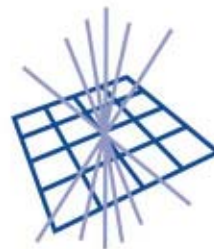


GridPP: Executive Summary

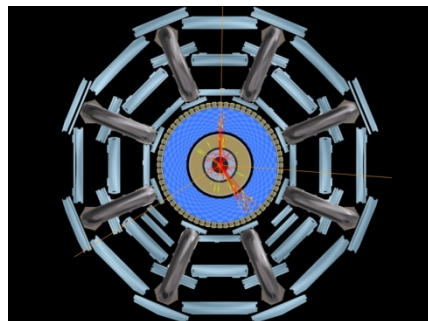
Tony Doyle



Science & Technology
Facilities Council

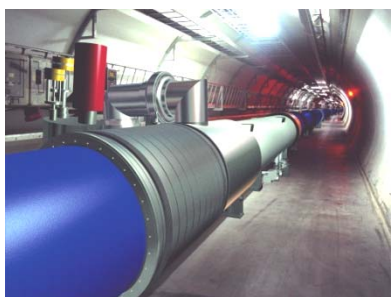


GridPP
UK Computing for Particle Physics



The
Icemen
Cometh

Exec² Summary
Grid Status:
Geographical View: GridMap
High-level View: ProjectMap
Topical View: CASTOR
Performance Monitoring
Disaster Planning
Transition Point





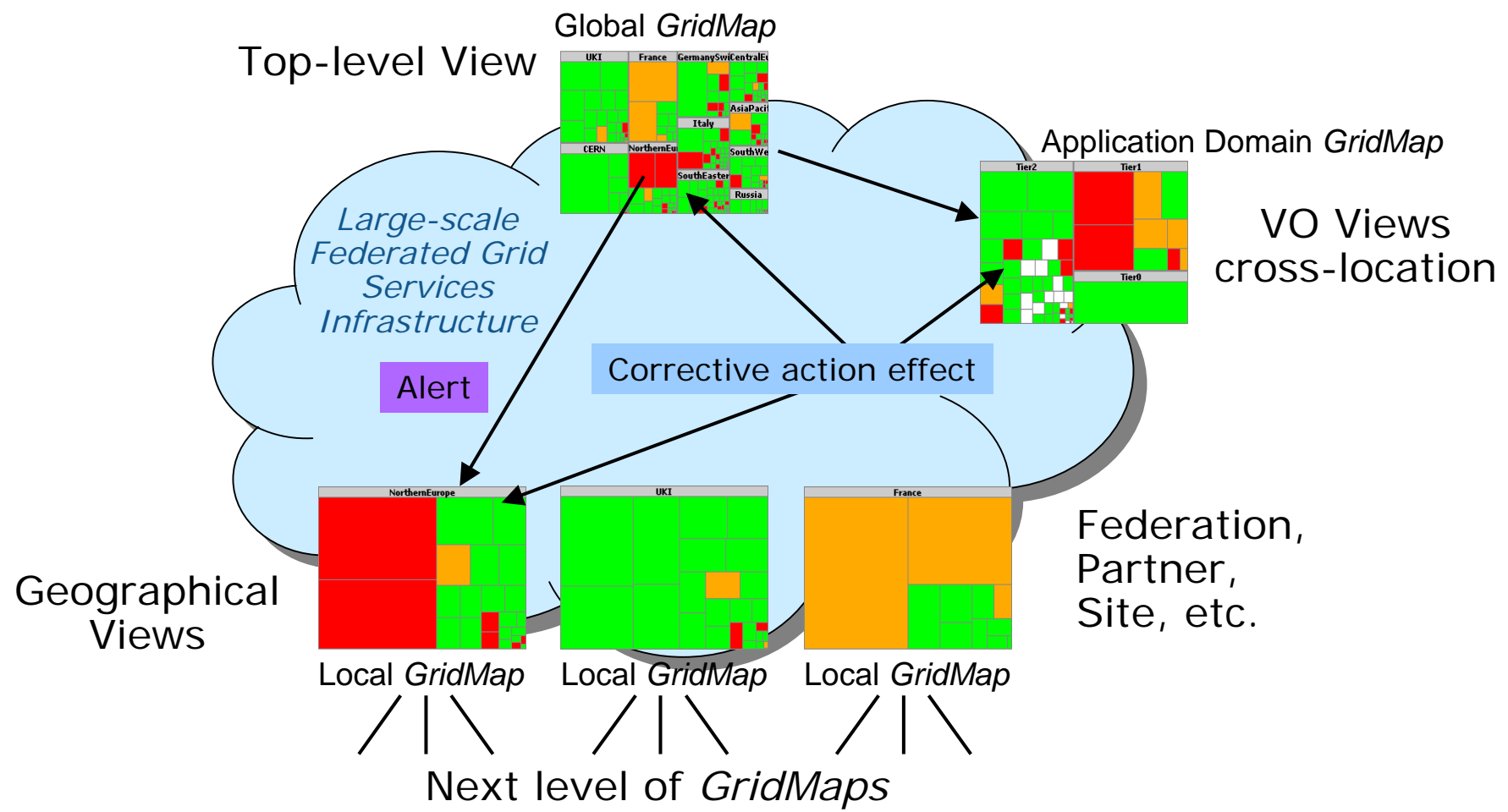
- 2007 is the third full year for the Production Grid
- More than 10,000 kSI2k and 1 Petabyte of disk storage
- The UK is the largest CPU provider on the EGEE Grid
- Total CPU used of 25 GSI2k-hours in the last year to Sept.
- The GridPP2 project has met 86% of its targets with 93% of the metrics within specification (up to 07Q2)
- The GridPP2 project has been extended by 7 months to April 2008
 - The LCG (full) Grid Service is underway
 - The aim is to continue to improve reliability and performance
- The GridPP3 proposal has been approved for 3 years through to March 2011 [total cost of £29.5m]
 - The aim is to provide a performant service to the experiments
- We anticipate a challenging period especially for the support of experiment applications running on the Grid



- To create a UK Particle Physics Grid and the computing technologies required for the Large Hadron Collider (LHC) at CERN
- To place the UK in a leadership position in the international development of an EU Grid infrastructure



- View can be *geographical, high-level or topical*



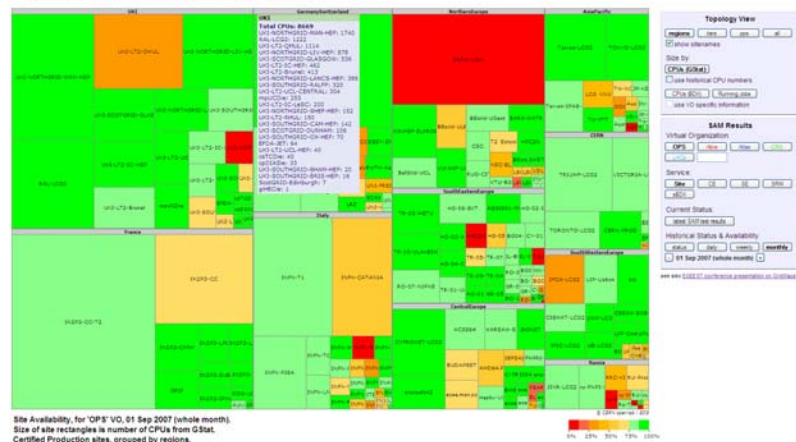


The latest availability figures are
(approx. in case of Tier-1):

	<u>Tier-1</u>	<u>Tier-2</u>	<u>Total</u>
CPU [kSI2k]	1500	8588	10,088
Disk [TB]	750	743	1,493
Tape [TB]	>800		>800

- GridPP2 capacity targets met
- Combined effort from *all* Institutions

GridMap Prototype – Visualizing the “State” of the Grid



- Aim: by 2008 (full year's data taking)
- CPU ~100MSI2k (100,000 CPUs)
 - Storage ~80PB
 - Involving >100 institutes worldwide
 - Build on complex **middleware** being developed in advanced Grid technology projects, both in Europe (Glite) and in the USA (VDT)

Status in Oct 2007:
245 sites, 40,518 CPUs,
24,135 TB storage

1. Prototype went live in September 2003 in 12 countries
2. Extensively **tested** by the LHC experiments in September 2004
3. February 2006 25,547 CPUs, 4398 TB storage



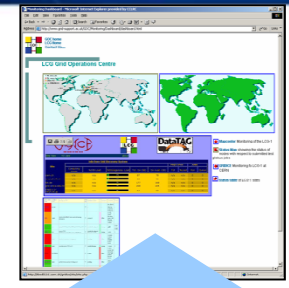
CPU

LHC start-up

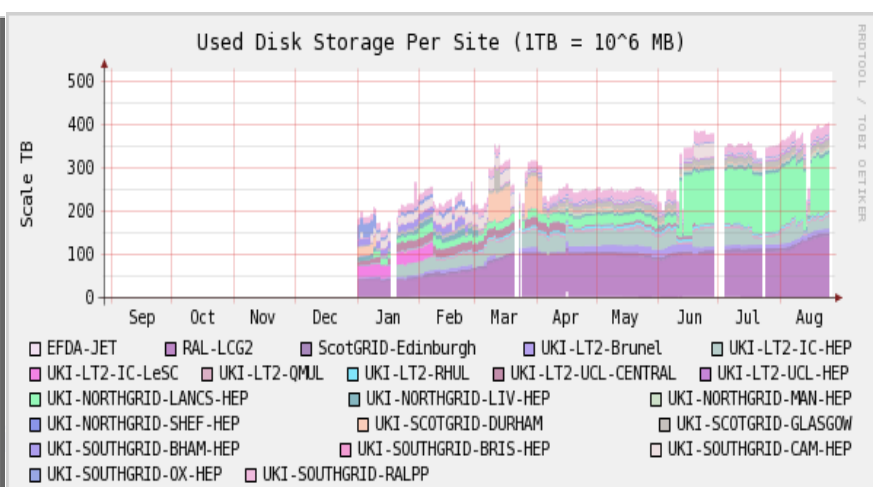
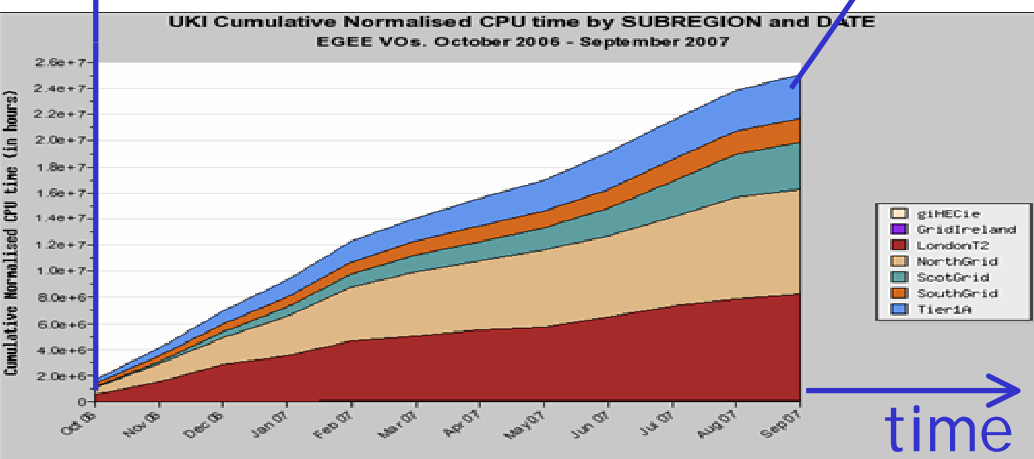
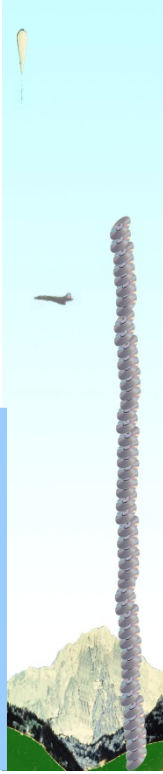
CPU resources at ~required levels (just in time delivery)



Grid Operations Centre



Grid-accessible disk accounting being improved



Production Grid project nearing successful completion...

Production Grid Milestones																	Production Grid Metrics																
⇕																																	⇕
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.100	0.101	0.102	0.103	0.104	0.105	0.106	0.107	0.108	0.109	0.110	0.111	0.112	0.113	0.114	0.115	0.116
0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.117	0.118	0.119	0.120	0.121	0.122	0.123	0.124	0.125	0.126	0.127	0.128	0.129	0.130	0.131	0.132	0.133
0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.134	0.135	0.136	0.137	0.138	0.139	0.140	0.141	0.142	0.143	0.144	0.145	0.146	0.147			
0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68																	

⇕	1	⇕	2	⇕	3	⇕	4	⇕	5	⇕	6
	LCG		M/S/N		LHC Apps		Non-LHC Apps		Management		External
	Design		Metadata		ATLAS		BaBar		Project Planning		Dissemination
	⇕ 1.1 ⇕		⇕ 2.1 ⇕		⇕ 3.1 ⇕		⇕ 4.1 ⇕		⇕ 5.1 ⇕		⇕ 6.1 ⇕
	1.1.1 1.1.2 1.1.3 1.1.4		2.1.1 2.1.2 2.1.3 2.1.4 2.1.5		3.1.1 3.1.2 3.1.3 3.1.4 3.1.5		4.1.1 4.1.2 4.1.3 4.1.4 4.1.5		5.1.1 5.1.2 5.1.3 5.1.4 5.1.5		6.1.1 6.1.2 6.1.3 6.1.4 6.1.5
	1.1.5		2.1.6 2.1.7 2.1.8 2.1.9 2.1.10		3.1.6 3.1.7 3.1.8 3.1.9 3.1.10		4.1.6 4.1.7 4.1.8 4.1.9 4.1.10		5.1.6 5.1.7 5.1.8 5.1.9 5.1.10		6.1.6 6.1.7 6.1.8 6.1.9
			2.1.11 2.1.12		3.1.11 3.1.12 3.1.13		4.1.11 4.1.12		5.1.11 5.1.12		
	Service Challenges		Storage		GANGA		SamGrid		Project Execution		Interoperability
	⇕ 1.2 ⇕		⇕ 2.2 ⇕		⇕ 3.2 ⇕		⇕ 4.2 ⇕		⇕ 5.2 ⇕		⇕ 6.2 ⇕
	1.2.1 1.2.2 1.2.3 1.2.4		2.2.1 2.2.2 2.2.3 2.2.4 2.2.5		3.2.1 3.2.2 3.2.3 3.2.4 3.2.5		4.2.1 4.2.2 4.2.3 4.2.4 4.2.5		5.2.1 5.2.2 5.2.3 5.2.4 5.2.5		6.2.1 6.2.2 6.2.3 6.2.4 6.2.5
	1.2.5		2.2.6 2.2.7 2.2.8 2.2.9 2.2.10		3.2.6 3.2.7		4.2.6 4.2.7 4.2.8 4.2.9 4.2.10		5.2.6 5.2.7 5.2.8 5.2.9 5.2.10		6.2.6 6.2.7 6.2.8 6.2.9 6.2.10
			2.2.11 2.2.12 2.2.13 2.2.14 2.2.15				4.2.11 4.2.12 4.2.13 4.2.14 4.2.15		5.2.11 5.2.12 5.2.13 5.2.14 5.2.15		6.2.11 6.2.12 6.2.13 6.2.14
	Development		Workload		LHCb		Portal				Engagement
	⇕ 1.3 ⇕		⇕ 2.3 ⇕		⇕ 3.3 ⇕		⇕ 4.3 ⇕				⇕ 6.3 ⇕
	1.3.1 1.3.2 1.3.3		2.3.1 2.3.2 2.3.3 2.3.4 2.3.5		3.3.1 3.3.2 3.3.3 3.3.4 3.3.5		4.3.1 4.3.2 4.3.3 4.3.4 4.3.5				6.3.1 6.3.2 6.3.3 6.3.4 6.3.5
			2.3.6 2.3.7 2.3.8 2.3.9 2.3.10		3.3.6 3.3.7 3.3.8 3.3.9 3.3.10		4.3.6 4.3.7 4.3.8 4.3.9 4.3.10				
			2.3.11		3.3.11 3.3.12 3.3.13		4.3.11 4.3.12 4.3.13				
			Security		CMS		UKQCD				Knowledge Transfer
			⇕ 2.4 ⇕		⇕ 3.4 ⇕		⇕ 4.4 ⇕				⇕ 6.4 ⇕
			2.4.1 2.4.2 2.4.3 2.4.4 2.4.5		3.4.1 3.4.2 3.4.3 3.4.4 3.4.5		4.4.1 4.4.2 4.4.3 4.4.4 4.4.5				6.4.1 6.4.2 6.4.3 6.4.4
			2.4.6 2.4.7 2.4.8 2.4.9 2.4.10		3.4.6 3.4.7 3.4.8 3.4.9 3.4.10		4.4.6 4.4.7 4.4.8 4.4.9 4.4.10				
			2.4.11 2.4.12 2.4.13 2.4.14 2.4.15		3.4.11 3.4.12 3.4.13 3.4.14 3.4.15						
			InfoMon		PhenoGrid						
			⇕ 2.5 ⇕		⇕ 3.5 ⇕						
			2.5.1 2.5.2 2.5.3 2.5.4 2.5.5		3.5.1 3.5.2 3.5.3 3.5.4 3.5.5						
			2.5.6 2.5.7 2.5.8 2.5.9 2.5.10		3.5.6 3.5.7 3.5.8 3.5.9						
			2.5.11 2.5.12 2.5.13 2.5.14								
			Network		LHC Deployment						
			⇕ 2.6 ⇕		⇕ 3.6 ⇕						
			2.6.1 2.6.2 2.6.3 2.6.4 2.6.5		3.6.1 3.6.2 3.6.3 3.6.4 3.6.5						
			2.6.6 2.6.7 2.6.8 2.6.9 2.6.10		3.6.6 3.6.7 3.6.8 3.6.9 3.6.10						
			2.6.11 2.6.12 2.6.13								

⇕ Navigate down
⇕ External link
⇕ Other Link

Status Date - 30/Jun/07 + next 90 Days

- Monitor OK 1.1.1
- Monitor not OK 1.1.1
- Milestone complete 1.1.1
- Milestone overdue 1.1.1
- Milestone due soon 1.1.1
- Milestone not due soon 1.1.1
- Item not Active 1.1.1

Update
Clear

3. Topical Status

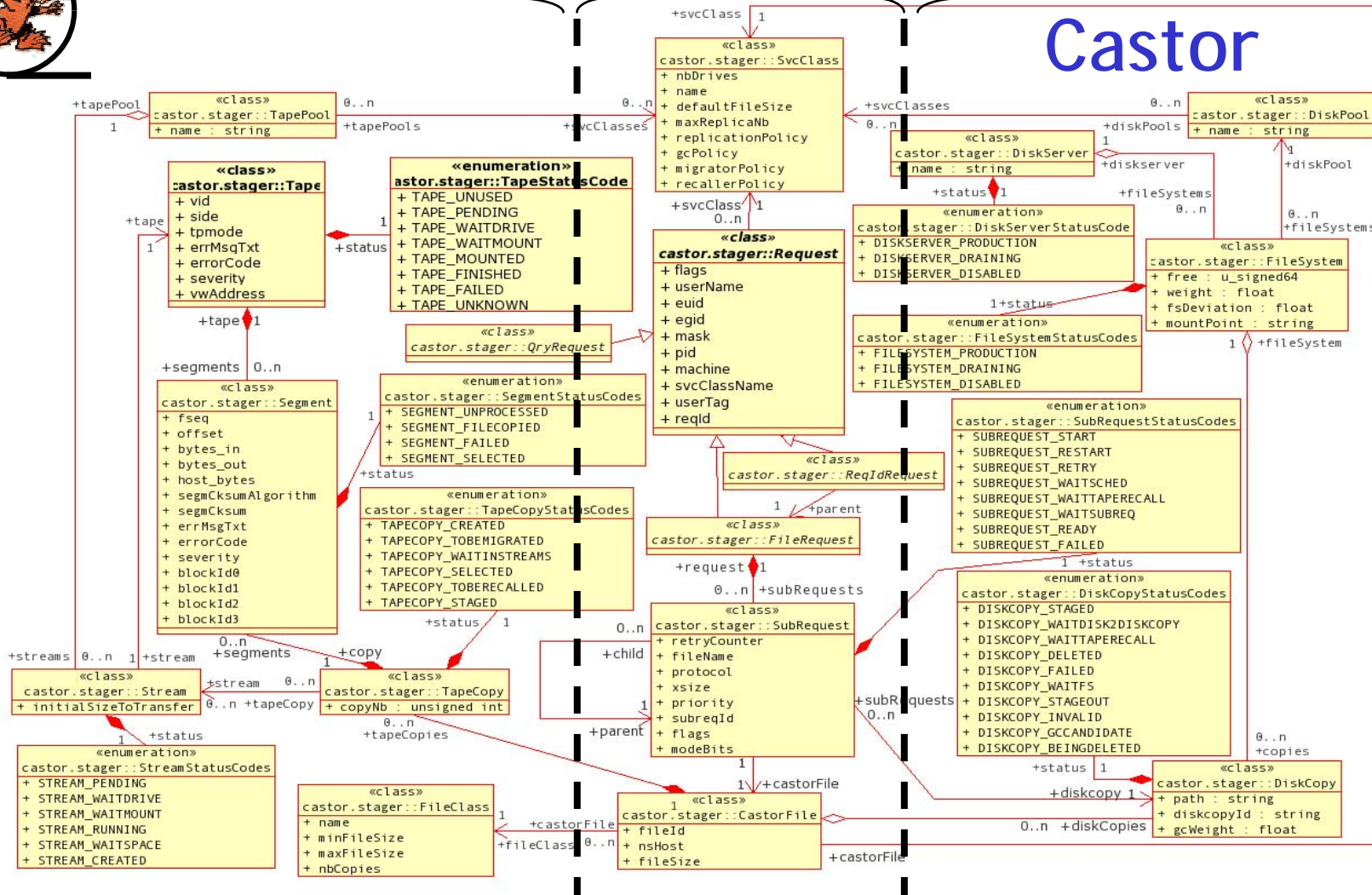


Tape oriented

Request oriented

Disk oriented

Castor





Experiments

- migration to Castor is an important milestone
- weekly technical meetings set up
- deployment of separate instances of Castor 2.1.3 for ATLAS, CMS and LHCb
- The current progress, next steps and concerns of the experiments in this area are provided in the User Board report.

Tier-1

- http://www.gridpp.ac.uk/wiki/RAL_Tier1_CASTOR_Experiments_Technical_Issues
- CASTOR 2.1.3 has recently proven to be robust under test loads and early service challenge trials
- CASTOR 2.1.4 ready for deployment ("disk1" storage classes)
- Tier-1 review planned for November



Bridging the Experiment-Grid Gap..

UK Grid Status at 10 Oct 2007 17:51:56

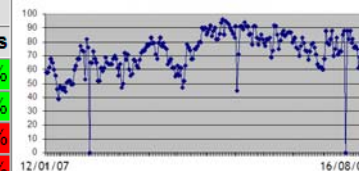
[RB Tests](#) [SAM Tests](#) [Atlas Tests](#)

RB Summary: RAL1 : **Good** RAL2 : **Good** RAL3 : **Good** Scot : **Good** Lond : **Bad**

Institute	SAM Tests					ATLAS Tests						
	CE	SE	SRM	24 Hrs	Week	CE	Release	Replica	HW	NP	UA	24 Hrs
Brunel	P	P	P	91%	98%	40 brunel.ac.uk	13.0.30	DPM	S	S	S	94%
						44 brunel.ac.uk	13.0.30	DPM	S	S	S	98%
Imperial HEP	W	P	P	100%	98%	hep.ph.ic.ac.uk	13.0.30	dCache	S	F	S	62%
Imperial LeSC	W			70%	93%	lesc.doc.ic.ac.uk	13.0.30	dCache	A	A	A	47%
QMUL	W	P	P	57%	70%	qmul.ac.uk	13.0.30	DPM	S	S	S	73%
RHUL	W	P	P	30%	62%	rhul.ac.uk	12.0.7	DPM	F	F	F	16%
UCL CCC	W	P	P	91%	56%	ccc.ucl.ac.uk	13.0.30	DPM	S	S	S	92%
UCL HEP	M	F	F	0%	0%	hep.ucl.ac.uk	13.0.20	DPM	A	A	A	0%
Lancaster	P	P	P	96%	96%	lancs.ac.uk	13.0.30	dCache	S	S	S	92%
Liverpool	W	P	P	96%	90%	liv.ac.uk	13.0.20	dCache	S	F	S	90%
Manchester	F	F	F	0%	0%	ce01.tier2.hep.manchester.ac.uk	13.0.30	dCache	S	S	S	92%
						ce02.tier2.hep.manchester.ac.uk	13.0.30	dCache	S	S	F	66%
Sheffield	P	P	P	52%	90%	shef.ac.uk	13.0.30	DPM	A	A	S	55%
Durham	W	P	P	91%	96%	dur.scotgrid.ac.uk	13.0.20	DPM	S	S	S	94%
Edinburgh	W	P	P	100%	43%	ed.ac.uk	13.0.30	dCache	A	A	A	0%
Glasgow	P	P	P	78%	93%	gla.scotgrid.ac.uk	13.0.20	DPM	S	S	S	76%
Birmingham	P	P	P	91%	94%	bham.ac.uk	13.0.20	DPM	S	S	S	96%
Bristol	P	P	P	87%	96%	bris.ac.uk	13.0.30	DPM	X	X	X	30%
Cambridge	P	P	P	70%	72%	cam.ac.uk	13.0.20	DPM	S	S	A	66%
Oxford	P	P	P	30%	4%	ox.ac.uk	13.0.30	DPM	S	S	S	87%
RAL PPD	W	P	P	78%	85%	pp.rl.ac.uk	13.0.30	dCache	S	S	S	94%
RAL Tier-1	W	P	P	96%	98%	gridpp.rl.ac.uk	13.0.20	dCache	S	F	S	64%
Total				70%	72%							68%



90% max
80% typical



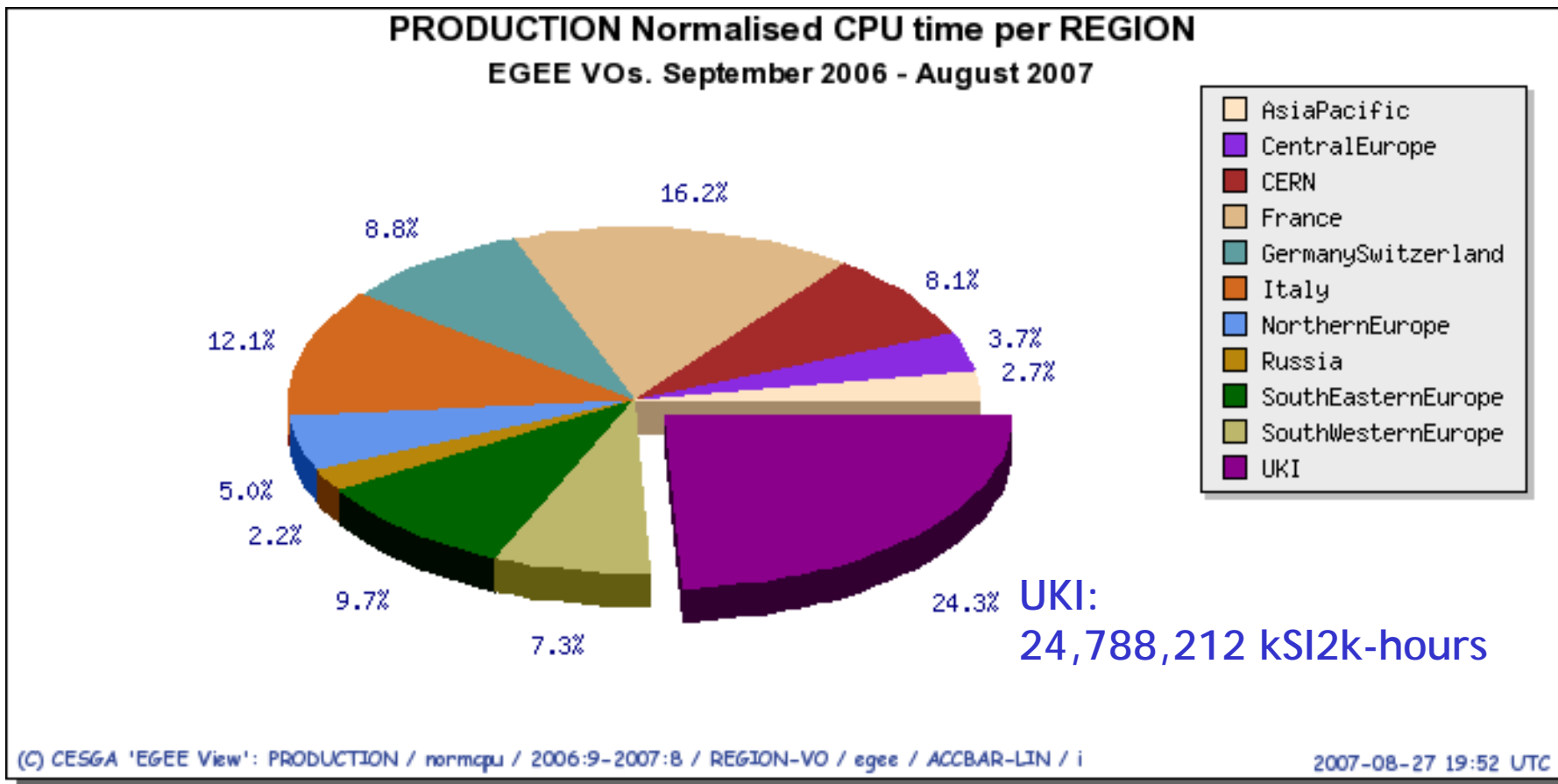
80% max
70% typical

c.f.
95% T2 target
98% T1 target

c.f.
~95% target



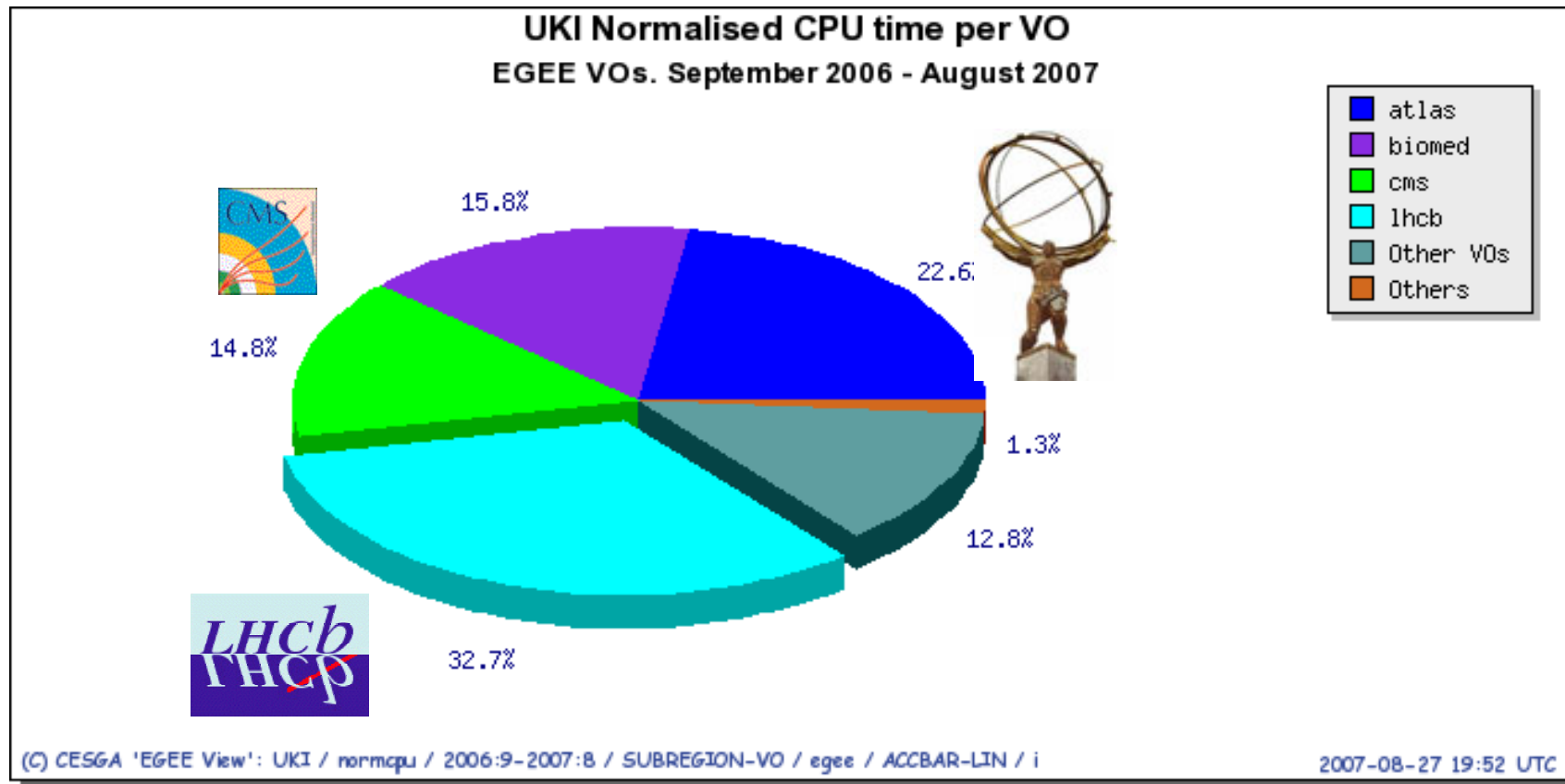
Accumulated EGEE CPU Usage 102,191,758 kSI2k-hours or >100 GSI2k-hours (!)



Via APEL accounting

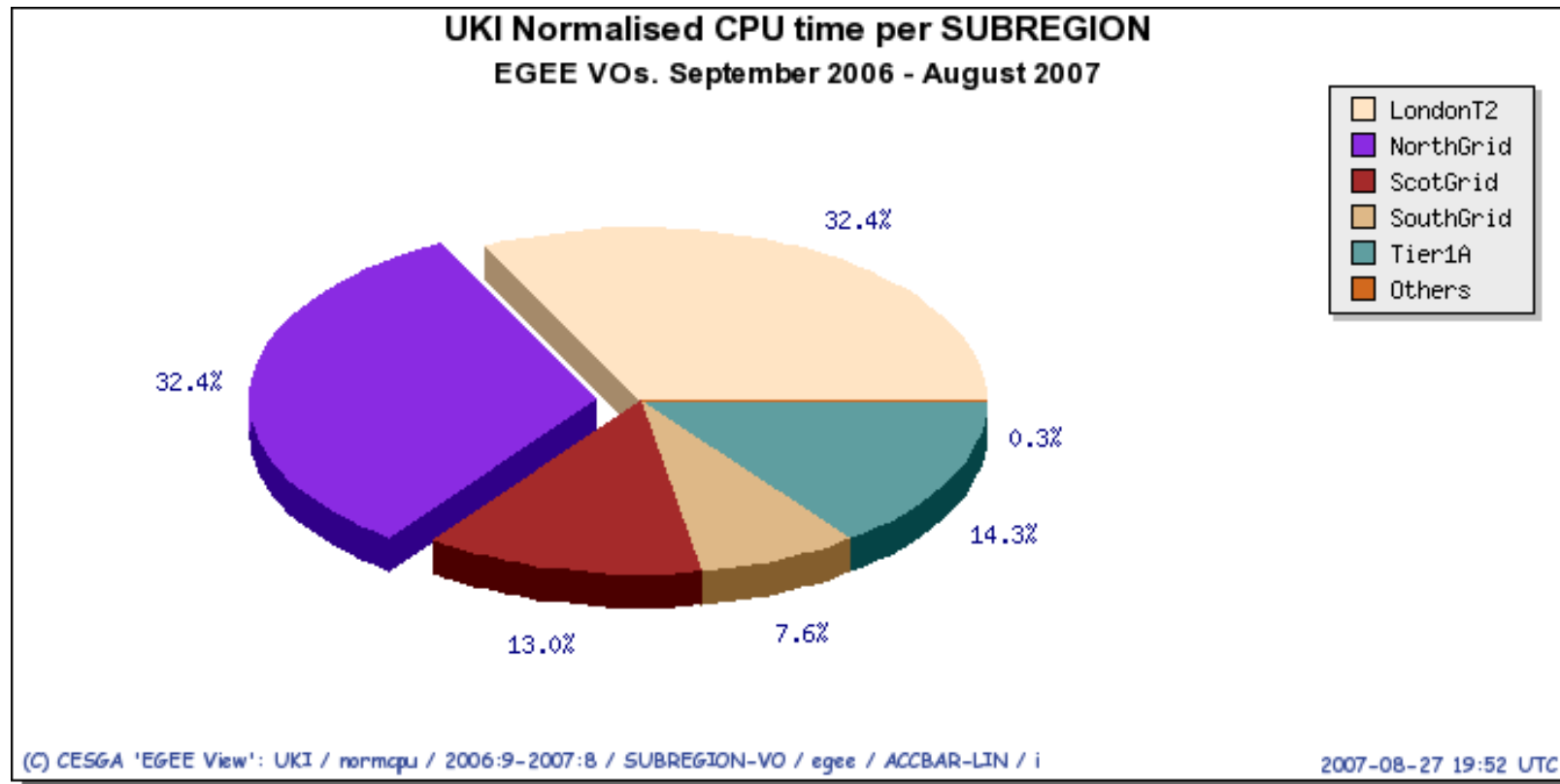


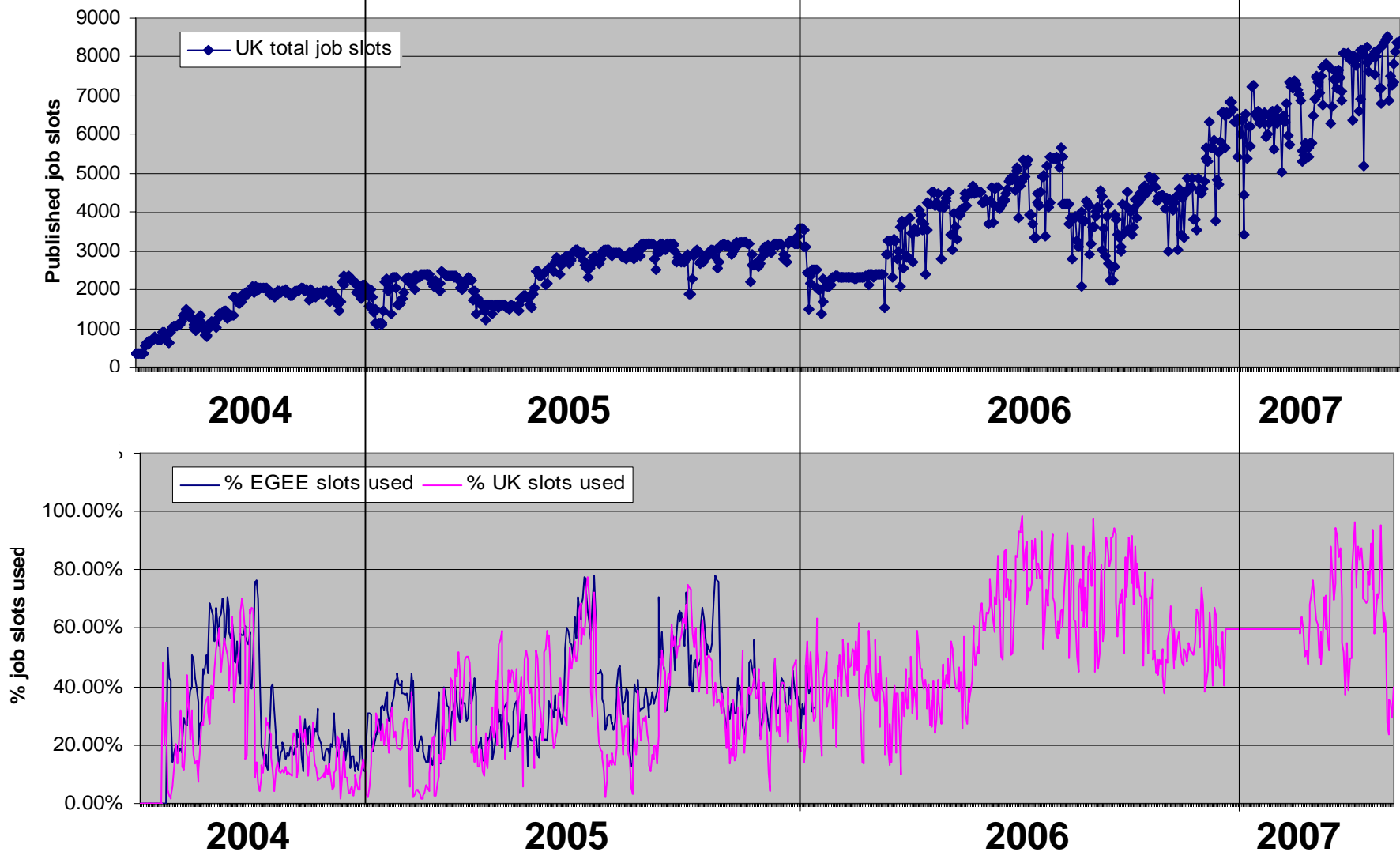
Past year's CPU Usage by experiment



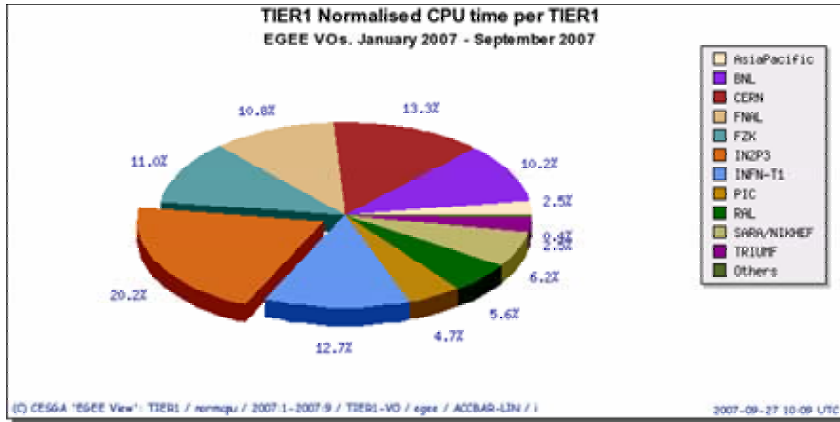


Past year's CPU Usage by Region

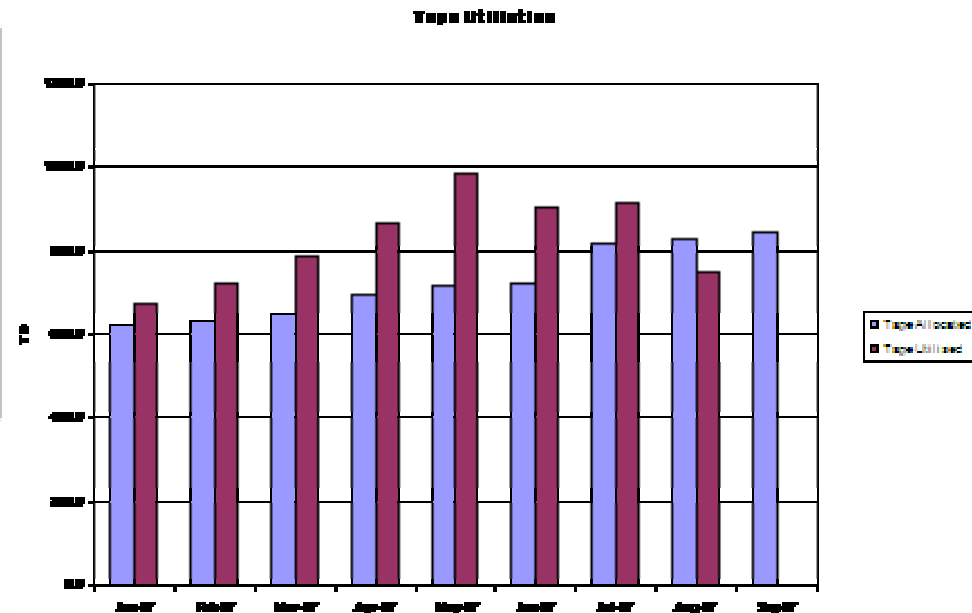
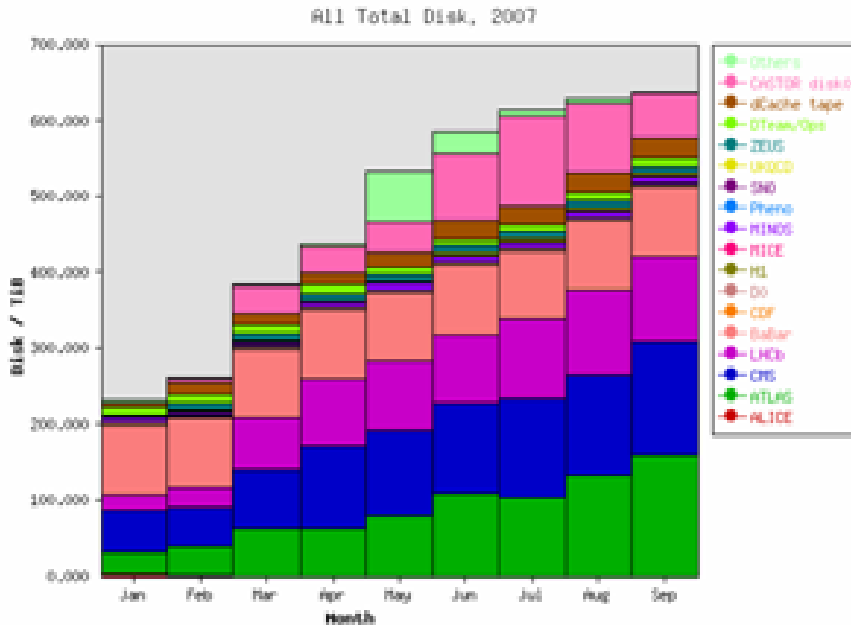




Currently ~51% which falls short of the 70% target



- CPU, disk and tape resources being built up according to plan
- 2008 procurement well underway





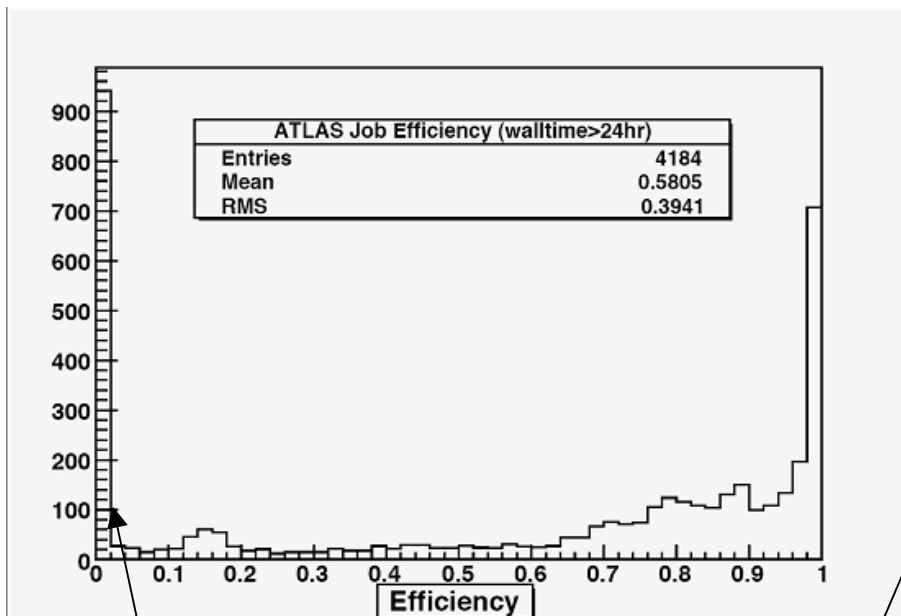
Efficiency



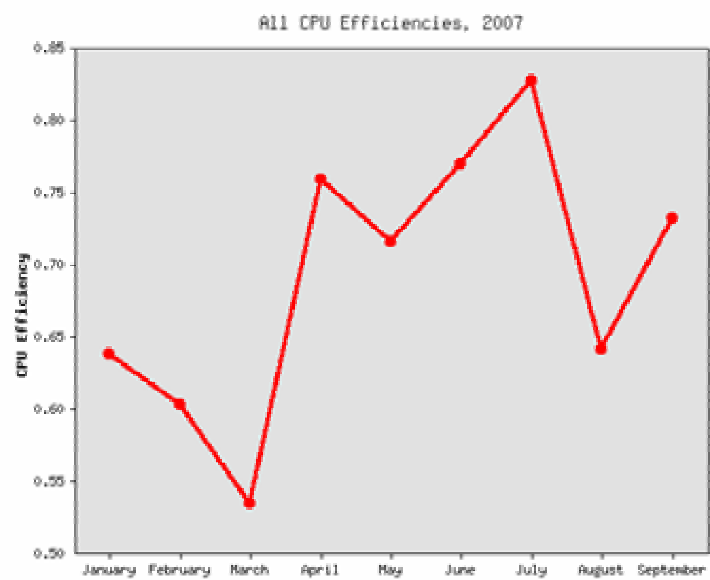
(measured by UK Tier-1 and Tier-2 for all VOs)

~90% CPU efficiency due to i/o bottlenecks

Concern that this is currently ~70% at the Tier-1



A big issue for the Tier-2s..
A bigger issue for the Tier-1..



Each experiment needs to work to improve their system/deployment practice anticipating e.g. hanging gridftp connections during batch work



Intervention Policy

All UK sites are given flexibility to deal with stalled jobs (in order that their CPUs are occupied more fully overall) according to the following *stalled job definition*:

Any job consuming **<10** minutes CPU over a given 6 hour period (efficiency < 0.027) is considered stalled

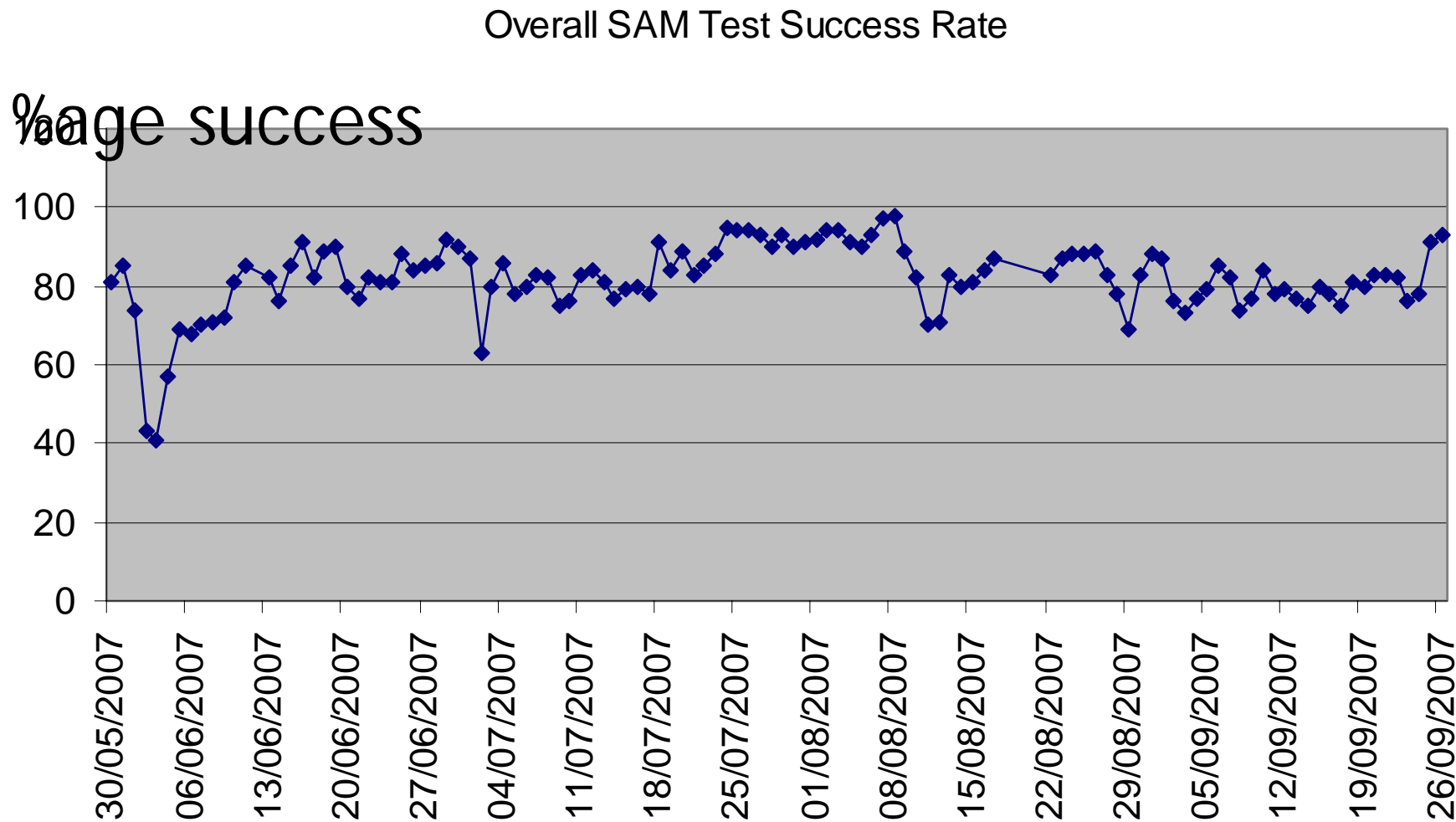
There is a recognised intervention scheme for UK sites

	CE								SE								SRM								Availability									
	Hours ago:	9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	24 Hrs	Week	Month
UKI-LT2-Brunel	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	100%	99%	87%	92%	
UKI-LT2-IC-HEP	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	100%	98%	97%	96%	
UKI-LT2-IC-LeSC	P	P	P	P	P	P	P	P	P	P	P																			100%	97%	93%	90%	
UKI-LT2-QMUL	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	70%	73%	48%	49%	
UKI-LT2-RHUL	P	F	F	F	P	P	P	P	P	P	F	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	78%	71%	84%	85%	
UKI-LT2-UCL-CENTRAL	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	87%	51%	86%	67%	
UKI-LT2-UCL-HEP	M	M	M	M	M	M	M	M	M	M	M	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	0%	0%	58%	68%	
UKI-NORTHGRID-LANCS-HEP	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	96%	97%	94%	78%	
UKI-NORTHGRID-LIV-HEP	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	74%	86%	93%	91%	
UKI-NORTHGRID-MAN-HEP	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	0%	0%	74%	93%	
UKI-NORTHGRID-SHEF-HEP	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	96%	95%	20%	43%	
UKI-SCOTGRID-DURHAM	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	100%	97%	98%	92%	
ScotGRID-Edinburgh	P	P	P	P	P	P	P	P	P	M	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	96%	31%	78%	93%	
UKI-SCOTGRID-GLASGOW	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	100%	95%	94%	92%	
UKI-SOUTHGRID-BHAM-HEP	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	100%	92%	86%	88%	
UKI-SOUTHGRID-BRIS-HEP	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	100%	98%	97%	94%	
UKI-SOUTHGRID-CAM-HEP	F	P	P	P	P	P	P	P	P	F	F	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	70%	69%	71%	64%	
UKI-SOUTHGRID-OX-HEP	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	0%	0%	48%	75%	
UKI-SOUTHGRID-RALPP	P	P	P	P	P	P	P	P	P	F	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	87%	88%	86%	87%	
RAL-LCG2_Tier-1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	100%	98%	95%	93%	
Total																														78%	72%	79%	81%	

- Performance over past 6 months to be used for Tier-2 hardware allocations..

The metric is to be based on

SAM Test Efficiency x (CPU Delivered + Disk Available)



<http://hepwww.ph.qmul.ac.uk/~lloyd/gridpp/sam.html>



Experiments categorisation:

- Non-scalability or general failure of the Grid data transfer / placement system.
- Non-scalability or general failure of the Grid workload management system.
- Non-scalability or general failure of the metadata / bookkeeping system.
- Medium-term loss of data storage resources.
- Medium-term loss of CPU resources.
- Long-term loss of data or data storage resources.
- Long-term loss of CPU resources.
- Medium- or long-term loss of wide area network.
- Grid security incident.
- Mis-estimation of resource requirements.



Disaster Modes:

ID	Cause	Explanation	Correlation between sites/services
1	Service failure	Loss of an individual Grid service due to a hardware failure	Random at individual sites, but may be correlated within a site
2	Site failure	Loss of an entire Grid site	Usually uncorrelated, although air conditioning failures may have some correlation
3	Software failure: new middleware	Vital new functionality is not available on time or fails in deployment	Changes are incremental and pre-tested and therefore usually uncorrelated Upgrades take place over a limited, controlled period
4	Software failure: load-related	Major bugs/limits are exposed as the load increases	Likely to appear at many sites
5	Software failure: OS-related	New versions of the OS require upgrades/porting which are not available	Correlated between sites, depending on hardware purchases and local policy
6	Software failure: usage	Usage patterns by individual users result in large numbers of job failures or resource exhaustion	May be correlated (common software or practices)
7	Loss or absence of key staff	Resignations or unavailability for an extended period	May be correlated due to holiday periods, epidemic illness or changes in employment conditions
8	Network failure: OPN	T0-T1 connection currently not redundant	Single point of failure
9	Network failure: JANET	T1-T2 (or T2-T2) connections fail	Depends on JANET/MAN topology
10	Security incident	An incident may close many sites until it is resolved	May be local or Grid wide
11	Procurement failure	Required increased capacity is not available on the required timescale through non-delivery or hardware not meeting specification.	There is a potential for correlation if the same supplier was being used by several sites.

Importance of Communication:

Further Introduction and Instructions

Organisational	Applications	Middleware	Infrastructure	Institutions
All People	ALICE	InfoMon	Tier-1	Birmingham: Bristol
GridPP Post Holders	ATLAS	Metadata	Tier-2	Brunel: CERN
CB - members	CMS	Networking	London Tier 2	Cambridge: CCLRC
PMB - members	LHCb	Security	NorthGrid	Durham: Edinburgh
DB - members	BaBar	Storage	ScotGrid	Glasgow: Imperial
UB - members	CDF	WLMS	SouthGrid	Lancaster: Liverpool
OC - members	D0		T2 Hardware Support	Manchester: Oxford
Tier-1 Board Members	Other Applications		T2 Middleware Support	PPARC: QMUL
Tier-2 Board Members	PhenoGrid			RHUL: Sheffield
Deployment Team	UKQCD			Sussex: Swansea
EGEE	Portal	Dissemination	Security Contacts	Warwick: UCL
	Experiment Reqs			Site SysAdmins

If DataBase has been edited, click this button to update all lists: [Update All Lists](#)

Work in progress..



From UK Particle Physics perspective the Grid is *the* basis for computing in the 21st Century:

1. needed to utilise computing resources efficiently and securely
2. uses gLite middleware (with evolving standards for interoperation)
3. required significant investment from PPARC (STFC) – O(£100m) over 10 yrs - including support from HEFCE/SFC
4. required 3 years' prototype testbed development [GridPP1]
5. provides a working production system that has been running for three years in build-up to LHC data-taking [GridPP2]
6. enables seamless discovery of computing resources:
 utilised to good effect across the UK – internationally significant
7. not (yet) as efficient as end-user analysts require:
 ongoing work to improve performance
8. ready for LHC - just in time delivery
9. future operations-led activity as part of LCG, working with EGEE/EGI (EU) and NGS (UK) [GridPP3]
10. future challenge is to exploit this infrastructure to perform (previously impossible) physics analyses from the LHC (and ILC and vFact and..)



- *Planning..*
- *Good things take time.. ~20 months*

31st March 2006 - PPARC Call

31st October 2007? -
Grants implemented

Proposal Writing

Proposal Defence

Proposal Approval

Implementation

11 October 2007

Oversight Committee

Tony Doyle - University of Glasgow

Grid Data Management

GridPP Data Management

File Metadata

- Logical File Name
- GUID
- System Metadata (owner, permissions, check...)

User Metadata

- User Defined Metadata

File Metadata

- Storage File Name
- Storage Host

Symlinks

- Link Name

21 September 2005
AHM05 Meeting
Tony Doyle - University of Glasgow

Network Monitoring

GridPP High Performance Networking

UKLight UK national R&D network infrastructure

National Interconnection

International Connectivity:

21 September 2005
AHM05 Meeting
Tony Doyle - University of Glasgow

Workload Management

GridPP Workload Management

Integrated over all VOs and RBs:

Successes/Day: 15225
Success %: 69%
Improving from 42% to 70-80% during 2005

Problems Identified:

VO Status (Production, Suspended, Jobs + 69 x 15225 success jobs per day Coverage)

21 September 2005
AHM05 Meeting
Tony Doyle - University of Glasgow

GridPP would like to thank all the middleware developers who have contributed to the establishment of the Production Grid

Information Services

R-GMA Web Services

Created from WSDL using gSOAP (or Axis or...)

Tomcat Servlet Container

- Primary Producer Service
- Secondary Producer Service
- On-demand Producer Service
- Consumer Service

- API available for Java, C, C++ and Python
- Users may by-pass API if they wish, but API is the easiest way to use R-GMA services

R-GMA: Status and Plans, 14 September 2004 - 4

Security

GridPP Security in LCG/EGEE

Solutions/Recommendations

NA4

JRA3, JRA1, SA1

Middleware Security Group, LCG/EGEE Joint Security Group

"Joint Security Group" defines/maintains policy and procedures.

For LCG GDB and EGEE SA1

15-Sep-04
Grid Security

Storage Interfaces

SRM

- A single SRM server to service incoming file requests (this is implemented as a web service)
- Multiple file servers with unix filesystems on which data resides.
- Data transfer is done to/from the file servers, thus inbound IP connectivity is essential to make the SRM SE available to the wider grid.

SRM Server

File Server 1 (FS1, FS2, FS3), File Server 2 (FS1, FS2, FS3), File Server 3 (FS1, FS2, FS3)

21 September 2005
AHM05 Meeting
Tony Doyle - University of Glasgow



11 October 2007

Oversight Committee



Tony Doyle - University of Glasgow