



# Grid Operations

LCG Grid Deployment Board

FNAL, 9th October 2003

John Gordon  
CCLRC RAL

- Recent Progress
- Future work

- Website
- Monitoring Activities
- Reporting
- Accounting

- Main structure is in place
- Pages on
  - participating institutions,
  - contact information
  - and monitoring fully operational
- Marker pages for SLAs, News, Security and Meetings
- Uses GridSite for updating

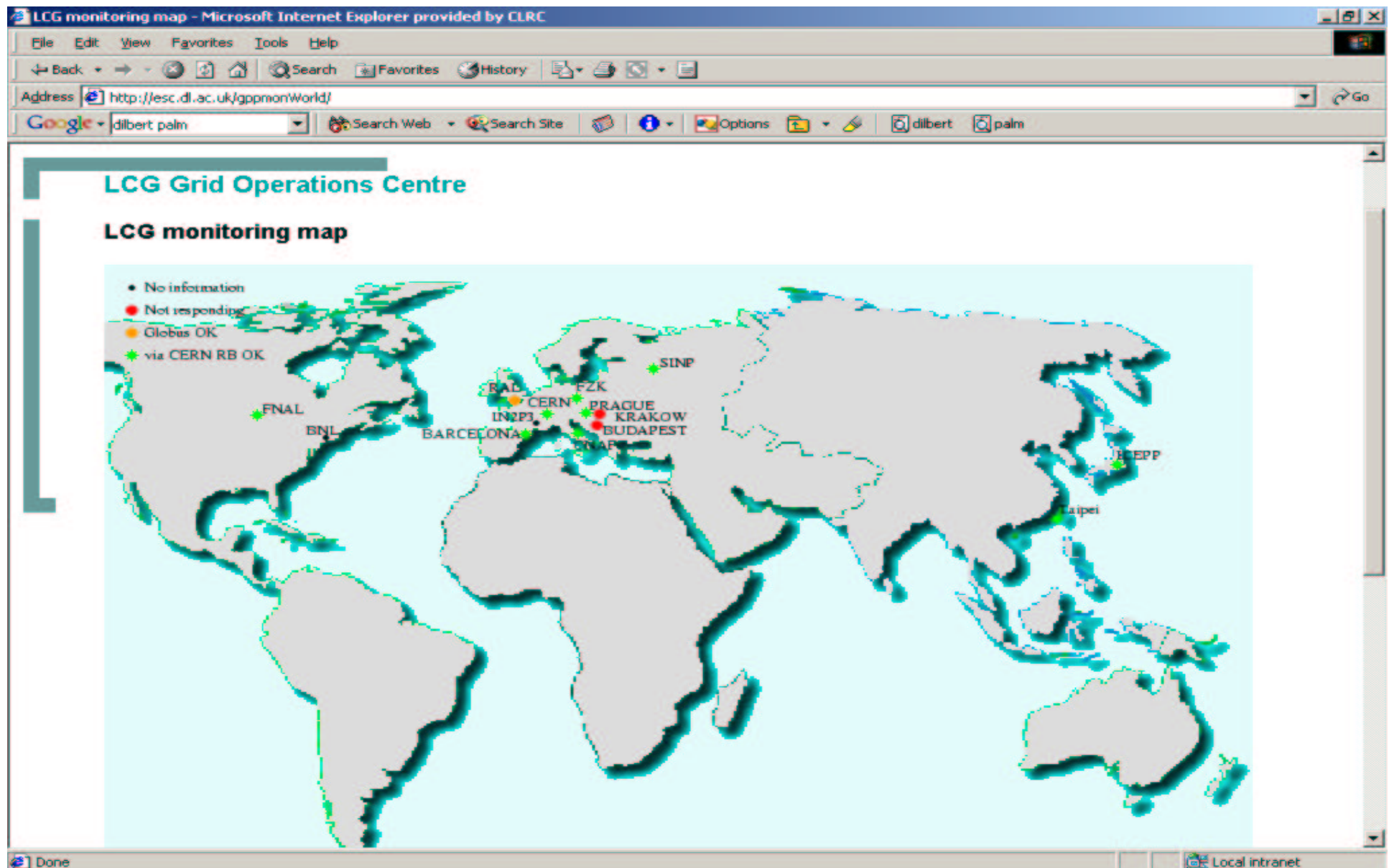


- Installed a variety of monitoring tools to gain experience of them on a Production Grid
  - Gppmon
  - MapCenter
  - GridICE
  - CE\_mon
  - RB\_mon
  - **Mona Lisa**



- Submits jobs every hour via globus and CERN RB
- Coloured dots on map on GOC web
- Static list of sites,
  - but easy to update; currently fully up to date
- Most useful at this stage for quick check of status of CE and RB
- Needs history;
  - available in later version but not yet implemented
- How to check all RBs?
  - Segmented dots? One map per RB?
  - Fewer sites/RB?





## Two-week monitoring history

Site	7/10	6/10	5/10	4/10	3/10	2/10	1/10	30/9	29/9	28/9	27/9	26/9	25/9
<a href="#">Birmingham</a>	Orange	Orange	Orange	Orange	Orange	Orange	Orange						
<a href="#">Bristol</a>													
Brunel	Orange	Orange	Orange	Orange	Orange	Orange	Orange						
<a href="#">Cambridge</a>	Orange	Orange	Orange	Orange	Orange	Orange	Orange						
Durham													
Edinburgh													
<a href="#">Glasgow</a>	Orange	Orange	Orange	Orange	Orange	Orange	Orange						
IC	Orange	Orange	Orange	Orange	Orange	Orange	Orange						
Lancaster	Orange	Orange	Orange	Orange	Orange	Orange	Orange						
Liverpool													
<a href="#">Manchester</a>													
Oxford													
<a href="#">QMUL</a>	Orange												
<a href="#">RAL</a>	Green	Green	Orange	Green	Green	Green	Green						
RALPP	Orange	Green	Orange	Green	Green	Green	Orange						
RHUL													
Sheffield													
Sussex													
Swansea													



- Checks IP/UDP ports, no sensors.
  - Set up with help from Franck Bonnassieux
- Static version running , breaks occasionally
- Difficult to update
  - tricky format, needs root
- dynamic version added to website,
  - but shows only services in MDS
  - These are MDSs, BDIIs, CEs and SEs.



# LCG Static MapCenter

GRID Status Map - Microsoft Internet Explorer provided by CLRC

File Edit View Favorites Tools Help

Address <http://mapcentre.rl.ac.uk/>

Google dilbert palm Search Web Search Site Options dilbert palm

10/08 17:50 GMT

## GRID Status Map

Powered by [Map Center 1.3.0](#)  
Local Admin: [Trevor Daniels](#)

### World (alarms)

**Views**

- Geographical List
- Logical Views
- LCG-1
- Countries
- Organizations
- Graphical Maps

**Graphs**

- Europe
- World

**Lists**

- Full View Objects
- History Alerts
- Services URLs

Tools Search

**Options**

GOC Monitoring



# LCG MapCenter

LCG Status Map - Microsoft Internet Explorer provided by CLRC

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Print Copy Paste

Address http://mapcentre.rl.ac.uk/mapcenter-dyn/ Go

Google dilbert palm Search Web Search Site Options dilbert palm

10/08 17:43 GMT

**LCG Status Map** Powered by [Map Center 2.0.1](#)  
Local Admin : [Dr Trevor Daniels](#)

**World (alarms)**

**Views**

- Domains
- Organizations
- Sites
- Nodes
- RB

**Graphs**

- World
- Europe

**Lists**

Full View	Objects
History	Alerts
Services	URLs

Tools Search

**Data GRID**

**urec** **INRIA**

10/08 17:43 GMT (refresh=10min)

Local intranet

LCG Status Map - Microsoft Internet Explorer provided by CLRC

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print Refresh

Address <http://mapcentre.rl.ac.uk/mapcenter-dyn/> Go

Google dilbert palm Search Web Search Site Options dilbert palm

10/08 17:43 GMT

## LCG Status Map

Powered by [Map Center 2.0.1](#)  
Local Admin : [Dr Trevor Daniels](#)

### Europe (alarms)

**Views**

- Domains
- Organizations
- Sites
- Nodes
- RB


**Graphs**

- World
- Europe

**Lists**





- Full View
- Objects
- History
- Alerts
- Services
- URLs

Tools Search



10/08 17:43 GMT (refresh=10min)

[http://mapcentre.rl.ac.uk/mapcenter-dyn/graph\\_Europe.html](http://mapcentre.rl.ac.uk/mapcenter-dyn/graph_Europe.html) Local intranet

- Running at CERN
- history of jobs run useful
- accurately shows gppmon jobs running every hour in dteam
- Shows several hundred Alice, Atlas, CMS and LHCb jobs submitted at end Sep in two batches
- pattern in all 4 is the same, so presumably a test
- mainly shown waiting
- no obvious real use of LCG1 observed yet







# GridICE

INFN - GridICE - Grid Monitoring Service - Microsoft Internet Explorer provided by CLRC


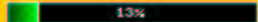










File Edit View Favorites Tools Help




Address http://tbed0116.cern.ch/gridice/site/site.php

Google dilbert palm Search Web Search Site Options dilbert palm

Site View VO view about

Site	Computing power	JOB Load	StorageArea Load	SA Tot (GB)	SA Avl (GB)	Phys CPUs		JOBS	
						Tot	Load	Run	Wait
cern.ch	n/a	n/a	 10%	87	78	n/a	n/a	0	0
cr.cnaf.infn.it	n/a	n/a	 13%	77	66	n/a	n/a	0	0
cyf-kr.edu.pl	n/a	n/a	 5%	177	168	n/a	n/a	0	0
farm.particle.cz	n/a	n/a	 11%	46	41	n/a	n/a	0	0
fnal.gov	n/a	n/a	 35%	10	6	n/a	n/a	0	0
fzk.de	n/a	n/a	 2%	22554	22008	n/a	n/a	0	0
grid.sinica.edu.tw	n/a	n/a	 3%	312	301	n/a	n/a	0	0
gridpp.rl.ac.uk	n/a	n/a	 9%	2416	2414	n/a	n/a	0	4
icepp.s.u-tokyo.ac.jp	n/a	n/a	 5%	62	59	n/a	n/a	0	0
ifae.es	n/a	n/a	 7%	1913	1778	n/a	n/a	0	0
kfki.hu	n/a	n/a	 14%	49	44	n/a	n/a	1	13
sinp.msu.ru	n/a	n/a	 5%	172	163	n/a	n/a	0	0

php Nagios    © 2003 by INFN

Internet

INFN - GridICE - Grid Monitoring Service - Microsoft Internet Explorer provided by CLRC

Address: <http://tbed0116.cern.ch/gridice/vo/vo.php>

Google: dilbert palm

queue	free cpus	busy cpus	total cpus	run jobs	wait jobs	total jobs	max jobs
✓ jobmanager-pbs-long	4	0	4	0	0	0	99999
✓ jobmanager-pbs-short	4	0	4	0	0	0	99999
✓ jobmanager-pbs-infinite	4	0	4	0	0	0	99999

cluster: [adc0015.cern.ch](#) total phys cpus: n/a load5min: n/a

queue	free cpus	busy cpus	total cpus	run jobs	wait jobs	total jobs	max jobs
✓ jobmanager-lcgpbs-long	42	0	42	0	0	0	99999
✓ jobmanager-lcgpbs-infinite	42	0	42	0	0	0	99999
✓ jobmanager-lcgpbs-short	42	0	42	0	0	0	99999

storage element: [adc0021.cern.ch](#)

area	avail space (Mbytes)	used space (Mbytes)
✓ dteam:/dteam	16013	1752

site: [cr.cnaf.infn.it](#)

cluster: [wn-02-29-a.cr.cnaf.infn.it](#) total phys cpus: n/a load5min: n/a

queue	free cpus	busy cpus	total cpus	run jobs	wait jobs	total jobs	max jobs
✓ jobmanager-lcgpbs-infinite	4	0	4	0	0	0	99999
✓ jobmanager-lcgpbs-long	4	0	4	0	0	0	99999
✓ jobmanager-lcgpbs-short	4	0	4	0	0	0	99999

storage element: [wn-02-30-a.cr.cnaf.infn.it](#)

area	avail space (Mbytes)	used space (Mbytes)
✓ dteam:/dteam	13594	2104

site: [farm.particle.cz](#)

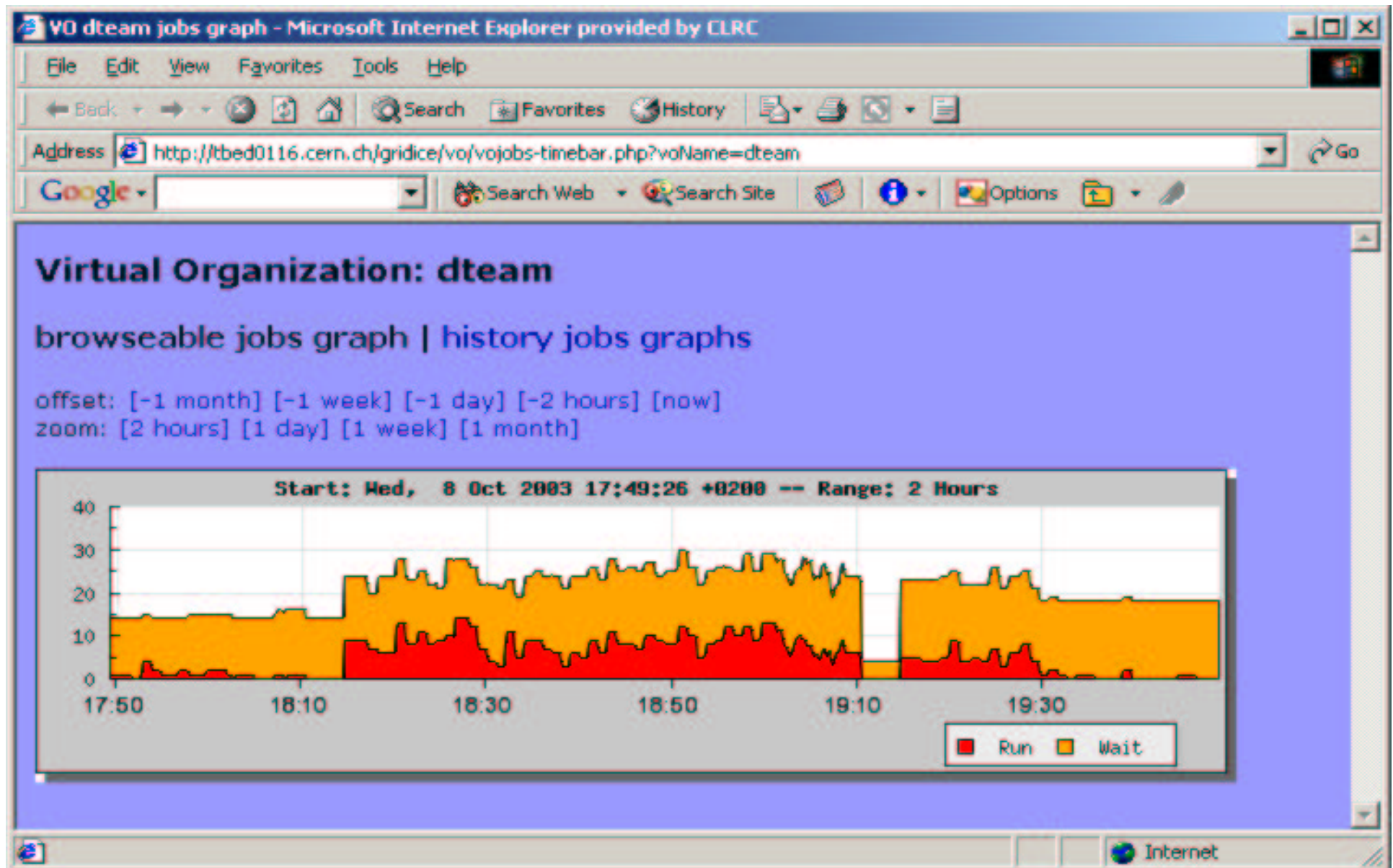
cluster: [goliass25.farm.particle.cz](#) total phys cpus: n/a load5min: n/a

queue	free cpus	busy cpus	total cpus	run jobs	wait jobs	total jobs	max jobs
✓ jobmanager-lcgpbs-long	6	0	6	0	0	0	99999
✓ jobmanager-lcgpbs-infinite	6	0	6	0	0	0	99999
✓ jobmanager-lcgpbs-short	6	0	6	0	0	0	99999

storage element: [goliass26.farm.particle.cz](#)

area	avail space (Mbytes)	used space (Mbytes)

Internet





- Attempts authentication at every CE every 10 mins (globusrun -authenticate-only)
- permits reliability and availability to be calculated from user perspective
- intended to investigate suitability as SLA test
- now believed reliable enough to begin to extract availability and reliability figures
- needs web output developing



- Attempts job-list-match every 10 mins to every RB
- permits reliability and availability to be calculated from user perspective
- intended to investigate suitability as SLA test
- not yet quite reliable enough to begin to extract availability and reliability figures
- needs web output developing



- No single tool to do everything
- Probably need use of several tools for different circumstances
- Need to evaluate Mona Lisa
- Would like to add EDG WP7 tools
  - To non EDG sites
  - Requires R-GMA
  - <http://ccwp7.in2p3.fr/wp7archive/>

EDG Network Metrics - Microsoft Internet Explorer provided by CLRC

Address: http://ccwp7.in2p3.fr/wp7/archive/

Google: datagrid wp7

**Network Metrics**  
Metrics matrices per site  
Raw data (graph+text)

**GridFTP Traffic**  
Traffic matrices per site  
Traffic matrices per node  
Total Traffic Graph  
Raw data (graph+text)

**Advanced**  
GridFTP Performances  
GridFTP vs TCP  
TCP vs RTT/Loss

**Debugging**  
Grid Elements mappings  
Last values raw  
Last values matrices  
Monitoring matrices

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**Network Metrics Matrices**

**Metric**  
TCP Throughput  
ICMP RTT  
ICMP Packet Loss  
UDP Throughput  
UDP PacketLoss  
One Way IPDV


**Dates**: last 30 days

**Start**: 2003/09/09 00:07:16 GMT

**End**:

**Function**: Average

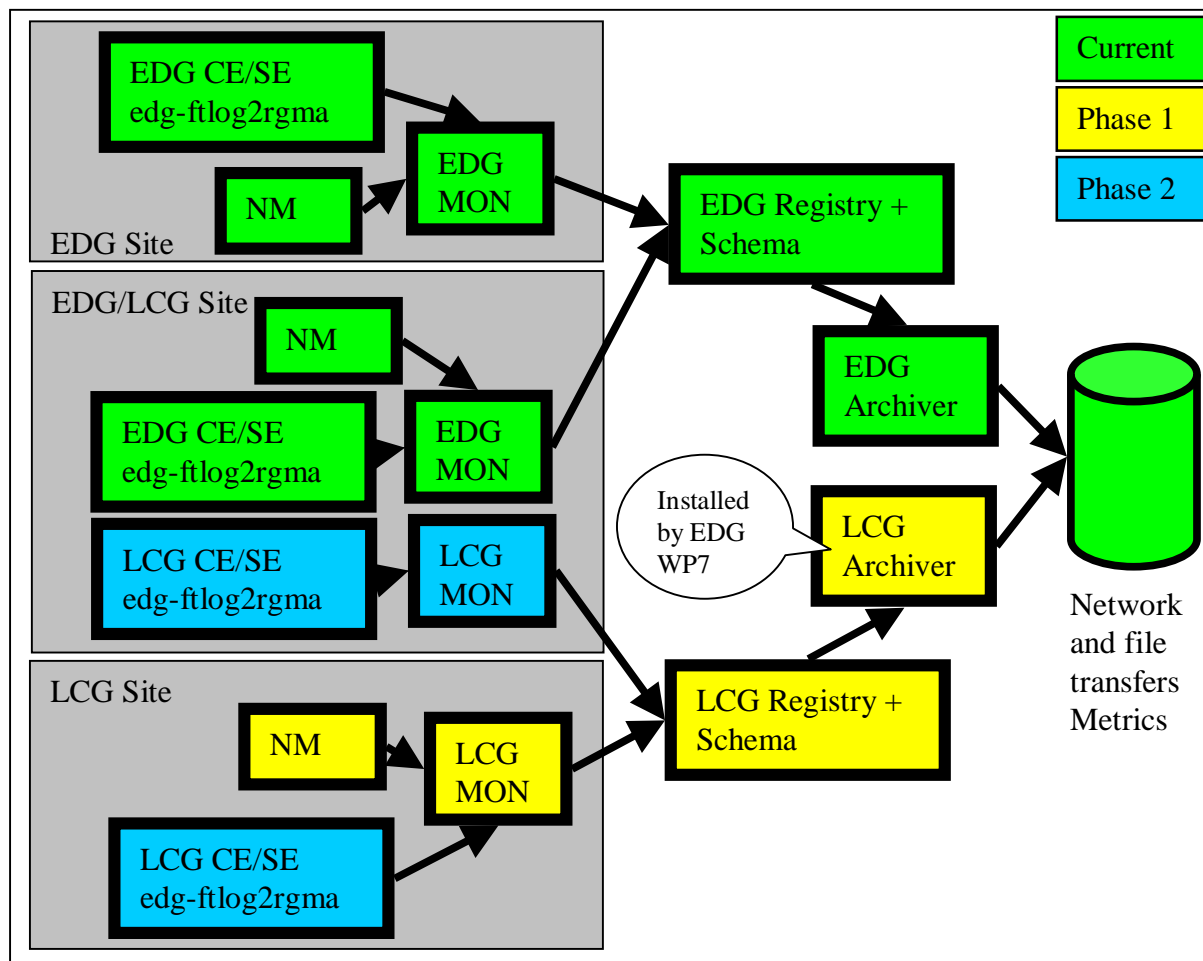
**Matrix**



	CH CERN	FR IN2P3-LYON	IT CNAF	NL NIKHEF	UK RAL-GRIDPP	Sum	Avg
CH CERN		78.94	80.87	75.78	73.91	309.5	77.37
DE FZK	71.36					71.36	71.36
FR IN2P3-LYON	82.82		63.05	80.71	72.36	305.94	76.48
IT CNAF	80.34	47.9		78.34	46.42	253	63.25
IT PADOVA			83.82			83.69	83.69
NL NIKHEF	55.02	77.88	67.71		80.09	280.7	70.17
NL SARA	68.95	69.75		90.16		228.86	76.28
UK RAL-GRIDPP	71.49	74.7	57.14	64.38		287.7	71.92
UK UCL	28.39				67.74	96.13	48.06
Sum	465.37	349.17	352.46	409.37	340.52	1916.89	70.95
Avg	66.48	69.83	70.49	81.87	68.1	71.35	

28.39 37.21 46.03 54.86 63.68 72.51 81.33 90.16

Table: NetworkTCPThroughput  
Field: value  
Unit: Mbit/s  
Function: AVG



- RAL using the tools to monitor LCG1
- summaries of gppmon, CE\_Mon and RB\_Mon sent to LCG-Rollout list twice a week
- so far have helped to diagnose several problems
  - need to set GLOBUS\_TCP\_PORT\_RANGE env variable for globus submits
  - communication problems to Hungary
  - CE queue and site name inconsistencies
  - requirements for firewall to permit access to certain ports



- Batch systems already accumulating batch records and/or process accounts in their local formats
- define a schema for interchange of accounting data
- develop two filters to convert from local accounts to schema (eg PBS and LSF)
- Pull data to a central repository (or two)
- Store in an accounting DB
- Display front-ends already exist
  - Release 1 – information for VO
  - Release 2 – information per user



Planning and evaluation phase

- Many aspects to an SLA
  - Schedule
  - Availability
  - Reliability
  - Performance
  - Throughput
- tests already running for CE and RB
- need script to extract reliability and availability
  - next are MDS servers
- Need discussion on performance and throughput indicators
- Work on agreed definition of SLA template





- drafting for GDB (with Security Group) complete
- some GOC-related procedures remain to be drafted:
  - Procedures for Resource Administrators
  - Procedures for Site Self-Audit
  - Rules for Service Level Agreement



# Local Ops and Admin Group

- to be set up (in November?) to discuss GOC operational procedures
- Draft ToR with GOC Steering Group



- Met with the GUS from Karlsruhe
- agreed to use single Remedy at Karlsruhe
  - For GUS and GOC
  - Interchange schema later

- Plan called for second GOC soon
  - At level of a few staff
- Are we ready for this?
  - cf EGEE with multiple ROCs
  - More staff and more duties
- Agreed there should be combined GUS/GOC if possible
  - What is procedure to decide who?



- Defined but has not yet met
  - Trevor Daniels, Cristina Vistoli, Markus Schulz
  - Rolf Rumler, Claude Wang, Eric Yen
  - Ian Fisk, Bruce Gibbard, John Gordon
- First phone conference 16<sup>th</sup> October
- Address Priorities
  - Accounting
  - Gap Analysis of Monitoring
  - Wider Operations Group?
    - Forum for sysadmins?
  - Performance indicators for SLA

- Web
- Monitoring

- Integrate GOC with LCG web
- Educate people how to update their information
  - Demo of GridSite

- Planning and evaluation phase
- Probably two months work
  - Manual prototypes before then
  - Release 1 – information for VO
  - Release 2 – information per user



- Wider use of monitoring
- Leading to gap analysis
  - And possible development
- Extend network monitoring from EDG WP7

- A lot of work has gone into a variety of GOC tools and infrastructure
- Now need to
  - engage the wider community
  - commission required developments