Tier1 Readiness

John Gordon

LHCC Review

19/2/2008

Outline

- Review of Relevant Milestones
  - Plans to meet them
  - Explanations
- 24x7
- VO Boxes
- Procurement
  - MoU Commitments
- WN/UI
  - Milestones on individual components have replaced the earlier ‘Upgrade to SL4’
- Reliability & Availability

WLCG Milestones

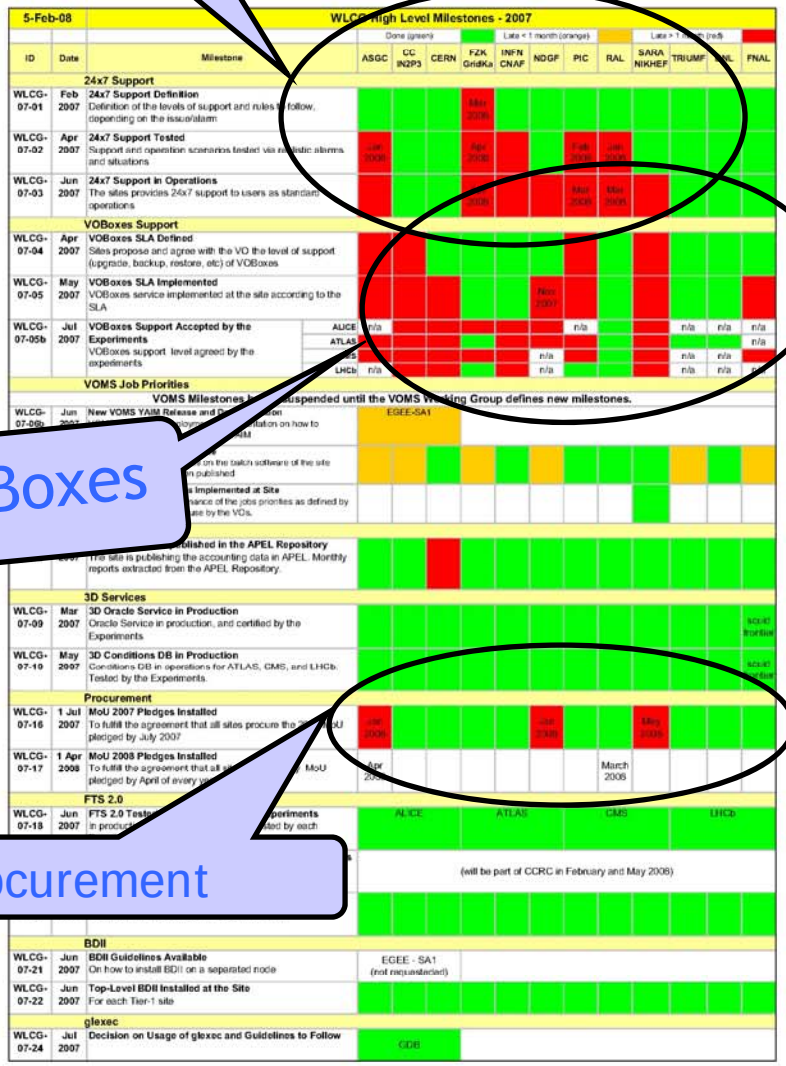
24*7

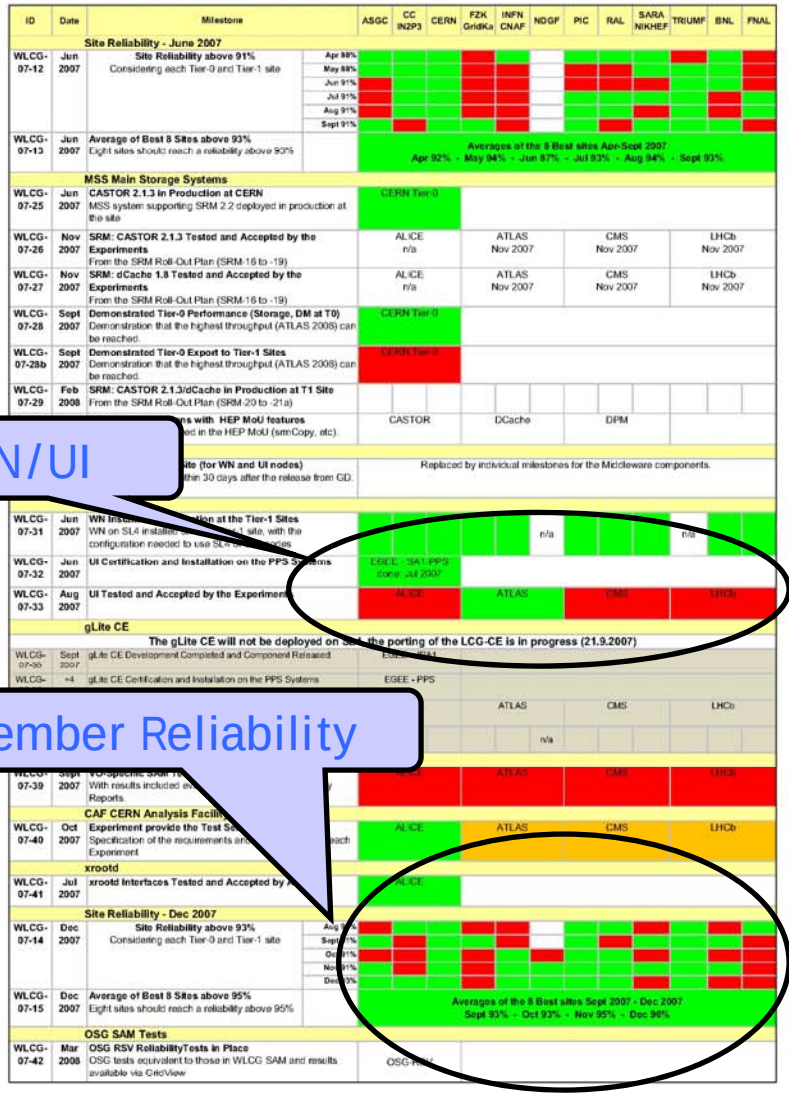
VO Boxes

Procurement

WN/UI

December Reliability





5-Feb-08		WLCG High Level Milestones - 2007												
			Done (green)				Late < 1 month (orange)				Late > 1 month (red)			
ID	Date	Milestone	ASGC	CC IN2P3	CERN	FZK GridKa	INFN CNAF	NDGF	PIC	RAL	SARA NIKHEF	TRIUMF	BNL	FNAL
		24x7 Support												
WLCG-07-01	Feb 2007	**24x7 Support Definition** Definition of the levels of support and rules to follow, depending on the issue/alarm				Mar 2008								
WLCG-07-02	Apr 2007	**24x7 Support Tested** Support and operation scenarios tested via realistic alarms and situations	Jan 2008			Apr 2008			Feb 2008	Jan 2008				
WLCG-07-03	Jun 2007	**24x7 Support in Operations** The sites provides 24x7 support to users as standard operations				Apr 2008			Mar 2008	Mar 2008				

- T1s underestimated the effort involved in planning this.
  - most have done this now
- 07-03 was never going to happen to original schedule as T1s are mostly ramping up staff for data taking
- Full explanations for missed milestones attached to agenda.

- ASGC no comment
- CNAF Critical services are already HA. Infrastructure on 30 minute callout.
- FZK Done a lot of work on hardening services. Respective operational procedures will be documented in March 2008 (WLCG-07-01) and go into operation in April 2008 (WLCG-07-03).
- NDGF All tested. Shifts will start with data-taking.
- PIC testing (WLCG 07-02) started at Xmas, complete end of Feb. In production (WLCG 07-03) end of March
- RAL Testing slipped a month to end Feb. Initial production on target for end of March
- SARA-NIKHEF testing under way. Complicated by integrating two sites.

5-Feb-08		WLCG High Level Milestones - 2007													
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ID	Date	Milestone		ASGC	CC IN2P3	CERN	FZK GridKa	INFN CNAF	NDGF	PIC	RAL	SARA NIKHEF	TRIUMF	BNL	FNAL
VOBoxes Support															
WLCG-07-04	Apr 2007	**VOBoxes SLA Defined** Sites propose and agree with the VO the level of support (upgrade, backup, restore, etc) of VOBoxes													
WLCG-07-05	May 2007	**VOBoxes SLA Implemented** VOBoxes service implemented at the site according to the SLA							Nov 2007						
WLCG-07-05b	Jul 2007	**VOBoxes Support Accepted by the Experiments** VOBoxes support level agreed by exp.	ALICE	n/a						n/a			n/a	n/a	n/a
			ATLAS												n/a
			CMS						n/a			n/a	n/a	n/a	
			LHCb	n/a					n/a				n/a	n/a	n/a

Green

- All T1s support VO Boxes for relevant VOs
  - This milestone is about a defined service
- 5b not always under the control of the T1s.
- Full explanations for missed milestones attached to agenda.

- ASGC – no comment
- IN2P3 – Has been deferred due to higher priority work. SLA by end of February, agreement by end March
- CERN no response
- NDGF Should be in place by end of March. Had to negotiate with 7 sites for Alice and ATLAS change to pilot jobs changed the definition of the VO Box.
- PIC ATLAS waiting definition of VO Box; CMS draft proposed; LHCb done.
- SARA NIKHEF advanced draft exists, it has been circulated amongst all parties nationally. It has not yet been discussed with the VOs.

Procurement

5-Feb-08		WLCG High Level Milestones - 2007											
			Done (green)				Late < 1 month (orange)				Late > 1 month (red)		
ID	Date	Milestone	ASGC	CC IN2P3	CERN	FZK GridKa	INFN CNAF	NDGF	PIC	RAL	SARA NIKHEF	TRIUMF	BNL	FNAL
Procurement														
WLCG-07-16	1 Jul 2007	**MoU 2007 Pledges Installed** To fulfill the agreement that all sites procure the 2007 MoU pledged by July 2007	Jan 2008					Jan 2008			May 2008			
WLCG-07-17	1 Apr 2008	**MoU 2008 Pledges Installed** To fulfill the agreement that all sites procure they MoU pledged by April of every year	Apr 2008							March 2008				

- SARA-NIKHEF had procurement problems for 2007.

LCG Tier 0 and 1 Resources

CERN Tier0	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	4480	11170	23260	35310	37410	40910	Required	1800	3705	5300	360	
							Offered	1800	3710	5300	360	
							% of Req.	100%	100%	100%	100%	
Disk (Tbytes)	330	2423	5135	5542	5942	6142	Required	1600	152	400	270	
							Offered	1600	153	400	270	
							% of Req.	100%	101%	100%	100%	
Tape (Tbytes)	1620	10780	21160	36090	51120	66780	Required	3300	2449	4400	630	
							Offered	3300	2450	4400	630	
							% of Req.	100%	100%	100%	100%	
Nominal WAN (Mbits/sec)	100000	120000	140000	160000	160000	160000						

CERN Analysis Facility	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SI
CPU (kSI2K)	3090	4680	9710	18090	25120	31930	Required	500	2081	2100	0	
							Offered	500	2080	2100	0	
							% of Req.	100%	100%	100%	100%	
Disk (Tbytes)	960	3126	5131	7865	11136	14022	Required	100	1146	1800	80	
							Offered	100	1146	1800	80	
							% of Req.	100%	100%	100%	100%	
Tape (Tbytes)	790	1270	3620	6960	10460	14850	Required	0	370	900	0	
							Offered	0	370	900	0	
							% of Req.	100%	100%	100%	100%	

Canada Tier1	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SI
CPU (kSI2K)	160	905	1420	2480	3535	3535	Offered		905			
							% of Total		5%			
Disk (Tbytes)	110	500	985	1975	2810	2810	Offered		500			
							% of Total		5%			
Tape (Tbytes)	80	385	750	1435	2245	2245	Offered		385			
							% of Total		5%			
Nominal WAN (Mbits/sec)		10000	10000	10000	10000	10000						

FZK-GridKa (Note 1)	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SI
CPU (kSI2K)	1660	5672	10354	15710	20789	26282	Offered	2500	1812	1080	350	
							% of Total	25%	10%	11%	18%	
Disk (Tbytes)	880	2933	5122	9257	12549	16340	Offered	1000	1077	690	171	
							% of Total	25%	13%	12%	17%	
Tape (Tbytes)	1010	3629	7190	11867	16818	21942	Offered	1400	808	1280	143	
							% of Total	24%	10%	13%	17%	
Nominal WAN (Mbits/sec)	10000	20000	30000	30000	30000	30000						

IN2P3 Lyon	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	1288	4240	7998	13441	18105	23024	Offered	830	2066	804	480	4240
							% of Total	8%	11%	9%	27%	11%
Disk (Tbytes)	729	2375	4600	8224	11397	14710	Offered	316	1133	648	278	2375
							% of Total	8%	11%	9%	27%	10%
Tape (Tbytes)	745	2470	5175	9180	13914	18901	Offered	481	877	882	230	2470
							% of Total	8%	11%	9%	27%	10%
Nominal WAN (Mbits/sec)	10000	10000	10000	10000	10000	10000						

INFN CNAF	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	1300	3000	5500	8500	12500	16000	Offered	660	960	1050	330	3000
							% of Total	7%	5%	11%	19%	8%
Disk (Tbytes)	500	1300	2500	4100	6800	9500	Offered	290	420	450	140	1300
							% of Total	7%	4%	6%	14%	6%
Tape (Tbytes)	650	1500	2600	4200	7100	11000	Offered	330	480	530	160	1500
							% of Total	8%	6%	5%	19%	6%
Nominal WAN (Mbits/sec)	10000	20000	30000	40000	40000	40000						

Netherlands LHC/Tier1	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	1677	4382	7544	12305	11085	11085	Offered	317	3046		1017	4382
							% of Total	3%	17%		57%	15%
Disk (Tbytes)	1059	2510	3753	6149	7796	7796	Offered	173	1776		559	2510
							% of Total	4%	17%		55%	16%
Tape (Tbytes)	719	1613	3546	5736	7353	7353	Offered	173	1163		477	1813
							% of Total	3%	14%		55%	12%
Nominal WAN (Mbits/sec)	10000	10000	10000	10000	10000	10000						

NDGF Tier1	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	688	2172	3228	4280	4280	4280	Offered	1102	1070			2172
							% of Total	11%	6%			8%
Disk (Tbytes)	385	1079	1824	2180	2180	2180	Offered	523	556			1079
							% of Total	13%	5%			7%
Tape (Tbytes)	273	930	1898	2261	2261	2261	Offered	517	413			930
							% of Total	9%	5%			7%
Nominal WAN (Mbits/sec)	5000	10000	20000	20000	20000	20000						

ASGC Taipei	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	1770	3400	5000	7000	7000	7000	Offered		1700	1700		3400
							% of Total		9%	18%		12%
Disk (Tbytes)	900	1500	3000	3500	3500	3500	Offered		750	750		1500
							% of Total		7%	10%		8%
Tape (Tbytes)	800	1300	3000	3500	3500	3500	Offered		650	650		1300
							% of Total		8%	7%		7%
Nominal WAN (Mbits/sec)	10000	10000	10000	10000	10000	10000						

UK Tier1	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	1300	3139	5620	9047	12995	16900	Offered	132	1925	650	232	3138
							% of Total	1%	11%	9%	13%	8%
Disk (Tbytes)	640	1921	3314	5877	8144	11200	Offered	93	1056	652	122	1921
							% of Total	2%	10%	9%	12%	8%
Tape (Tbytes)	1060	1903	3947	6571	9577	13500	Offered	82	818	900	103	1903
							% of Total	1%	10%	9%	12%	8%
Nominal WAN (Mbits/sec)	10000	10000	10000	10000	40000	40000						

US-ATLAS Tier1	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	2560	4844	7337	12768	18193	18193	Offered		4844			4844
							% of Total		27%			27%
Disk (Tbytes)	1100	3136	5822	11837	16529	16509	Offered		3136			3136
							% of Total		29%			29%
Tape (Tbytes)	803	1715	3277	6286	9820	9820	Offered		1715			1715
							% of Total		21%			21%
Nominal WAN (Mbits/sec)	9952	19904	29856	39808	39808	39808						

US-CMS Tier1	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	1792	4300	5100	11100	11100	11100	Offered			4300		4300
							% of Total			45%		45%
Disk (Tbytes)	700	2000	2600	4100	4100	4100	Offered			2000		2000
							% of Total			28%		28%
Tape (Tbytes)	300	4700	7100	11000	11000	11000	Offered			4700		4700
							% of Total			46%		46%
Nominal WAN (Mbits/sec)												

Spain PIC	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	501	1509	2591	5109	6941	8731	Offered		865	477	167	1509
							% of Total		5%	5%	9%	5%
Disk (Tbytes)	218	967	1702	3009	4090	5178	Offered		512	358	97	967
							% of Total		5%	5%	9%	5%
Tape (Tbytes)	243	953	1844	3402	5248	7253	Offered		365	467	81	953
							% of Total		5%	5%	9%	5%
Nominal WAN (Mbits/sec)	2500	10000	10000	10000	10000	10000						

Summary Ext. Tier1s	2007	2008	2009	2010	2011	2012	Split 2008	ALICE	ATLAS	CMS	LHCb	SUM 2008
CPU (kSI2K)	14894	37563	61692	101737	126523	146130	Offered	5541	19195	10291	3536	37563
							Required	10100	18120	9600	1770	39590
							Balance	-46%	6%	7%	43%	-5%
Disk (Tbytes)	7221	20221	35222	60008	79875	93821	Offered	2395	10913	5546	1367	20221
							Required	4000	10730	7200	1025	22955
							Balance	-40%	2%	-23%	33%	-12%
Tape (Tbytes)	8503	21296	46329	85438	88837	108775	Offered	2963	7892	9429	1194	21296
							Required	5800	8070	9800	860	24530
							Balance	-49%	-4%	-4%	39%	-13%

Summary with Regu. Balance	2007	2008	2009	2010	2011	2012		SUM 2008	SUM 2009	SUM 2010	SUM 2011	SUM 2012
CPU (kSI2K)	14894	37563	61692	101737	126523	146130	Offered	37563	61692	101737	126523	146130
							Required	39590	59600	114726	152230	191810
							Balance	-5%	-11%	-11%	-17%	-24%
Disk (Tbytes)	7221	20221	35222	60008	79875	93821	Offered	20221	35222	60008	79875	93821
							Required	22955	40178	71008	96791	123883
							Balance	-12%	-12%	-15%	-17%	-24%
Tape (Tbytes)	8503	21296	46329	85438	88837	108775	Offered	21296	46329	85438	88837	108775
							Required	24530	46260	79864	114610	152596
							Balance	-13%	-13%	-17%	-23%	-29%

Note 1: The FZK Pledges indicated for 2008 will be fully available in October 2008. For April 2008 the following will be available : CPU 4522 kSI2K, Disk 2293 Tbytes, Tape 2449 Tbytes

During the 4 months after the end of heavy-ion runs ALICE requires the totality of its CERN resources in the T0. The rest of the time its CERN resources are shared between T0 (for pp reconstruction) and CAF.
Requirements for all experiments are for 2008 and compared with 2008 pledges.

Ext. Tier1 Regu. 2008	ALICE	ATLAS	CMS	LHCb	SUM
CPU (kSI2K)	10100	18120	9600	1770	39590
Disk (Tbytes)	4000	10730	7200	1025	22955
Tape (Tbytes)	5800	8070	9800	860	24530
Number of T1s	6	10	7	6	n.a.

2Q2008	Tier 1 Capacity: Available vs. Required (Scheduled)								
WLCG Site	CPU KSi2K			Disk TB			Tape TB		
	2008/9 pledge	Installed	Required	2008/9 pledge	Installed	Required	2008/9 pledge	Installed	Required
ASGC	3400	3400	2467	1500	1500	1673	1300	1300	1872
CC-IN2P3	4240	4240	4882	2375	1394	2747	2470	2470	2863
FZK/GridKa	5672	4522	7045	2933	2293	3579	3629	2449	4314
INFN/CNAF	3000	3000	3994	1300	1300	2289	1500	1500	2453
NDGF	2172	2172	2633	1079	385	1203	930	273	1407
PIC	1509	1200	1432	967	600	930	953	520	945
RAL	5220	5220	3714	2790	2790	2283	2070	2070	2140
SARA-NIKHEF	4382	1677	3334	2510	1059	1858	1813	719	1577
TRIUMF	905	905	779	500	500	461	385	385	347
US-ATLAS	4844	5400	4167	3136	2100	2468	1715	1800	1856
US-CMS FNAL	4300	4500	3840	2000	1700	2880	4700	1600	3920
US-ALICE		180	1111		45	440		35	638

- Most sites achieving CPU pledges
- Most sites will not have disk pledges in place
- Tape less important as can easily be bought just-in-time as data grows
- Some T1s have set dates later than April to meet their pledges in full.

Resource Comments

- FZK/GridKa (last report of 1 Feb): all hardware for April 2008 is on site in burnin or waiting for final installation. additional acquisitions are 1150 KSi2K cpu, 600 TB disk and 800 TB tape for ALICE and 380 TB disk for CMS to reach full 2008 pledges in October as planned.
- CC-IN2P3 (last report of 4 Feb): no changes in January. 2008 cpu capacity delivery delayed to mid-Feb so not for phase 1 but ok for 1 April. Tape pledge ok for April and will have 50% of disk pledge. No date yet for remaining disk
- INFN/CNAF (last report 4 Feb): Now unlikely to have all disk capacity by April 1. More info soon.
- NDGF (last report 1 Feb): All 2008 cpu in place by March. Will ramp up disk and tape following demand – confident they will not run out up to 2008 pledges.
- NL-T1 (last report 1 Feb): Will have full 2007 pledges installed in April and full 2008 pledges in November.
- PIC (last report 4 Feb): Solving power problems to reach 80% of 2008 cpu pledge by 1 April with remainder by May. Also 80% of disk by 1 April, rest by June. Ramp up tape capacity steadily to reach full pledge by October.
- RAL (last report 14 Jan): Were expecting 1PB of disk mid-Jan and MoU cpu pledge delivery end Feb. Tape media in place and last tape drive purchases about to be placed. Full pledges expected for 1 April.

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		WN and UI												
WLCG-07-31	Jun 2007	**WN Installed in Production at the Tier-1 Sites** WN on SL4 installed on each Tier-1 site, with the configuration needed to use SL4 or SL3 nodes						n/a				n/a		
WLCG-07-32	Jun 2007	**UI Certification and Installation on the PPS Systems**	EGEE - SA1-PPS done: Jul 2007											
WLCG-07-33	Aug 2007	**UI Tested and Accepted by the Experiments**	ALICE			ATLAS			CMS			LHCb		

- T1s all met milestone
- Experiments have not verified

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				Done (green)				Late < 1 month (orange)				Late > 1 month (red)			
ID	Date	Milestone		ASGC	CC IN2P3	CERN	FZK GridKa	INFN CNAF	NDGF	PIC	RAL	SARA NIKHEF	TRIUMF	BNL	FNAL
		Site Reliability - Dec 2007													
WLCG-07-14	Dec 2007	**Site Reliability above 93%** Considering each Tier-0 and Tier-1 site	Aug 91%												
			Sept 91%												
			Oct 91%												
			Nov 91%												
			Dec 93%												
WLCG-07-15	Dec 2007	**Average of Best 8 Sites above 95%** Eight sites should reach a reliability above 95%		**Averages of the 8 Best sites Sept 2007 - Dec 2007** **Sept 93% - Oct 93% - Nov 95% - Dec 96%**											

Reliability of WLCG Tier-1 Sites + CERN

August 2007 - January 2008

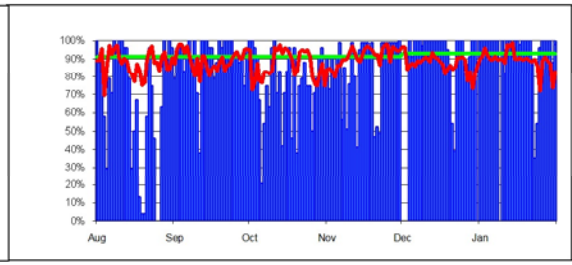
Data from SAM monitoring. Plots show *Reliability* calculated as *time_site_is_available / (total_time - time_site_is_scheduled_down)*

Target reliability for each site is 91% from June, 93% for December07. Target for 8 best sites is 95% from December07.

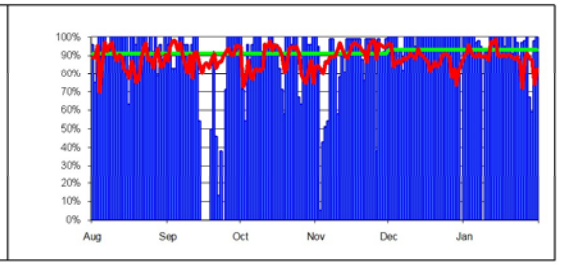
target reliability 93%
last 3 month average - all sites 89%
8 best sites 96%

site average colour coding: < 90% of target ≥ 90% of target ≥ target
sites: ≥ target 6 ≥ 90% of target 10

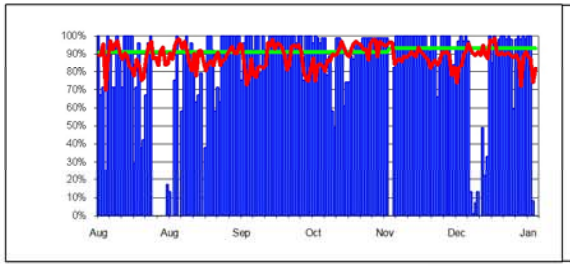
CERN-PROD av.reliability last 3 mths 99%



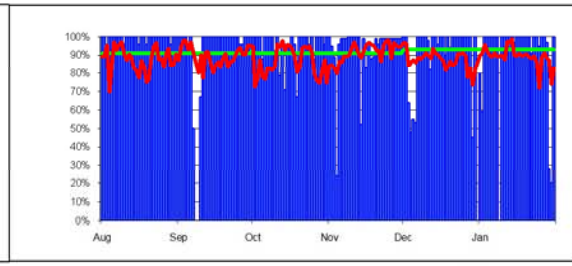
FZK-LCG2 av.reliability last 3 mths 90%



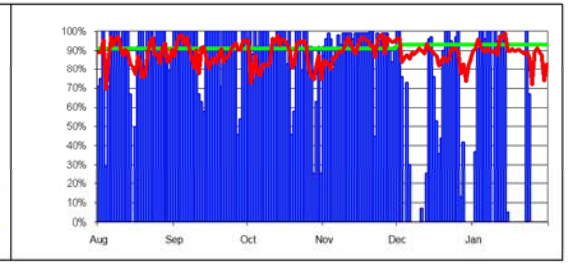
IN2P3-CC av.reliability last 3 mths 93%



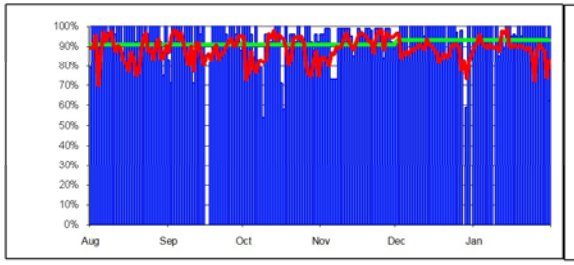
INFN-T1 av.reliability last 3 mths 85%



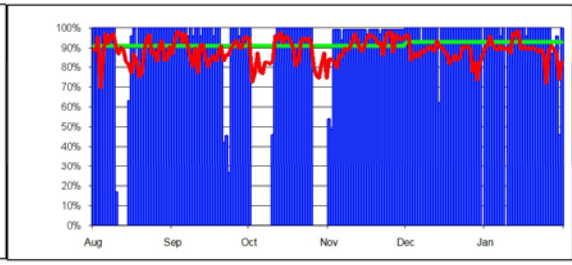
RAL-LCG2 av.reliability last 3 mths 92%



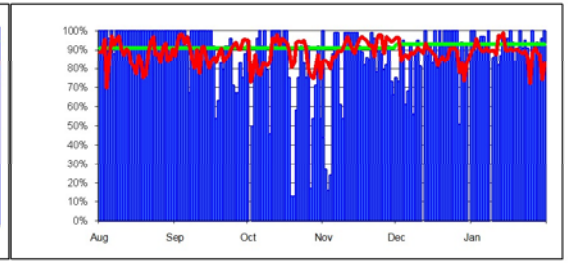
SARA-MATRIX av.reliability last 3 mths 68%



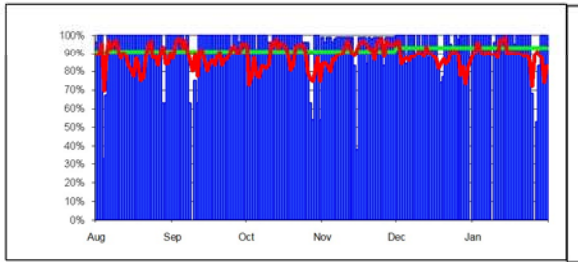
TRIUMF-LCG2 av.reliability last 3 mths 96%

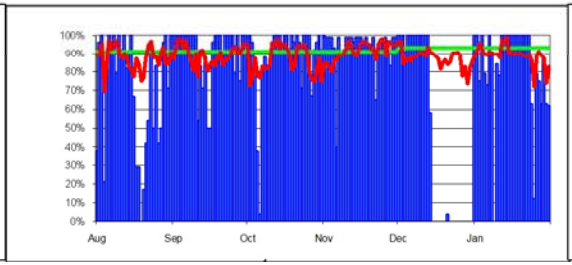


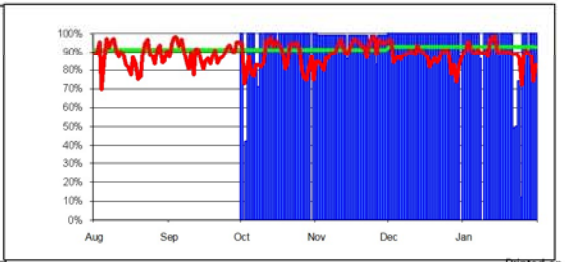
Taiwan-LCG2 av.reliability last 3 mths 96%



USCMS-FNAL-WC1 av.reliability last 3 mths 87%







Availability of WLCG Tier-1 Sites + CERN — August 2007

Data from SAM monitoring. Plots show *Availability* and *Scheduled_Down_Time*. Average *Reliability* is calculated as *Availability/Scheduled_Availability*

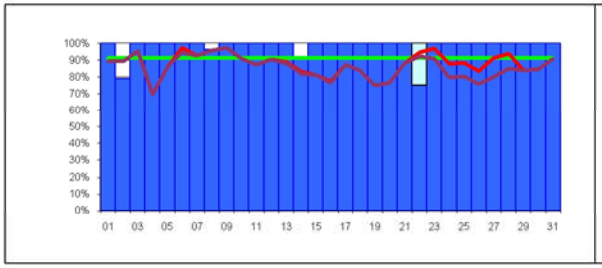
legend: tests passed; scheduled down

availability reliability target 91%

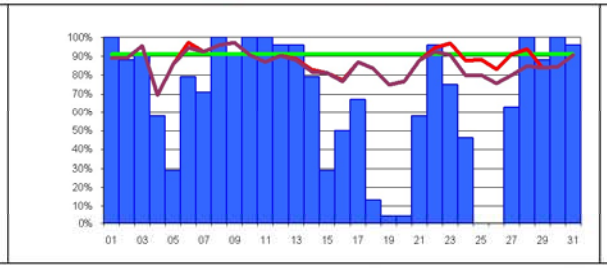
average (all sites): 86% 87%

average (8 best sites): #REF! 94%

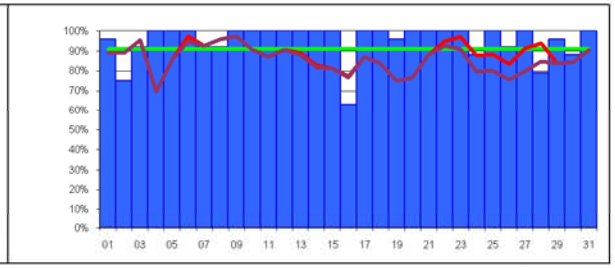
site average colour coding: < 90% of target ≥ 90% of target ≥ target



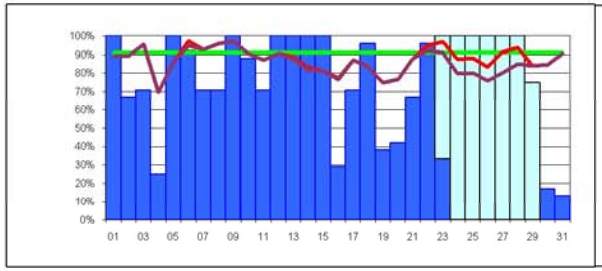
CERN-PROD avail: 98% reliability: 99%



FZK-LCG2 avail: 67% reliability: 67%

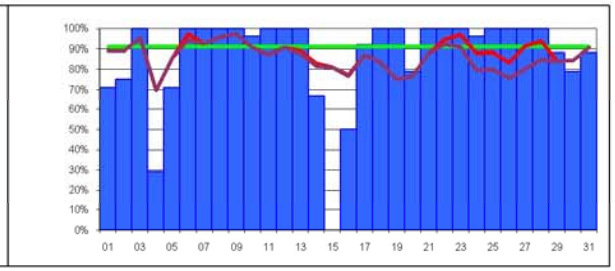


IN2P3-CC avail: 95% reliability: 95%

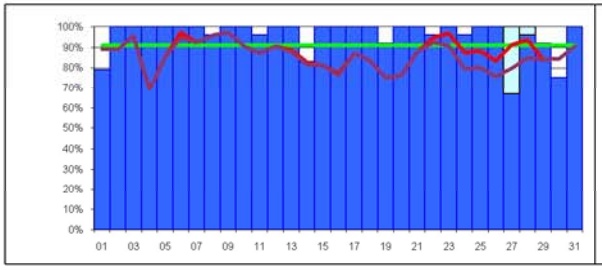


INFN-T1 avail: 57% reliability: 70%

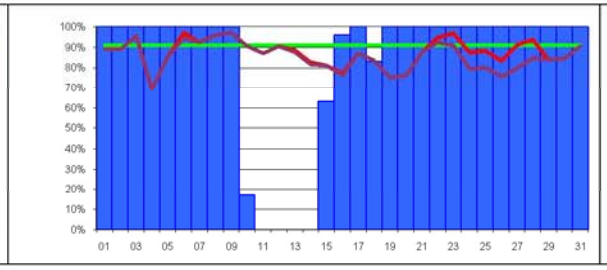
RAL-LCG2 avail: 99% reliability: 99%



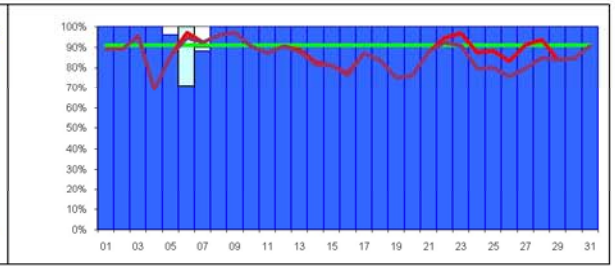
SARA-MATRIX avail: 86% reliability: 86%



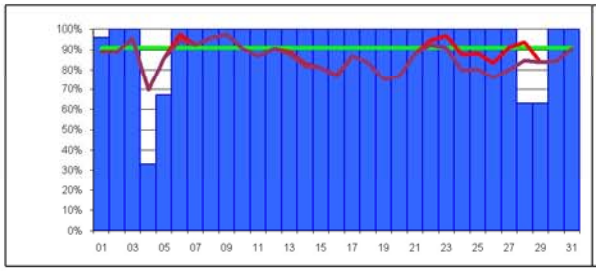
TRIUMF-LCG2 avail: 96% reliability: 97%

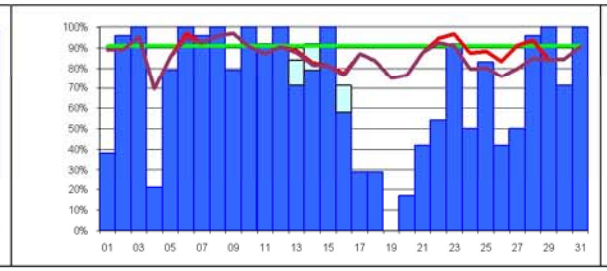


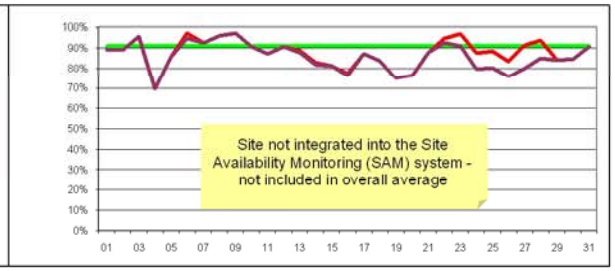
Taiwan-LCG2 avail: 83% reliability: 83%



USCMS-FNAL-WC1 avail: 99% reliability: 99%







Availability of WLCG Tier-1 Sites + CERN January 2008

Data from SAM monitoring. Plots show *Availability* and *Scheduled_Down_Time*. Average *Reliability* is calculated as *time_site_is_available / {total_time – time_site_is_scheduled_down}*

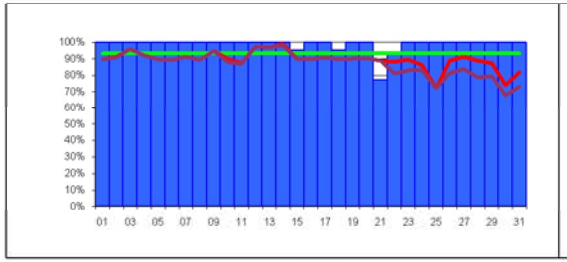
legend: tests passed; scheduled down

availability reliability target 93%

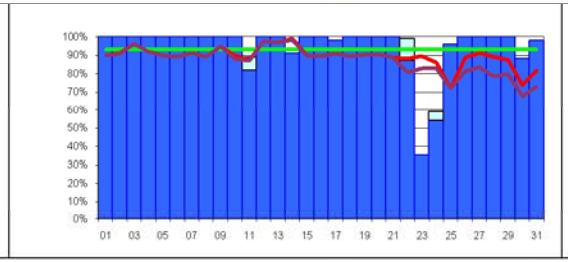
average (all sites): 87% 89%

average (8 best sites): 95% 95%

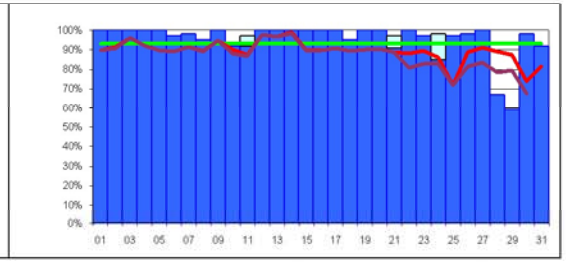
site average colour coding: < 90% of target ≥ 90% of target ≥ target



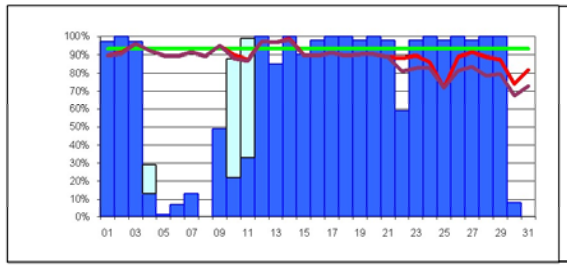
CERN-PROD avail: 99% reliability: 99%



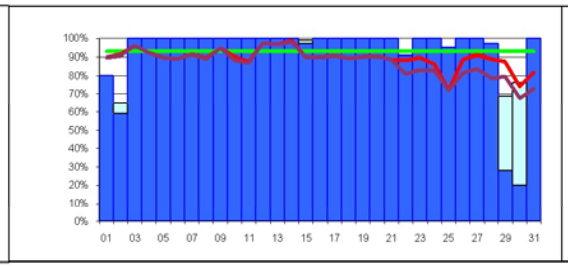
FZK-LCG2 avail: 94% reliability: 94%



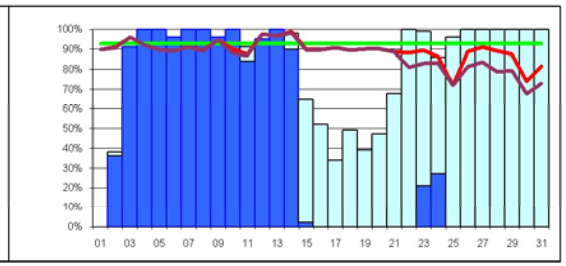
IN2P3-CC avail: 95% reliability: 95%



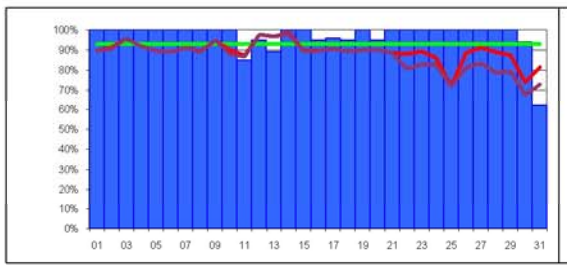
INFN-T1 avail: 70% reliability: 70%



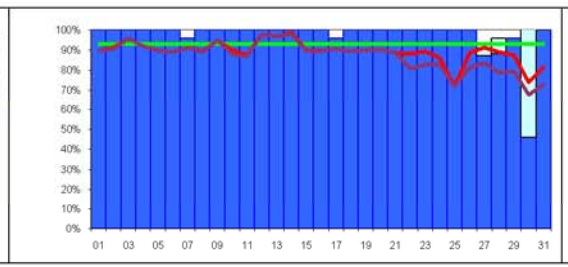
RAL-LCG2 avail: 92% reliability: 92%



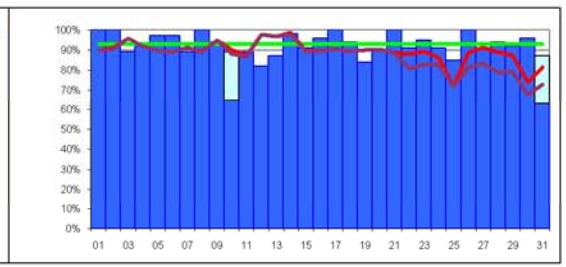
SARA-MATRIX avail: 40% reliability: 57%



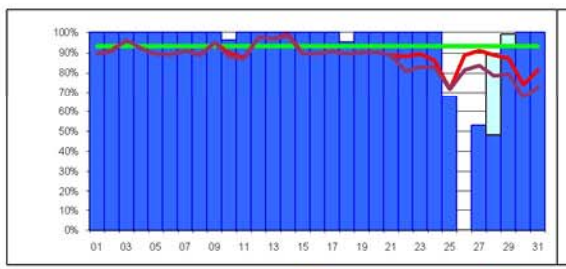
TRIUMF-LCG2 avail: 97% reliability: 97%



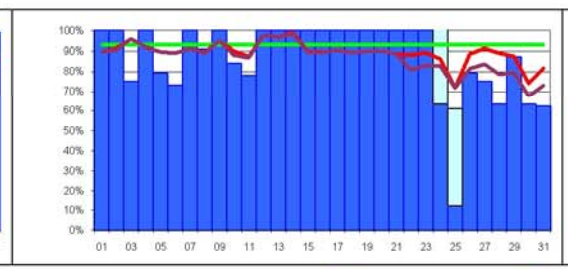
Taiwan-LCG2 avail: 97% reliability: 97%



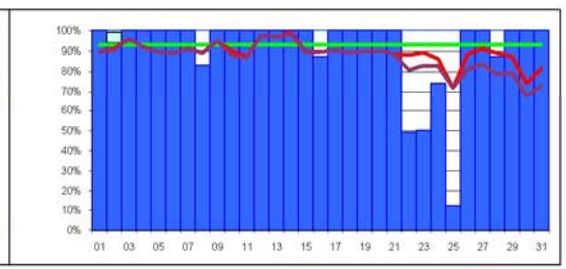
USCMS-FNAL-WC1 avail: 91% reliability: 93%



PIC avail: 92% reliability: 93%



BNL avail: 91% reliability: 91%



NDGF avail: 91% reliability: 92%

Reliability

- 8 Best sites have been acceptable throughout the last 6 months
- Average is generally rising.
- No clear view of why some sites are better than others
- Middleware improvement have reduced downtime
- There will always be service breaks but sites are coming back more quickly

Site Reliability - WLCG Tier-1s + CERN

NOTE - Target raised to 93% from December 07

Target reliability for each site is 91% from June, 93% from December 07. Target for 8 best sites is 95% in December 07.

Reliability = time_site_is_available / {total_time – time_site_is_scheduled_down} **Availability** = time_site_is_available / total_time

	CERN-PROD	FZK-LCG2	IN2P3-CC	INFN-T1	RAL-LCG2	SARA-MATRIX	TRIUMF-LCG2	Taiwan-LCG2	USCMS-FNAL-WC1	PIC	BNL-LCG2	NDGF	average reliabilities	8 best sites average			# sites ≥ target	# sites ≥90% target
														availability	reliability	(% target)		
Aug-2007	99%	67%	95%	70%	99%	86%	97%	83%	99%	94%	71%	0%	87%	94%	94%	101%	6	8
Sep-2007	100%	91%	70%	80%	90%	92%	95%	93%	89%	93%	91%	0%	89%	92%	93%	100%	7	9
Oct-2007	99%	76%	90%	97%	95%	89%	91%	51%	75%	96%	89%	89%	86%	93%	93%	100%	5	9
Nov-2007	98%	85%	84%	91%	93%	94%	94%	94%	79%	95%	93%	98%	92%	91%	95%	102%	9	11
Dec-2007	100%	90%	99%	96%	91%	50%	96%	99%	88%	96%	99%	100%	93%	95%	98%	103%	8	11
Jan-2008	99%	94%	95%	70%	92%	57%	97%	97%	93%	93%	91%	92%	93%	95%	95%	100%	7	10
average last	99%	90%	93%	85%	92%	68%	96%	96%	87%	95%	74%	96%	89%	–	96%	102%	6	10

Summary

- Some Tier1s seem fully ready for data taking
- Some are approaching readiness
- All much later than planned or than the project would like, but probably inevitable given the machine delays.
- Services in place as much as middleware readiness allows
  - But not all as reliable and resilient as could be
- So far the CCRC has not stress tested the T1s so there remains a risk they are not truly ready
  - But what else can they do?