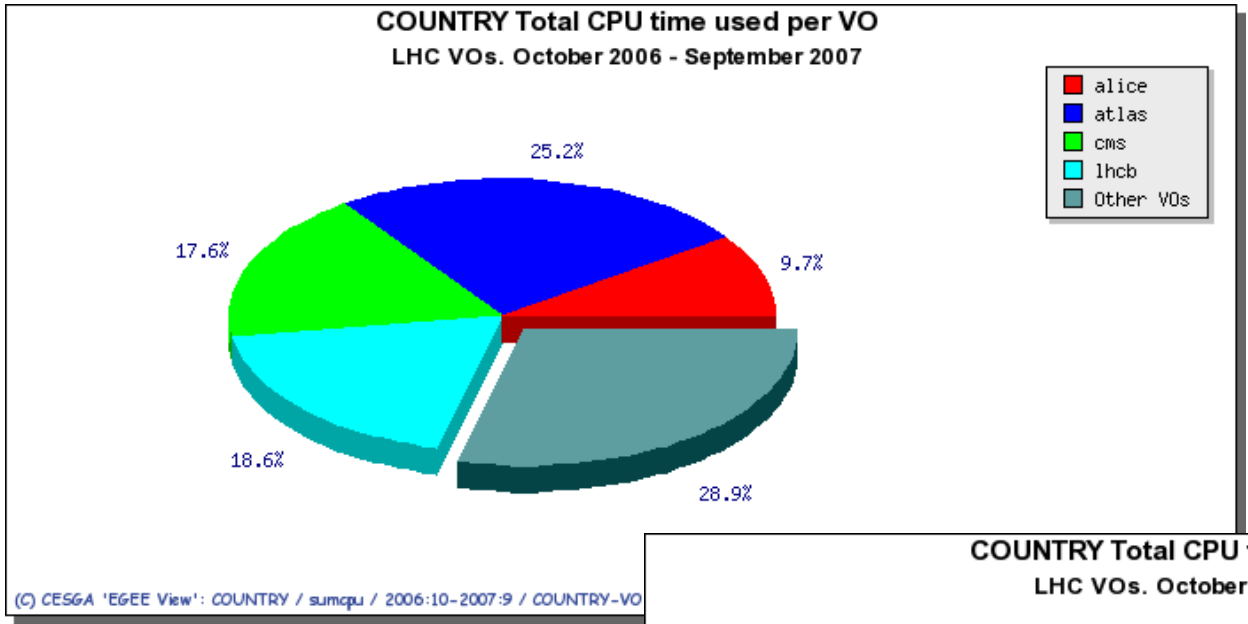
Accounting Portal: Examples

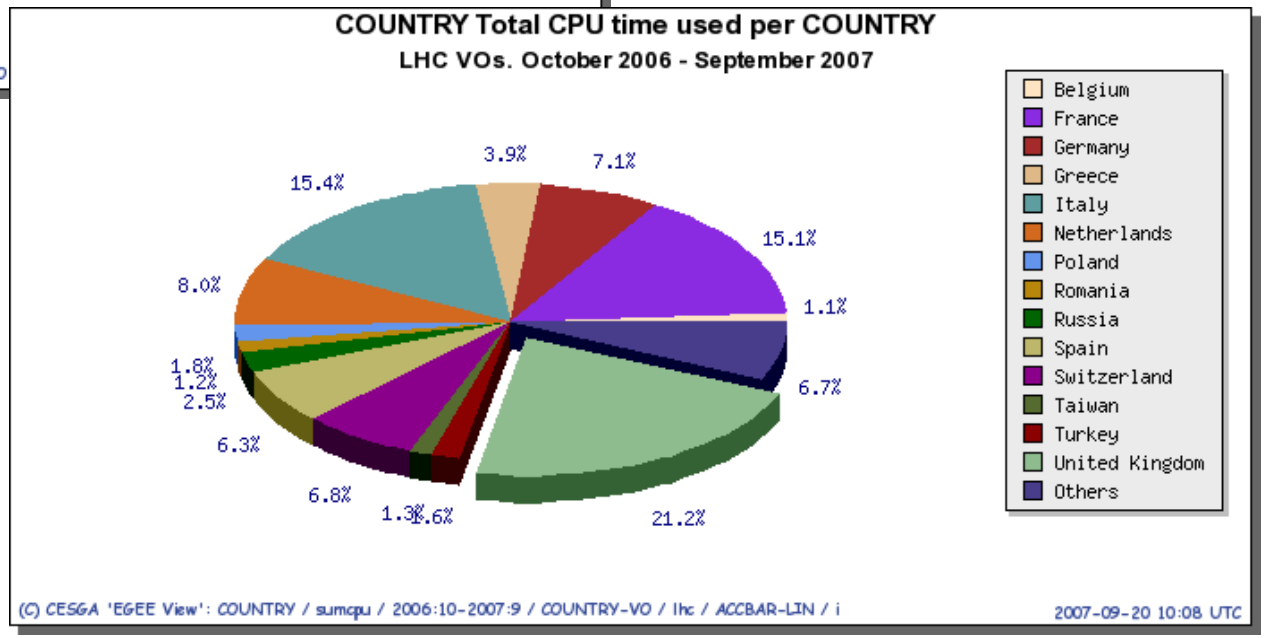


Accounting Portal: Examples II

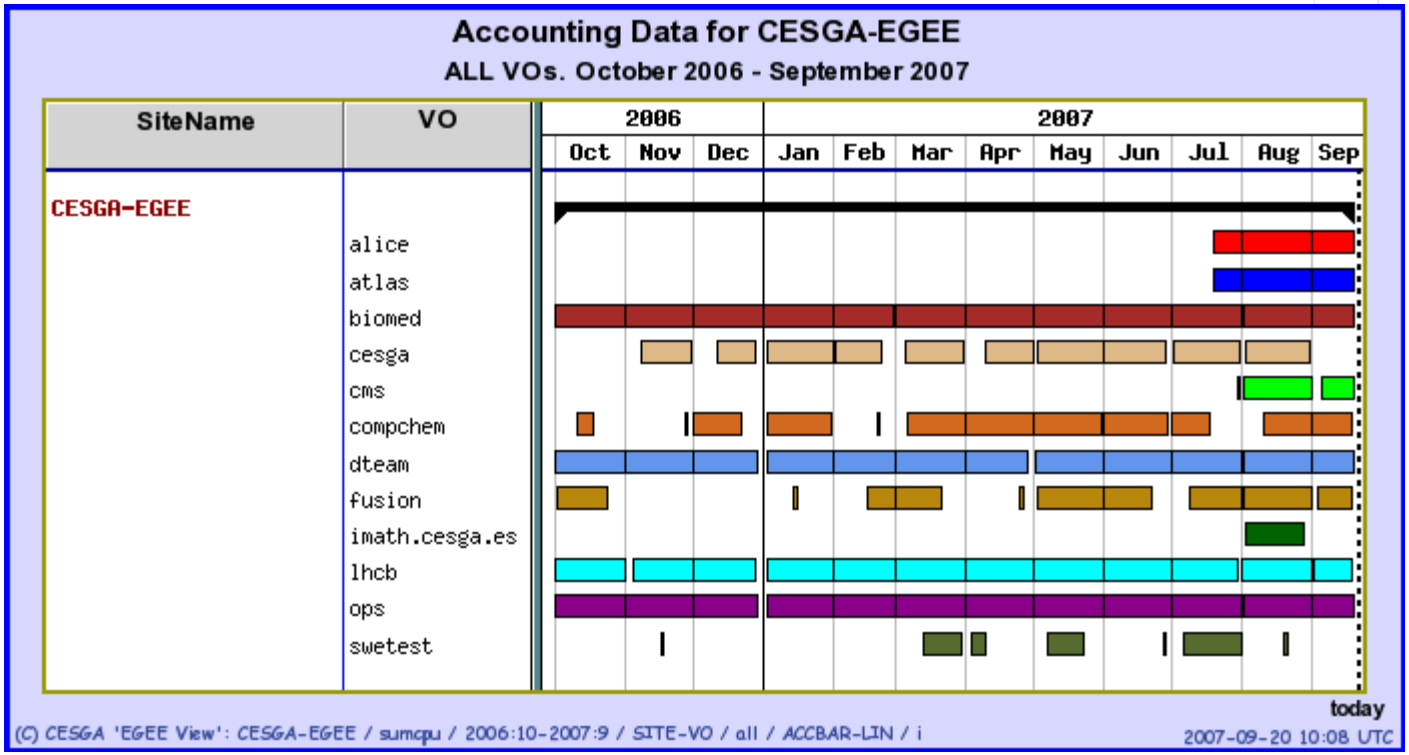


Accounting Portal: Examples III

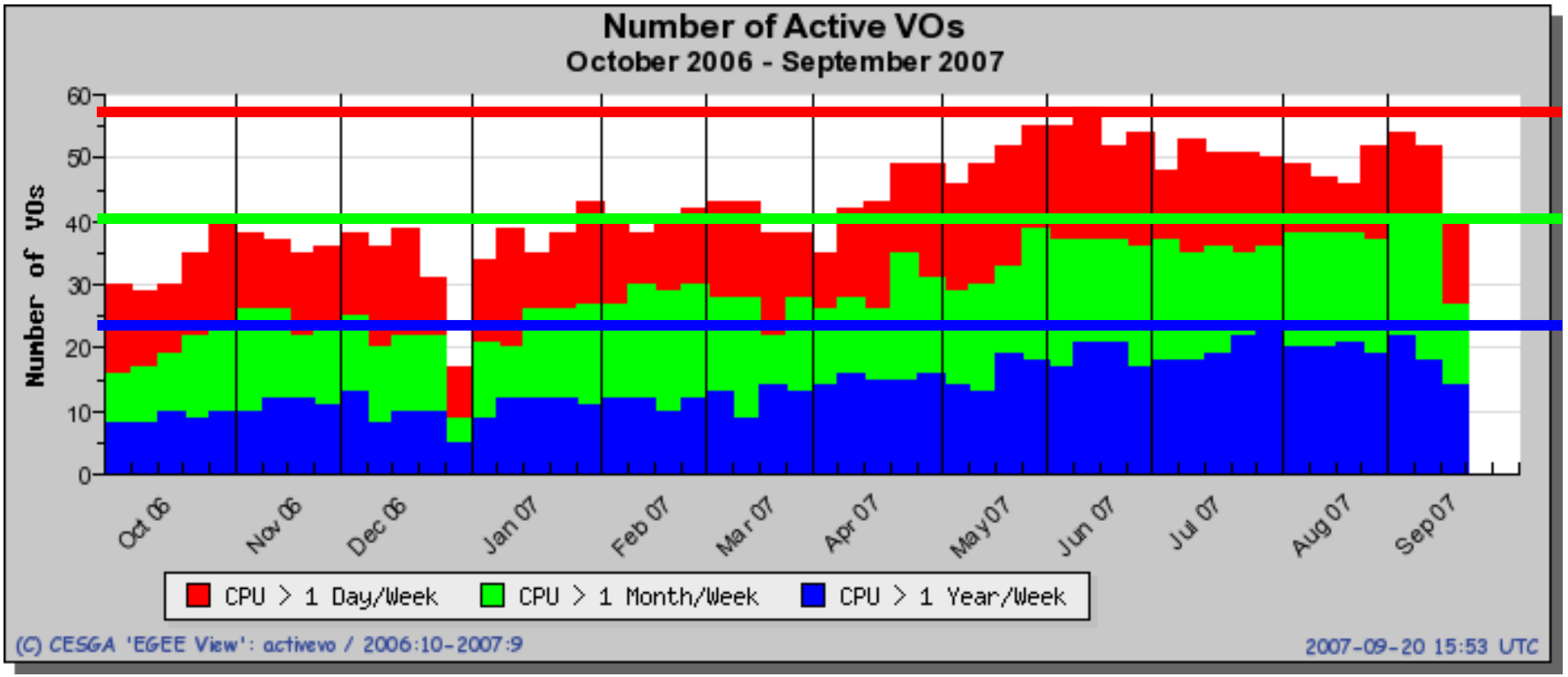




Accounting Portal: Examples IV

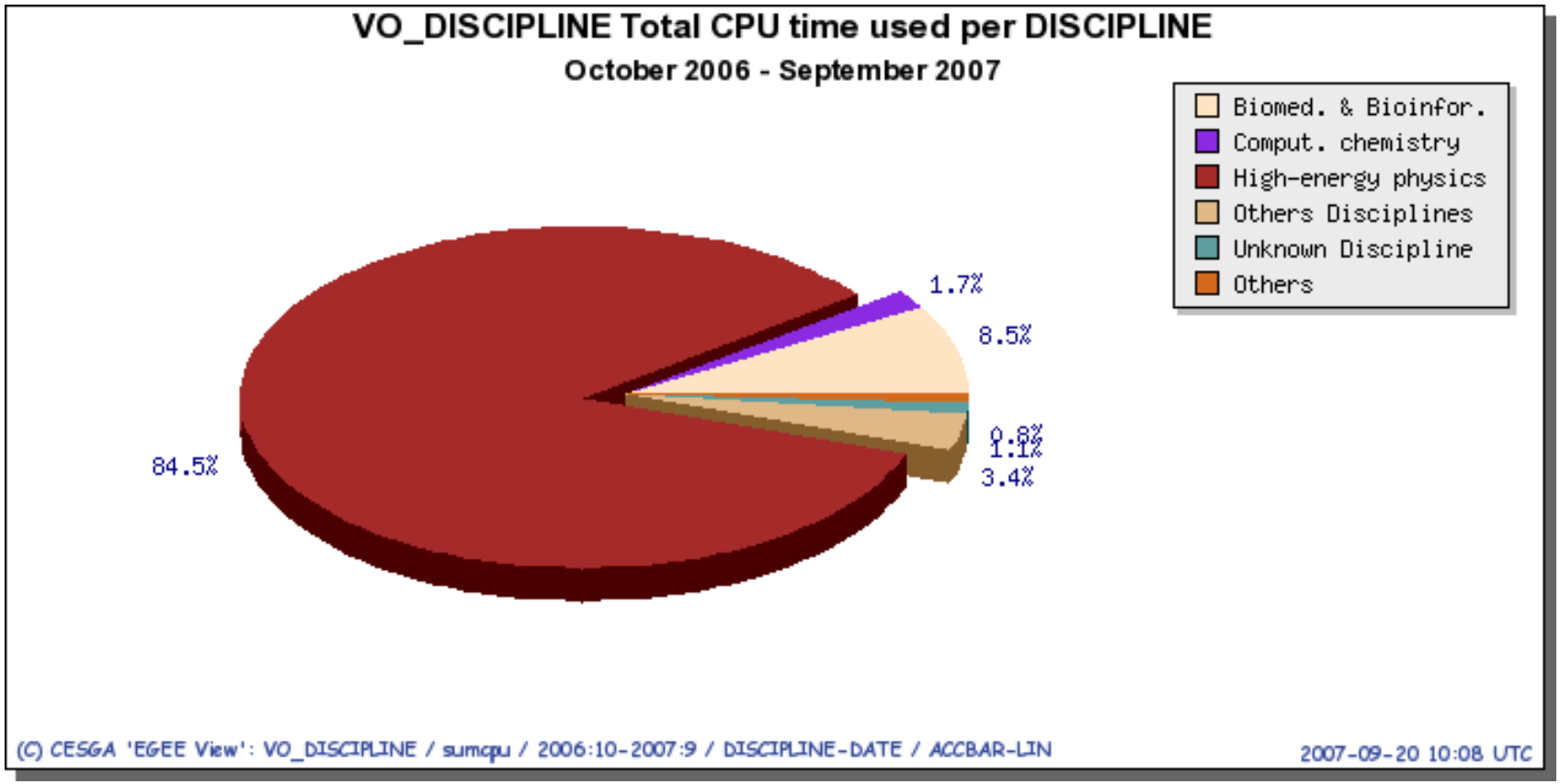


Accounting Portal: Active VOs

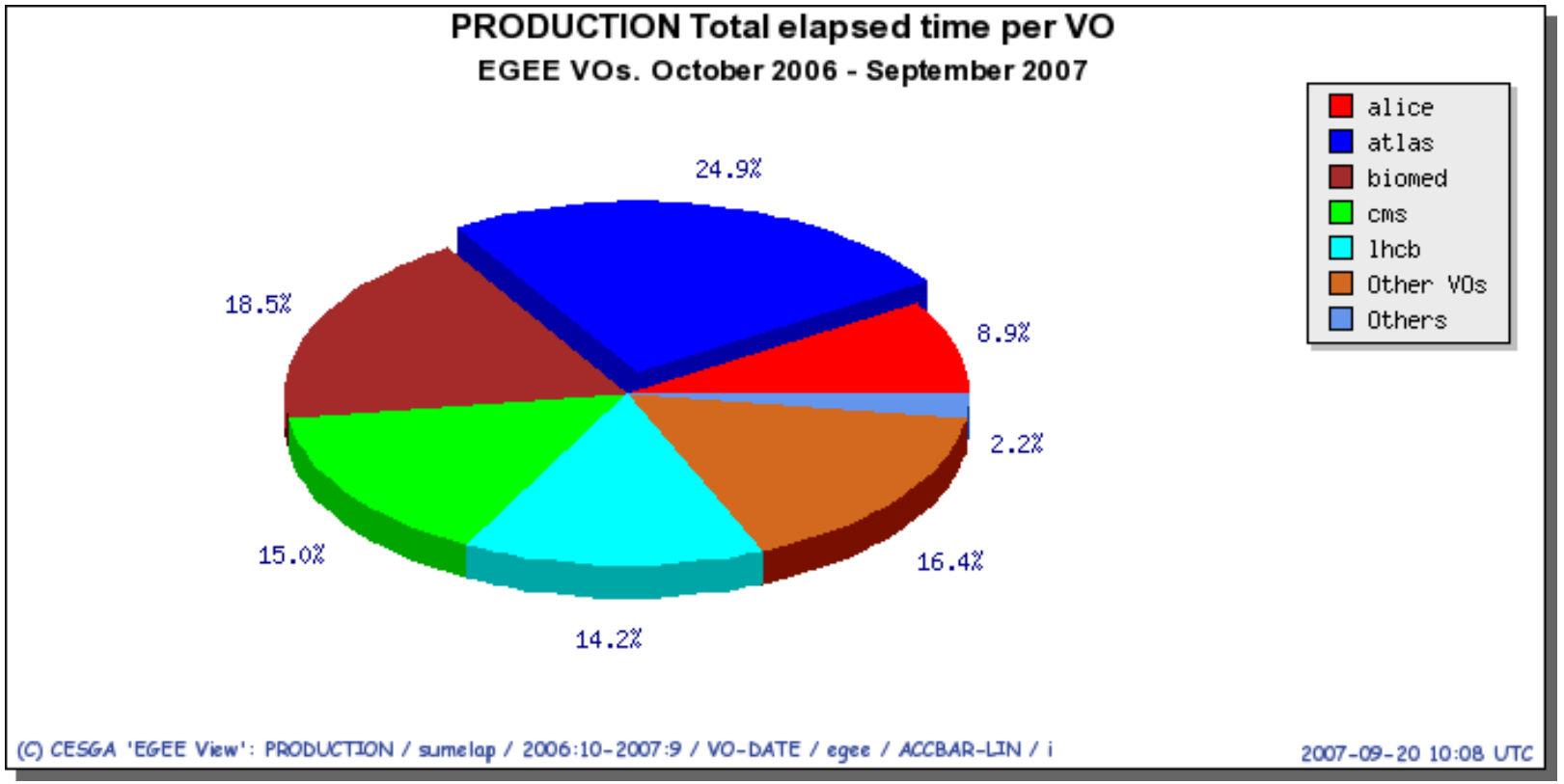


< 40/119

Accounting Portal: By Speciality



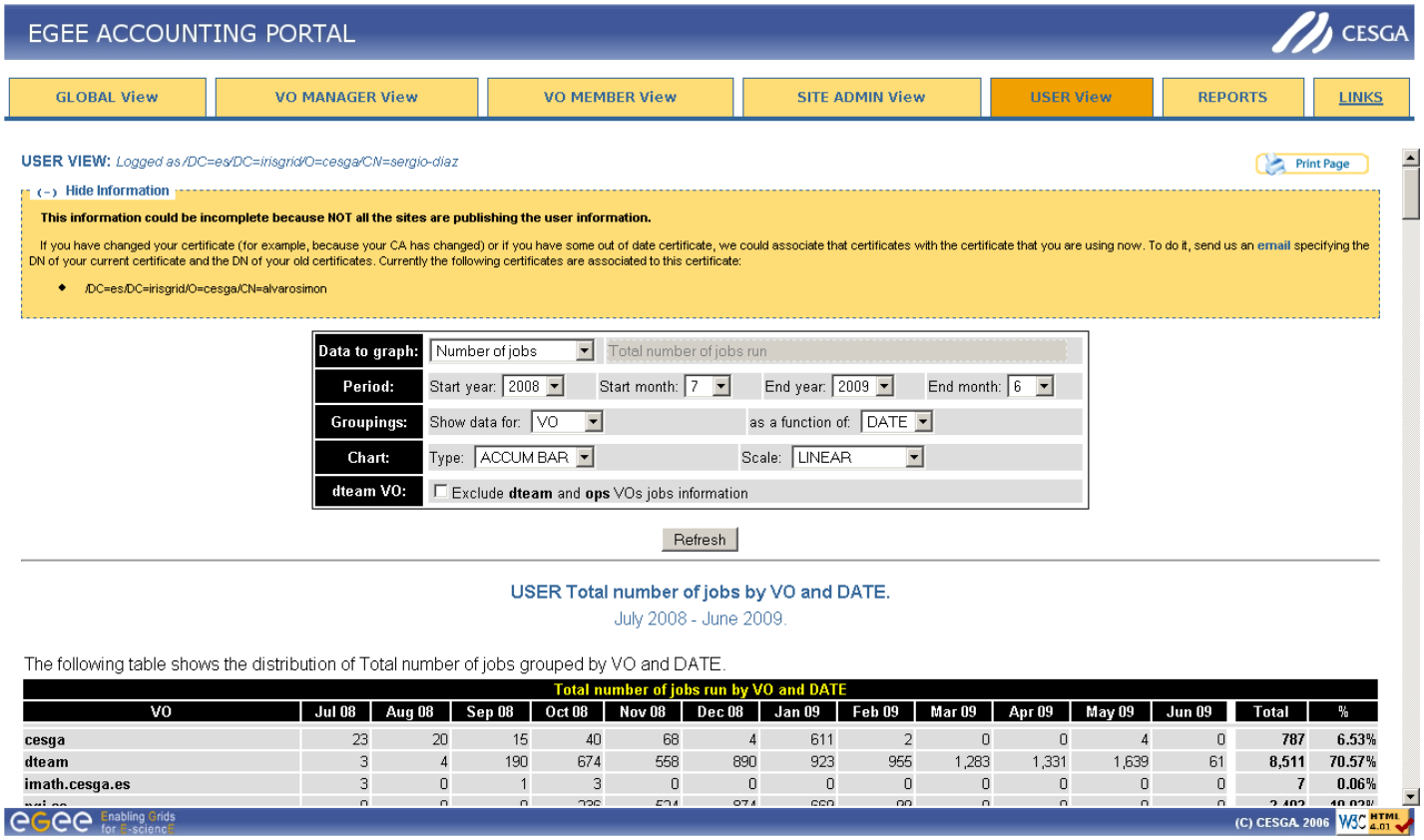
Accounting Portal: More active VOs



81.5% (5 VO)

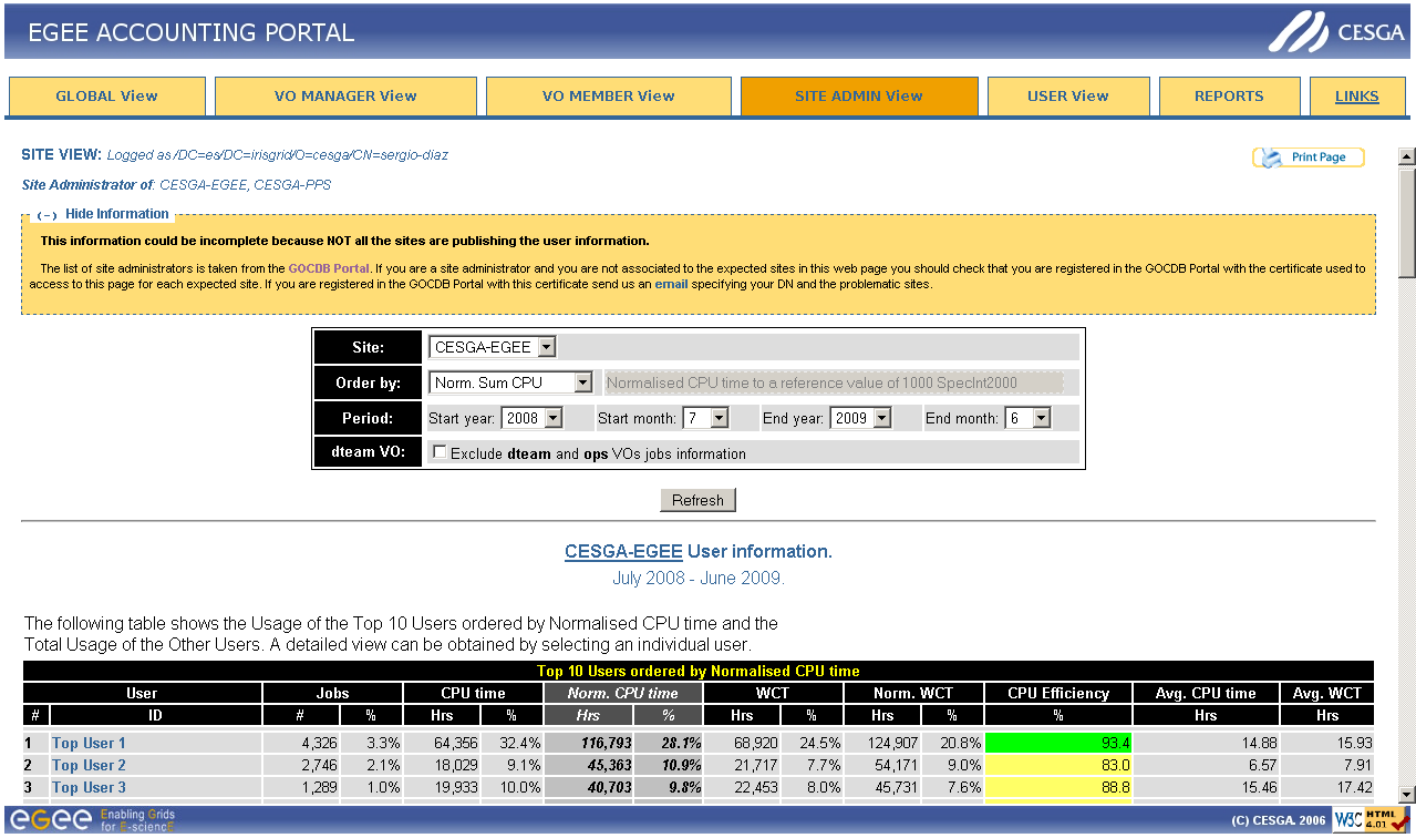
Accounting Portal: User View

- The User View allows any user to see the distribution of his/her jobs between ROCs and sites and the CPU, WCT and normalized CPU time consumed in each site/ROC.
- It is possible to make the association between an old user certificate and the new user certificate.



Accounting Portal: Site Admin

- The Site Admin View shows the contribution of each of the Top 10 Users that executed jobs in the site and the average WCT for all jobs belonging to each User,...
- Also, it is possible to see the accounting per Top User just clicking on its name.



EGEE ACCOUNTING PORTAL — CESGA

GLOBAL View | VO MANAGER View | VO MEMBER View | SITE ADMIN View | USER View | REPORTS | LINKS

SITE VIEW: *Logged as /DC=es/DC=irisgrid/O=cesga/CN=sergio-diaz*

Print Page

Site Administrator of: CESGA-EGEE, CESGA-PPS

(-) Hide Information

This information could be incomplete because NOT all the sites are publishing the user information.

The list of site administrators is taken from the GOCDB Portal. If you are a site administrator and you are not associated to the expected sites in this web page you should check that you are registered in the GOCDB Portal with the certificate used to access to this page for each expected site. If you are registered in the GOCDB Portal with this certificate send us an email specifying your DN and the problematic sites.

Site:	CESGA-EGEE
Order by:	Norm. Sum CPU — Normalised CPU time to a reference value of 1000 SpecInt2000
Period:	Start year: 2008 — Start month: 7 — End year: 2009 — End month: 6
dteam VO:	Exclude **dteam** and **ops** VOs jobs information

Refresh

CESGA-EGEE User information.

July 2008 - June 2009.

The following table shows the Usage of the Top 10 Users ordered by Normalised CPU time and the Total Usage of the Other Users. A detailed view can be obtained by selecting an individual user.

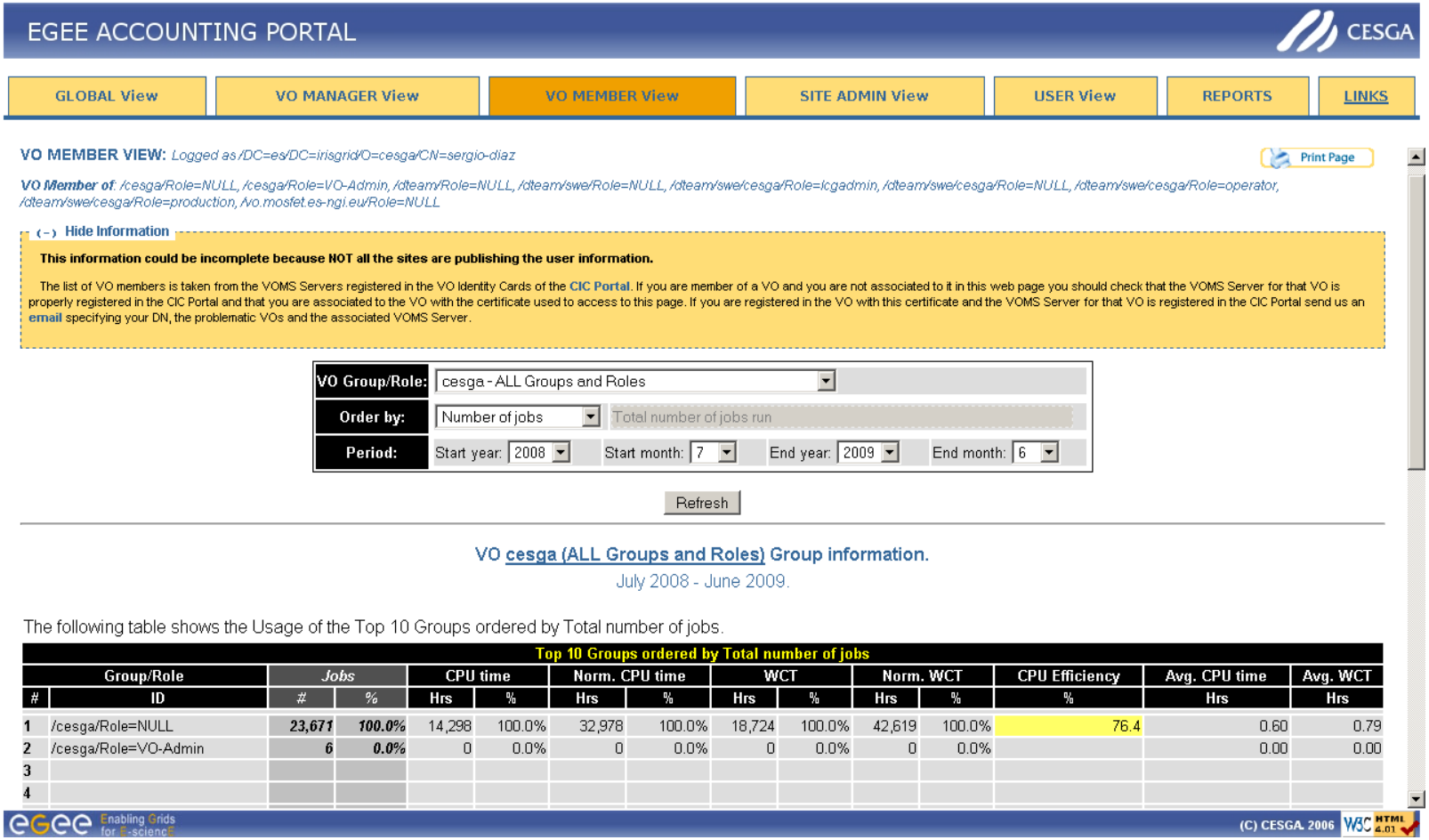
Top 10 Users ordered by Normalised CPU time

#	User ID	Jobs #	Jobs %	CPU time Hrs	CPU time %	Norm. CPU time Hrs	Norm. CPU time %	WCT Hrs	WCT %	Norm. WCT Hrs	Norm. WCT %	CPU Efficiency %	Avg. CPU time Hrs	Avg. WCT Hrs
1	Top User 1	4,326	3.3%	64,356	32.4%	116,793	28.1%	68,920	24.5%	124,907	20.8%	93.4	14.88	15.93
2	Top User 2	2,746	2.1%	18,029	9.1%	45,363	10.9%	21,717	7.7%	54,171	9.0%	83.0	6.57	7.91
3	Top User 3	1,289	1.0%	19,933	10.0%	40,703	9.8%	22,453	8.0%	45,731	7.6%	88.8	15.46	17.42

Enabling Grids for E-sciencE — (C) CESGA 2006

Accounting Portal: Member View

- **The VO Member view show an overview of the status of the VO at a lower level of detail than the global view.**



EGEE ACCOUNTING PORTAL — CESGA

GLOBAL View | VO MANAGER View | VO MEMBER View | SITE ADMIN View | USER View | REPORTS | LINKS

VO MEMBER VIEW: *Logged as /DC=es/DC=irisgrid/O=cesga/CN=sergio-diaz*

Print Page

VO Member of: */cesga/Role=NULL, /cesga/Role=VO-Admin, /dteam/Role=NULL, /dteam/swe/Role=NULL, /dteam/swe/cesga/Role=icgadmin, /dteam/swe/cesga/Role=NULL, /dteam/swe/cesga/Role=operator, /dteam/swe/cesga/Role=production, /vo.mosfet.es-ngi.eu/Role=NULL*

(-) Hide Information

This information could be incomplete because NOT all the sites are publishing the user information.

The list of VO members is taken from the VOMS Servers registered in the VO Identity Cards of the CIC Portal. If you are member of a VO and you are not associated to it in this web page you should check that the VOMS Server for that VO is properly registered in the CIC Portal and that you are associated to the VO with the certificate used to access to this page. If you are registered in the VO with this certificate and the VOMS Server for that VO is registered in the CIC Portal send us an email specifying your DN, the problematic VOs and the associated VOMS Server.

VO Group/Role:	cesga - ALL Groups and Roles
Order by:	Number of jobs — Total number of jobs run
Period:	Start year: 2008 — Start month: 7 — End year: 2009 — End month: 6

Refresh

VO cesga (ALL Groups and Roles) Group information.

July 2008 - June 2009.

The following table shows the Usage of the Top 10 Groups ordered by Total number of jobs.

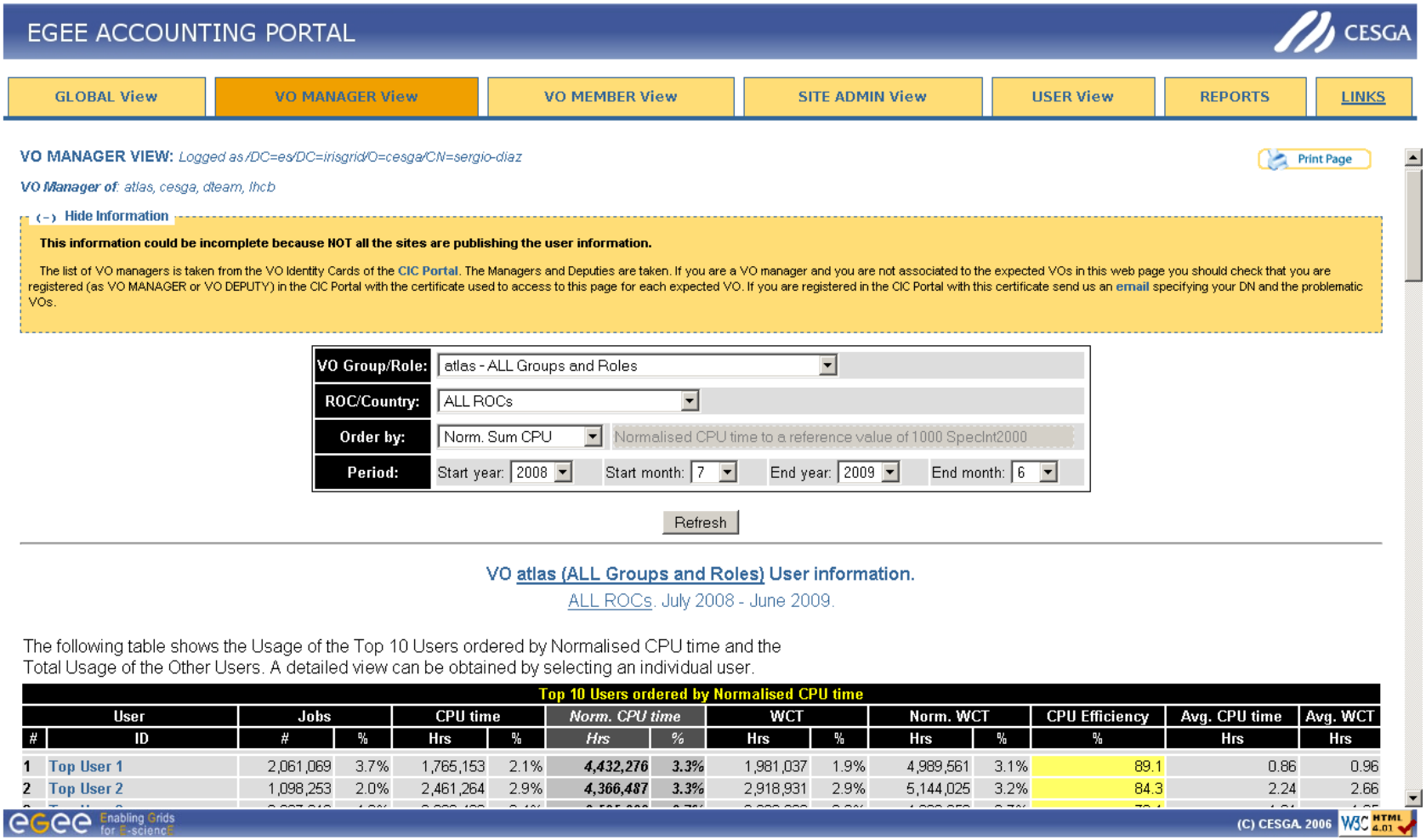
Top 10 Groups ordered by Total number of jobs

Group/Role		Jobs		CPU time		Norm. CPU time		WCT		Norm. WCT		CPU Efficiency	Avg. CPU time	Avg. WCT
#	ID	#	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	%	Hrs	Hrs
1	/cesga/Role=NULL	23,671	100.0%	14,298	100.0%	32,978	100.0%	18,724	100.0%	42,619	100.0%	76.4	0.60	0.79
2	/cesga/Role=VO-Admin	6	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%		0.00	0.00
3														
4														

Enabling Grids for E-sciencE (C) CESGA 2006 W3C HTML 4.01

Accounting Portal: Manager View

- **The VO manager view allows to see the Top 10 User ordered by #jobs, CPU,.. and displayed at the global level or at the ROC level.**



EGEE ACCOUNTING PORTAL — CESGA

GLOBAL View | VO MANAGER View | VO MEMBER View | SITE ADMIN View | USER View | REPORTS | LINKS

VO MANAGER VIEW: *Logged as /DC=es/DC=irisgrid/O=cesga/CN=sergio-diaz*

Print Page

***VO Manager of**: atlas, cesga, dteam, lhcb*

(-) Hide Information

This information could be incomplete because NOT all the sites are publishing the user information.

The list of VO managers is taken from the VO Identity Cards of the CIC Portal. The Managers and Deputies are taken. If you are a VO manager and you are not associated to the expected VOs in this web page you should check that you are registered (as VO MANAGER or VO DEPUTY) in the CIC Portal with the certificate used to access to this page for each expected VO. If you are registered in the CIC Portal with this certificate send us an email specifying your DN and the problematic VOs.

VO Group/Role:	atlas - ALL Groups and Roles
ROC/Country:	ALL ROCs
Order by:	Norm. Sum CPU — Normalised CPU time to a reference value of 1000 SpecInt2000
Period:	Start year: 2008 — Start month: 7 — End year: 2009 — End month: 6

Refresh

VO atlas (ALL Groups and Roles) User information.

ALL ROCs. July 2008 - June 2009.

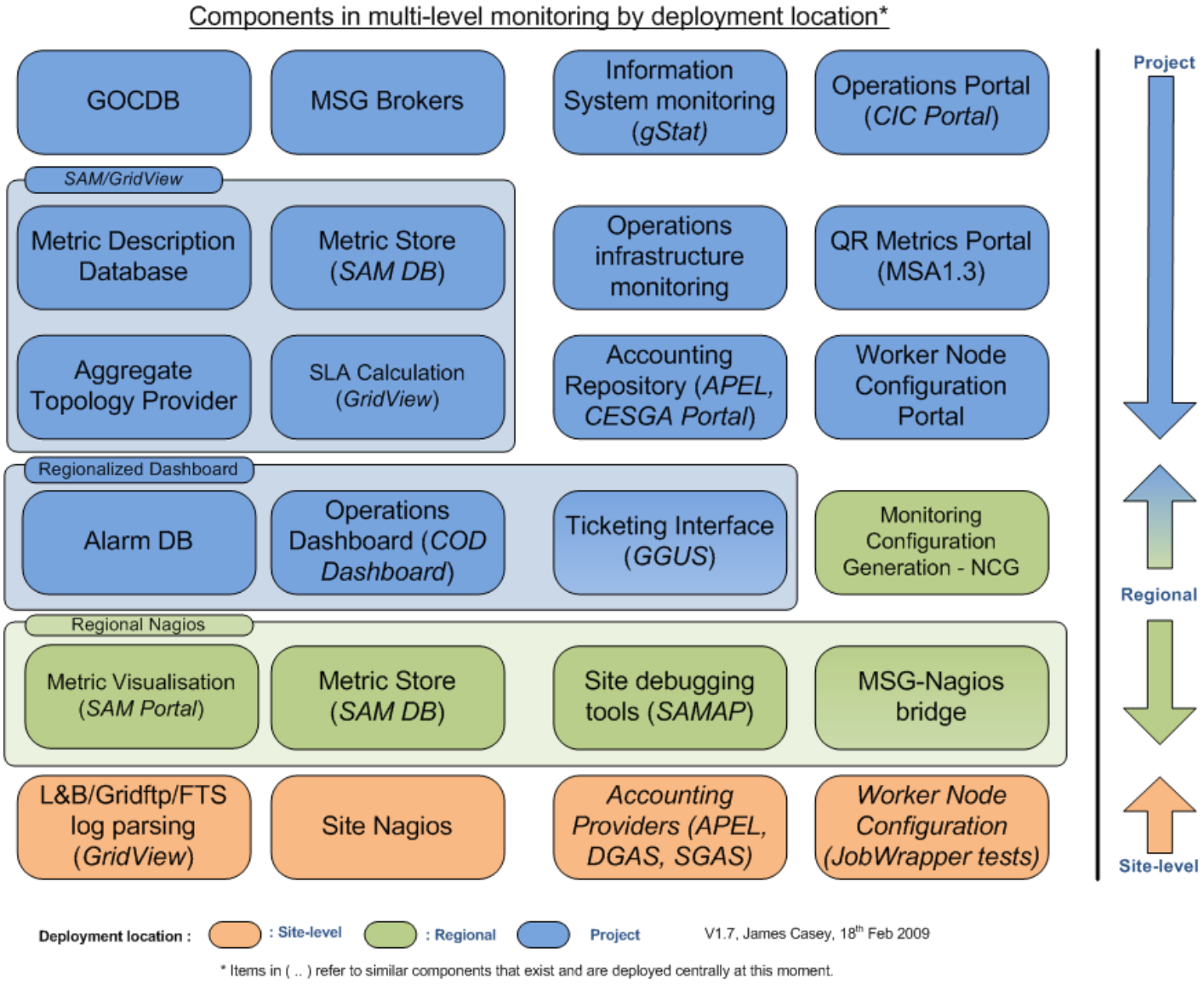
The following table shows the Usage of the Top 10 Users ordered by Normalised CPU time and the Total Usage of the Other Users. A detailed view can be obtained by selecting an individual user.

Top 10 Users ordered by Normalised CPU time

	User	Jobs		CPU time		Norm. CPU time		WCT		Norm. WCT		CPU Efficiency	Avg. CPU time	Avg. WCT
#	ID	#	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	%	Hrs	Hrs
1	Top User 1	2,061,069	3.7%	1,765,153	2.1%	**4,432,276**	**3.3%**	1,981,037	1.9%	4,989,561	3.1%	89.1	0.86	0.96
2	Top User 2	1,098,253	2.0%	2,461,264	2.9%	**4,366,487**	**3.3%**	2,918,931	2.9%	5,144,025	3.2%	84.3	2.24	2.66

Enabling Grids for E-sciencE — (C) CESGA 2006 — W3C HTML 4.01

Summary: Multi – level - monitoring



Acknowledgements & Questions

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