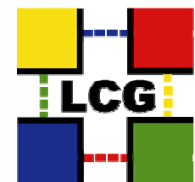


LCG - The Worldwide LHC Computing Grid

Collaboration Board
CERN
29 January 2007

Les Robertson
LCG Project Leader

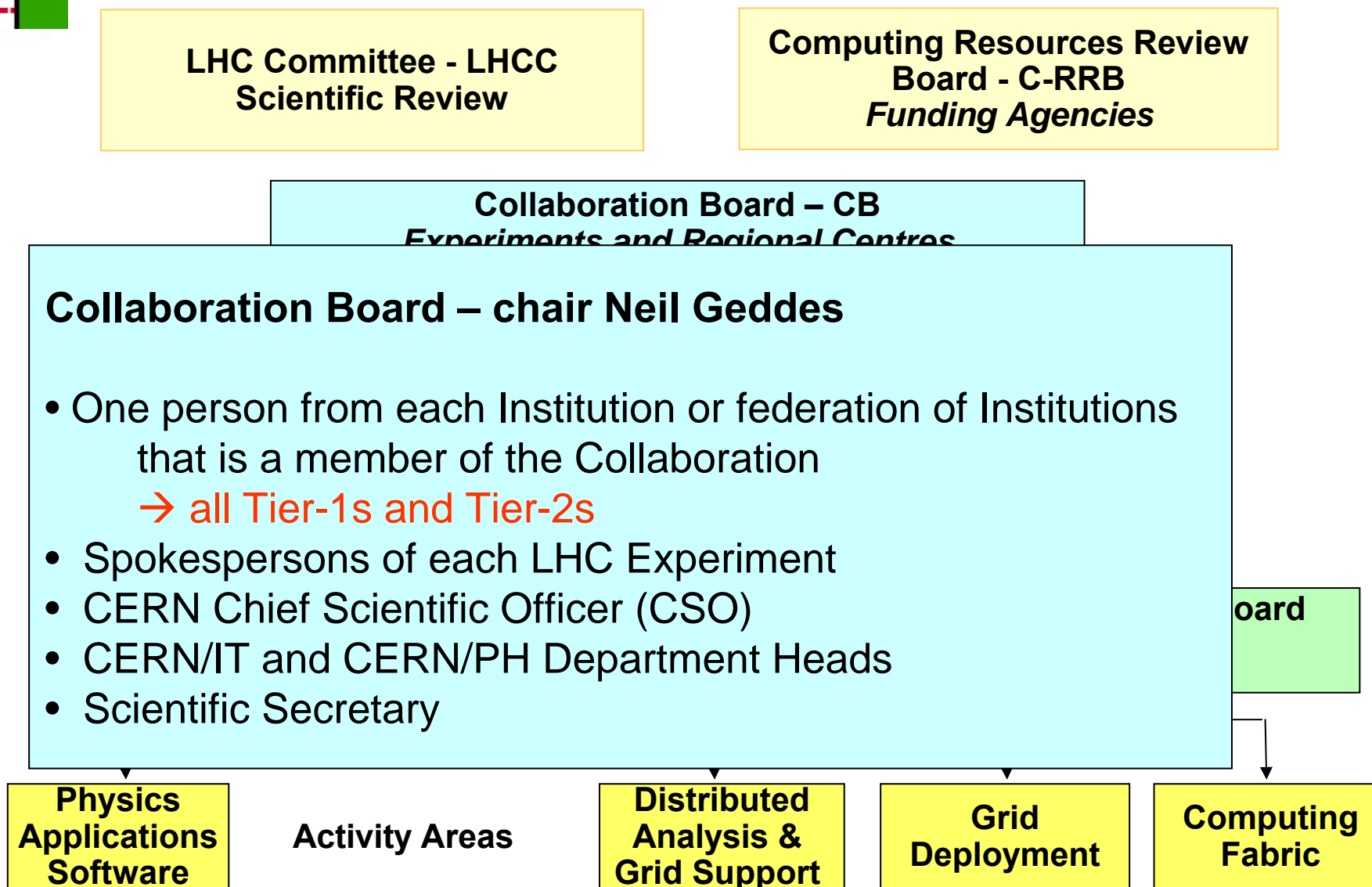




- This CB meeting is embedded in a week long workshop
- So I am assuming that you have all heard enough about the status of the project

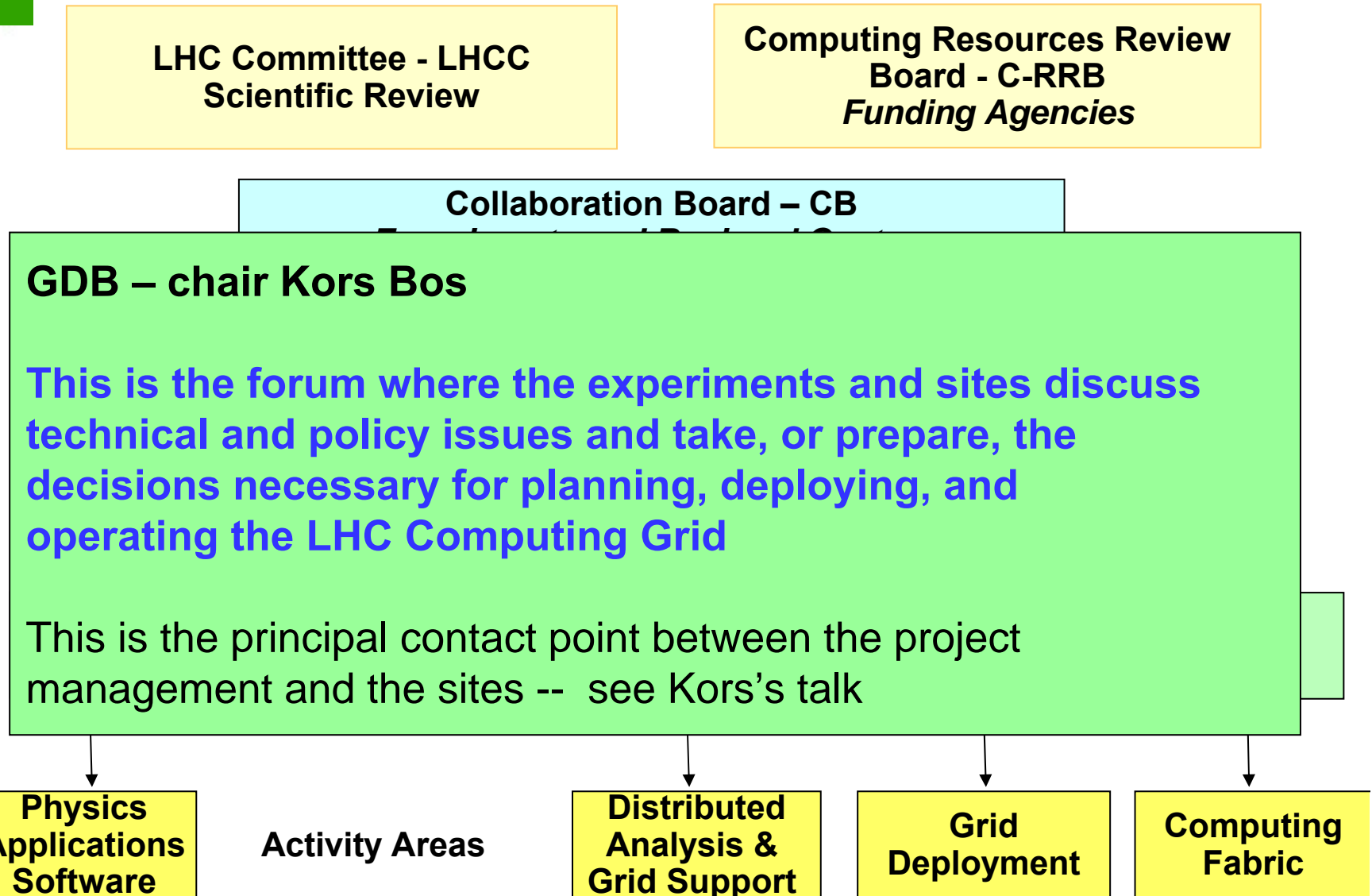


LCG Organisation – Phase 2





LCG Organisation – Phase 2





LCG Organisation – Phase 2

LHC Committee - LHCC
Scientific Review

Computing Resources Review
Board - C-RRB

Management Board – chair Project Leader

The executive board of the project

- organises and oversees the work of the project
- sets priorities and direction
- prepares the project plan
- monitors progress, service levels, resource usage
- initiates corrective actions
- meets weekly

Experiment Computing Coordinators

One person from Tier-0 and each **Tier-1** Site

GDB chair

Project Leader, Area Managers

EGEE Technical Director (Erwin Laure)

OSG Executive Director (Ruth Pordes)

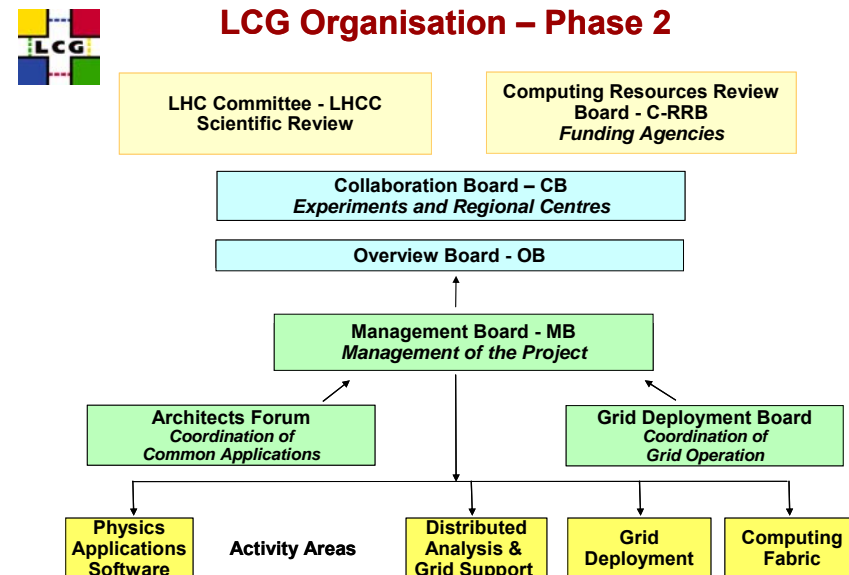
board

Computing
Fabric



Tier-2 Representation in WLCG

- Member of the Collaboration Board
- Technical discussion, evolving strategy, security policy → **GDB**
 - Tier-2s should be pro-active about ensuring that they are involved in this process
 - direct participation, through national federations
 - Monthly whole day meeting – often preceded by a technical day on a specific topic
- Operationally through the grid infrastructures
 - EGEE – regional ROC
 - OSG – US Tier-1s
 - Nordic sites – NDGF
- Input to the Management Board
 - via national Tier-1 if it exists
 - via the GDB chair for countries without a Tier-1
 - directly to me





MoU Commitments

- Resources are committed through the MoU
 - MoU defines delivered capacity,
service level – response time, reliability
 - The TDRs define how the resources are used –
 - with key parameters extracted for each site into the *MegaTable* (see talk by Chris Eck) -- network/data transfer performance, data storage classes
- The MB has to oversee how the resources are being delivered
preparing reports for the Overview Board, Computing Resource Review Board



Site Reliability

- Have been monitoring site reliability daily for CERN and Tier-1 sites since May 2006
- Reliability is measured for all EGEE sites through the Service Availability Monitoring (SAM) framework
- A subset of the basic tests have been agreed to define site availability – as seen from the grid
 - CE, SE, local BDII
 - All tests work – site is available
 - One test fails – site is not available
 - Reliability – excludes scheduled down times
 - Clearly this is simplistic – but it is a start
- SAM includes many other tests, and the framework also supports experiment specific tests
- The availability/reliability test set will evolve
- SAM sensors being developed also for OSG, NDGF
- During 2007 – progressively extend the reliability monitoring to Tier-2s



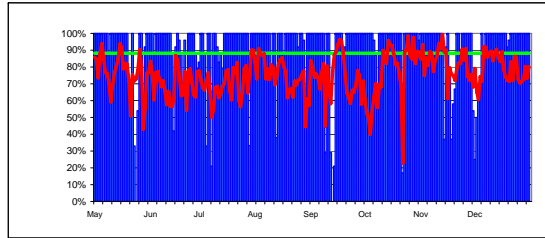
Reliability of WLCG Tier-1 Sites + CERN

2006

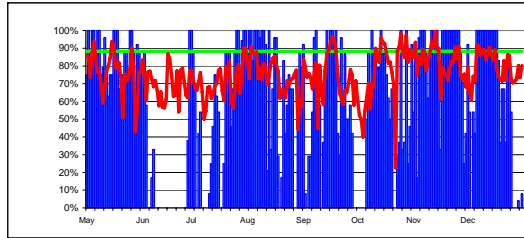
Data from SAM monitoring. Site availability and reliability as agreed in WLCG MB on 11 July 2006 (scheduled interruptions are excluded when calculating reliability)

Availability is plotted May through August, reliability is plotted from September on. Availability means tests passed, reliability means test passed or site scheduled down.

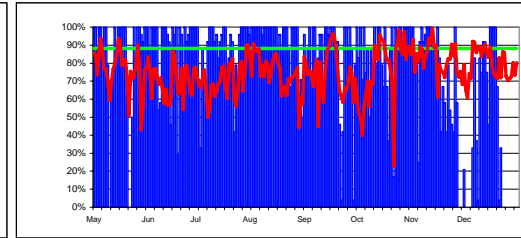
target (90% of MoU) — 88% site average colour coding: < 90% of target ≥ 90% of target ≥ target
average (all sites) — 79% 8 best sites 84% # sites: ≥ target 2 ≥ 90% of target 7



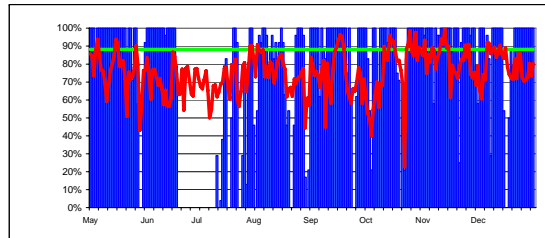
CERN-PROD average 93%



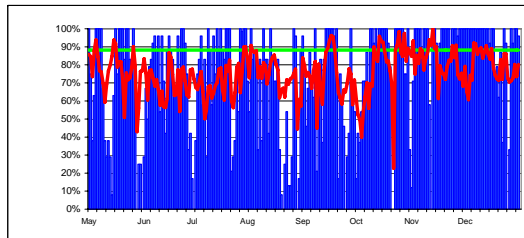
FZK-LCG2 average 67%



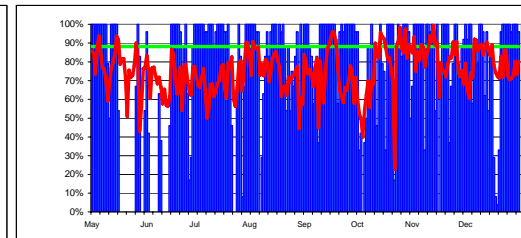
IN2P3-CC average 64%



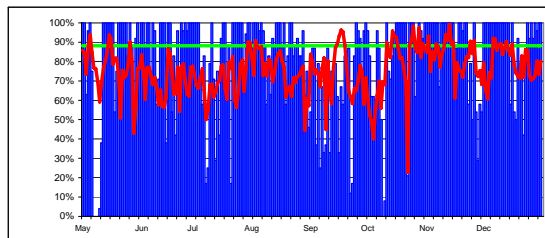
INFN-T1 average 88%



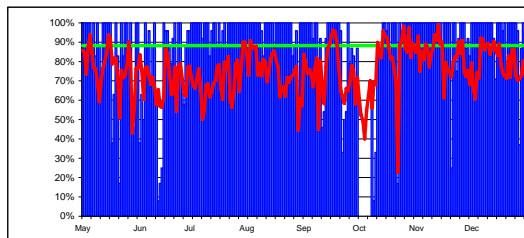
RAL-LCG2 average 85%



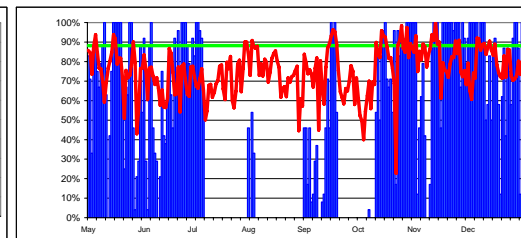
SARA-MATRIX average 80%



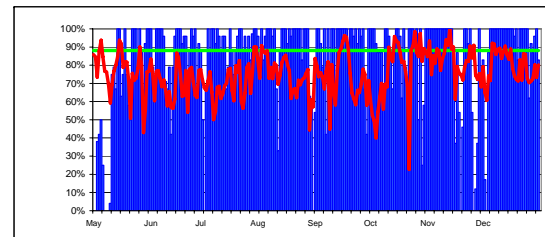
TRIUMF-LCG2 average 86%



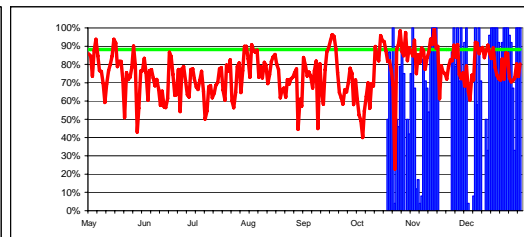
Taiwan-LCG2 average 85%



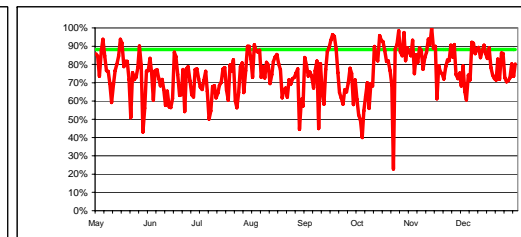
USCMS-FNAL-WC1 average 70%



PIC average 85%



BNL-LCG2 average 51%



NDGF average n/a



Other metrics

- Resource provision and usage (accounting)
- Network data throughout, quality
- Job reliability



Accounting

- Accounting data for CERN and Tier-1s reported to OB since April 2006 -- and to the C-RRB from last October
- User-level accounting will be introduced over the next few months
- Reporting will be progressively extended to Tier-2s during 2007

WLCG Accounting Summary
 December 2006 data source: site reports to LCG Project Office
 Centre Summary of CERN + Tier-1s

Please report accounting data in the shaded cells and return the report to lcg.office@cern.ch

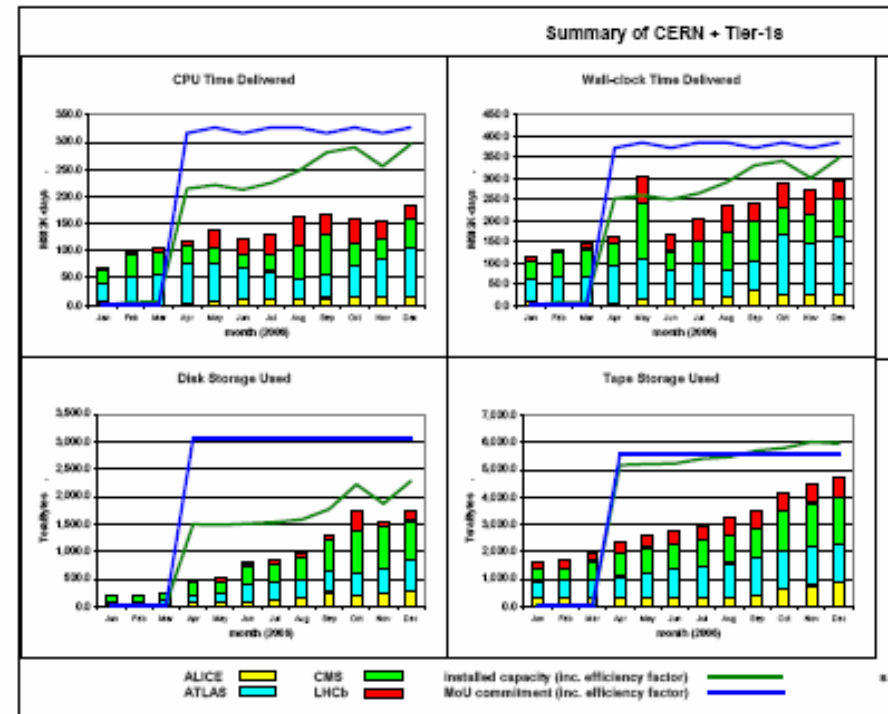
MoU pledges for 2006	
CPU (KSI2K-years)	12,404
Disk (Tbytes)	4,381
Tape (Tbytes)	5,546

Standard efficiency factors	
Scheduled cpu used (Tier-0, -1)	85%
Chaotic cpu used (Tier-2)	60%
Disk utilisation	70%
Mass store utilisation	100%

CPU used - KSI2K-days

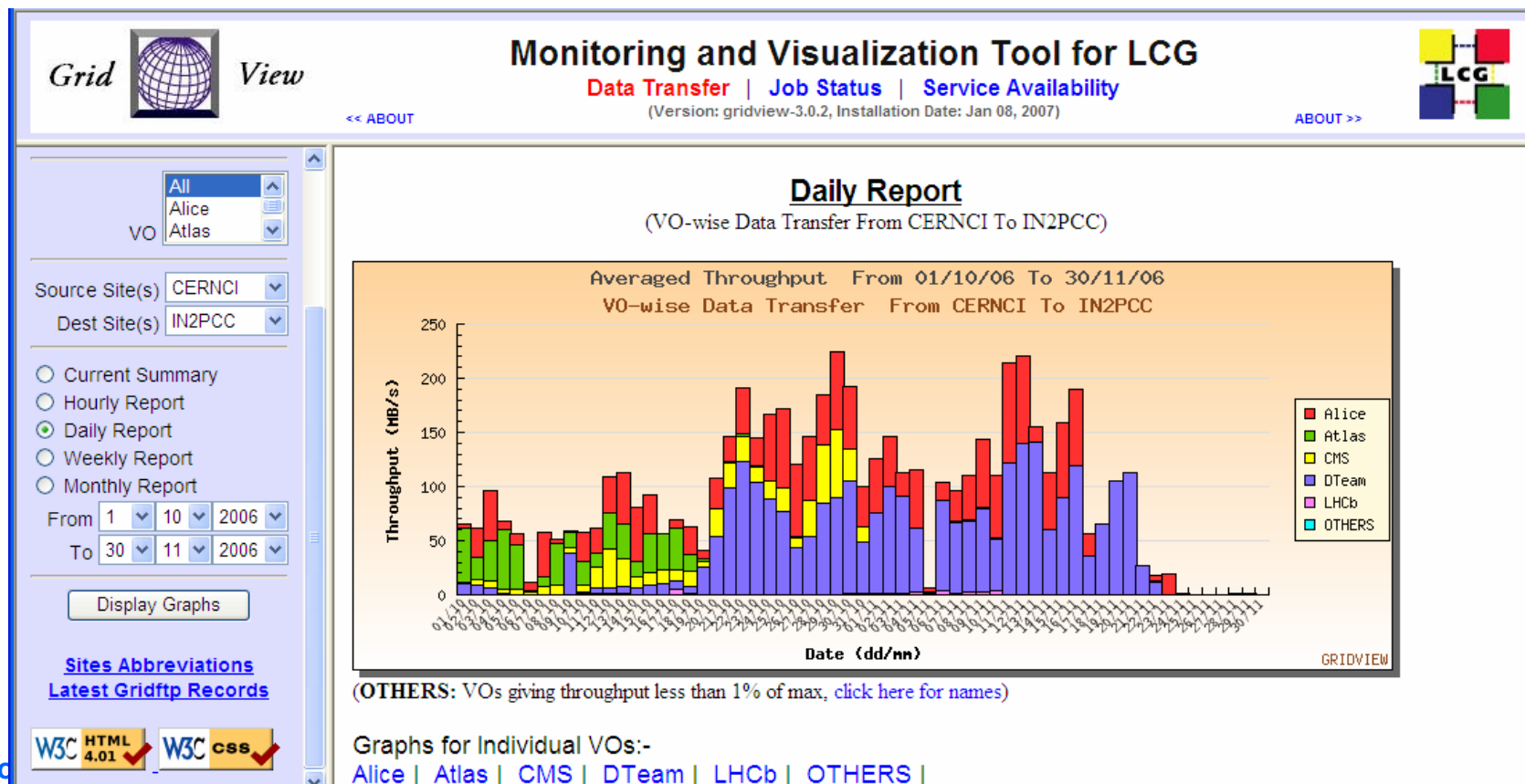
	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	MoU* monthly average	aggregate 2006 to date***	total	% MoU	
ALICE	CPU	1,710	875	1,320	3,750	9,065	9,263	8,262	11,749	13,852	12,902	16,522		88,473			
	MoU	2,871	1,380	6	5,862	6,264	11,272	13,482	14,817	31,771	23,287	21,194	24,016	183,796			
ATLAS	CPU	14,830	24,230	23,445	47,916	41,477	39,482	37,873	21,067	27,789	43,298	66,878	71,258		453,534		
	MoU	21,280	28,428	27,283	53,027	51,222	48,488	46,086	31,477	40,077	74,884	96,827	109,387	618,843			
CMS	CPU	13,046	13,796	14,354	17,054	10,317	13,961	16,773	47,613	82,962	18,134	27,542	29,177		284,066		
	MoU	22,801	24,681	24,461	35,344	86,787	27,229	26,170	86,483	76,185	28,418	62,671	61,236	618,802			
LHCb	CPU	1,134	1,815	5,465	7,265	32,390	25,965	36,660	50,149	34,667	38,894	28,190	23,428		265,402		
	MoU	4,066	3,211	7,438	8,401	48,969	35,348	46,690	58,029	40,084	44,414	56,286	36,468	362,194			
TOTAL	CPU	30,491	43,886	53,284	73,019	37,454	39,473	36,496	126,070	157,144	114,136	119,616	143,383	319,362	1,111,966	25%	
	MoU	86,794	83,006	88,481	124,144	186,964	119,226	116,827	279,064	287,827	279,584	268,894	314,047	1,478,880			

Notes - cpu tables
 * MoU monthly average - commitment in MoU for K
 ** installed capacity - capacity installed (KSI2K)
 *** aggregate 2006 to date - total - KSI2K-days data
 - % MoU - percentage of
 **** cpu usage as % installed - includes efficiency fac





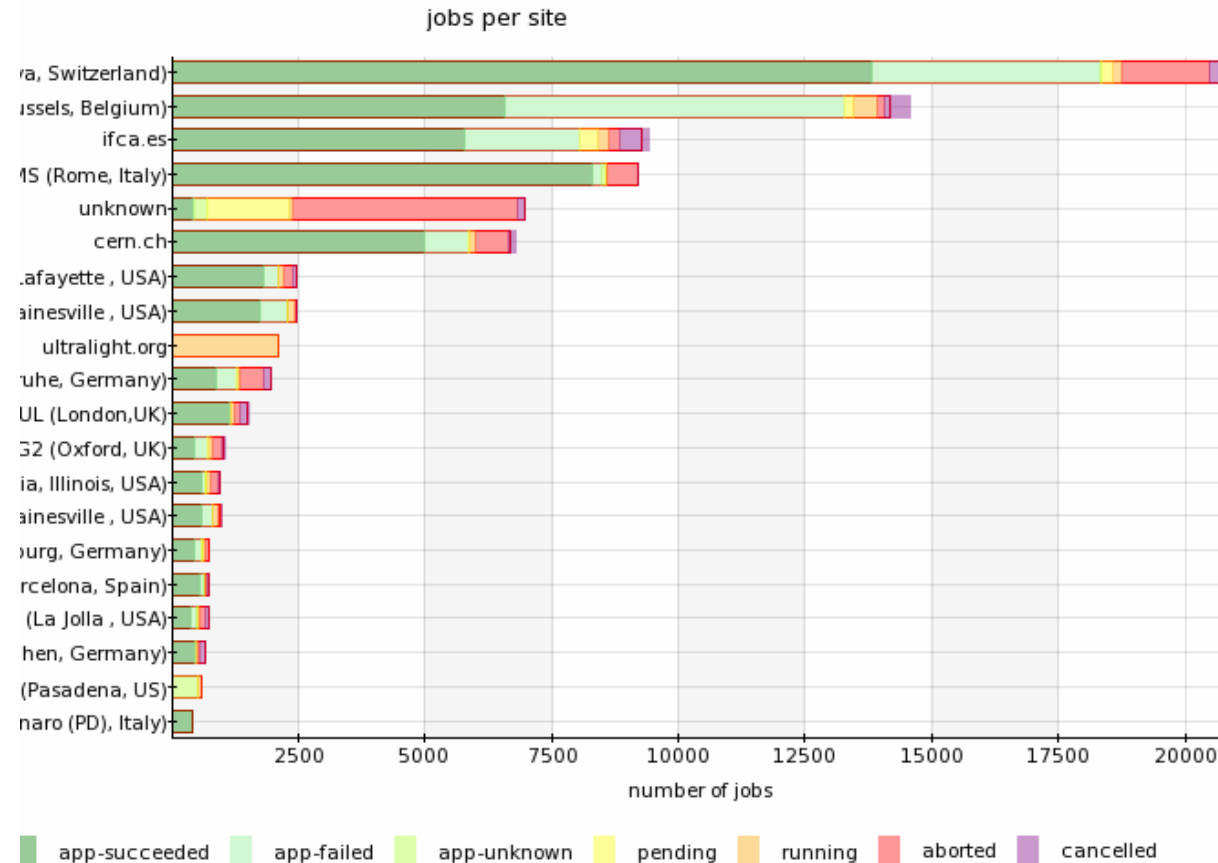
- Network data throughout, quality
 - Focus of the 2006 Service Challenge was on CERN → Tier-1s
 - Defining now milestones for Tier-1 ↔ Tier-2
Data rates specified in the MegaTable
 - Measurements -- driven by experiments (tests and production)
 - Reporting at the project level by GridView





- Job reliability –

- ATLAS and CMS dashboards – measure job success rates for certain classes of job
- being extended also to ALICE, LHCb
- Working on defining appropriate metrics



Inter-Site Rates - Revised Megatable

Centre	T0->T1	T1->T2	T2->T1	T1<->T1
	Predictable - Data Taking	Bursty - User Needs	Predictable - Simulation	Scheduled Reprocessing
IN2P3, Lyon	220	286.2	85.5	498.0
GridKA, Germany	220	384.9	84.1	395.6
CNAF, Italy	190	321.3	58.4	583.8
FNAL, USA	110	415.0	52.6	417.0
BNL, USA	300	137.7	24.8	358.0
RAL, UK	120	108.3	36.0	479.4
NIKHEF, NL	160	34.1	6.1	310.4
ASGC, Taipei	120	126.5	19.3	241.2
PIC, Spain	100	167.1	23.3	234.5
Nordic Data Grid Facility	60	-	-	62.4
TRIUMF, Canada	60	-	-	55.0

Continued testing of computing models, basic services

Testing **DAQ→Tier-0 (??)** & integrating into **DAQ→Tier-0→Tier-1** data flow

Building up end-user analysis support

Exercising the computing systems, ramping up job rates, data management performance,

WLCG Commissioning Schedule

2006

2007

2008

SC4 – becomes initial service when reliability and performance goals met

Introduce residual services
Full FTS services; 3D; gLite 3.x;
SRM v2.2; VOMS roles; SL(C)4

Initial service commissioning – increase performance, reliability, capacity to target levels, experience in monitoring, 24 x 7 operation,

01jul07 - service commissioned - full 2007 capacity, performance

first collisions in the LHC. Full FTS services demonstrated at 2008 data rates for all required Tx-Ty channels, over extended periods, including recovery (T0-T1).



The first collisions



- The accelerator schedule foresees first collisions in November
- So the experiments will have the first interesting data by the time of CERN's scheduled closure on 22 December and presumably they will want to start analysing it right away
- If there are delays in the start-up the current intention is to continue setting up over the year-end

In both cases →

Sites need to plan flexible coverage over the end of this year



Planning Page

formal resource data, reports, milestones

MB, GDB

agendas, minutes

LCG home | Calendar | Meetings | Contact Us

- ▶ Project Structure
 - Boards
 - CRRD
 - MB
 - CB
 - Committees
 - LHCC
 - Architects Forum
- ▶ Project Planning
- ▶ Documents
- ▶ Dissemination
- ▶ Related Projects
- ▶ LCG Bulletin
- ▶ Press & Media
- ▶ Jobs

Worldwide LHC Computing Grid
Distributed Production Environment for Physics data Processing

The Large Hadron Collider (LHC), currently being built at CERN near Geneva, is the largest scientific instrument on the planet. When it begins operations in 2007, it will produce roughly 15 Petabytes (15 million Gigabytes) of data annually, which thousands of scientists around the world will access and analyse.

The mission of the LHC Computing Project (LCG) is to build and maintain a data storage and analysis infrastructure for the entire high energy physics community that will use the LHC.

▶ Project Overview

Activities

- ▶ Distributed Analysis (ARDA)
- ▶ Grid Deployment
- ▶ LCG Middleware
- ▶ Security
- ▶ Service Challenges
- ▶ Physics Application Software
- ▶ LCG Optical Private Network

▶ Technical Design Report (TDR)
▶ Status of WLCG (presentation at IEEE NSS Conference 06)

LCG Users

New Users

- User Registration

Registered Users

- User Support
- Experiments Integration Support

LCG Sites

Getting Started

- Software Releases

Site Guides and FAQ

- Site Security

LCG Operations

Monitoring

- Core Infrastructure Center

Regional Centers

- Security Incidents

Local intranet

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- ▶ Project Structure
 - Boards
 - CRRB
 - MB
 - CB
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LCG Bulletin

24 January 2007 - Issue No. 13 - [Previous Issues](#)

Grid Deployment Board (GDB)

[Web](#) - [Wiki](#) - [Agendas](#) - [Minutes](#)

10 January 2007 - [Agenda](#)

At the latest GDB meeting presentations were about: **Security Documents** to approve in next meetings, update on **User and Storage Accounting**, LCG 3D DB status, use of **Dashboards for ATLAS and CMS**, **Monitoring and Storage Classes Working Groups**, **Plans from Experiments and Sites**.

The "pre-GDB" meeting discussed the status and mandate of the **Working Group on Storage Classes**. [pre-GDB 9 Jan](#)

WLCG-OSG-EGEE Operations (OPS)

[Agendas](#) - [Action List](#)

15 January 2007 - [Agenda](#), [Minutes](#)

ALICE on SL4 - ALICE testing their software on SL4 on the Pre-Production Service. A small incompatibility was found in the ALIROOT libraries but the fix for this issue is expected very soon.

Monitoring File Transfers and SRM Endpoints - LHCb raised issues concerning the reliability of data transfers between Tier-1 sites. ROCs and sites should use the prototype of the FTS monitoring tool to check on the status of their services frequently.

Also the grid operators and the ROCs should actively monitor the FTS services and the SRM endpoints (through SAM). Initially this will be carried out at the CERN Tier-0 site. When adequate experience is gained (2-3 weeks) a request will be sent to the grid operators in order to monitor for the FTS/SRM services at all Tier-1 sites. [Link](#).

[Sites Availability](#) - [Accounting Summary](#) - [LCG Planning](#)

Management Board (MB)

[Web](#) - [Wiki](#) - [Members](#) - [Agendas](#) - [Minutes](#)

16 January 2007 - [Agenda](#)

GSSD Working Group - Mandate and attendance of the GSSD (Grid Storage Systems Deployment) working group was approved by the MB.

Targets for 2007 Update - J.Shiers presented the progress, since the previous week, on defining milestones and targets for 2007.

9 January 2007 - [Agenda](#), [Minutes](#)

Decisions on Accounting - As follow-up to the previous meeting, the MB agreed on how and when accounting data will become be collected automatically and when it will be extended also to the WLCG Tier-2 sites.

Update on VOMS Roles/Groups and Priorities - J.Templon presented the status of the work done, and what is still needed, in order to implement Job Scheduling Priorities at the WLCG Tier-1 sites.

Targets for 2007 Update - J.Shiers presented the progress on defining milestones and targets for 2007.

Long-Term Planning for the CERN CC - L.Robertson presented initial ideas about the organization of long-term future computing resources and asked for input from the LHC experiments.

Architects Forum (AF)

[Minutes](#) - [Web](#)

11 January 2007 - [Minutes](#)