



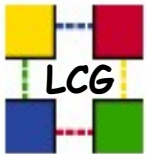
LHC Computing Grid

Status of Resources and Financial Plan

Sue Foffano
IT Department, CERN
23rd October 2007

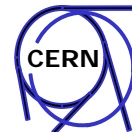
www.cern.ch/lcg





Introduction

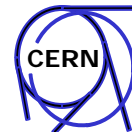
- This presentation covers:
 - The progress in signing the WLCG MoU
 - Funding and expenditure for WLCG at CERN
 - 2005-2008
 - 2009-2012
 - Resource usage accounting
 - for external Tier-1s and CERN
 - for Tier-2s
 - A summary of the revised computing capacity pledges
- Details can be found in:
 - The written report (CERN-RRB-2007-103)
 - The LCG planning web pages: <http://lcg.web.cern.ch/LCG> (Project Planning)





Signing the WLCG MoU (1)

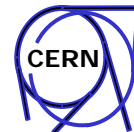
- Since the April 2007 C-RRB the following federations have signed:
 - Spain (T1+T2)
 - Switzerland (T2)
 - Australia (T2)
 - Israel (T2)
 - JINR, Dubna (T2)
 - Russia (T2)
 - Slovenia (T2)
 - Germany - ATLAS Federation FR/W (T2)
- Of the 11 Tier-1 Centres, all have signed except the Nordic Data Grid Facility (NDGF) which is still to be signed by Finland, Norway and Sweden, Denmark having already signed.





Signing the WLCG MoU (2)

- Signatures are expected soon for the following Tier-2s :
 - Austria - Institute for HEP, Vienna & University of Innsbruck
 - Germany - Ludwig Maximilian Universität (LMU) for the ATLAS Federation, Munich
 - Germany - Albert-Ludwigs-Universität (ALU), Freiburg for the new ATLAS Federation FR/W (Universities of Freiburg & Wuppertal)
- Following information from the WLCG Collaboration Board member, the signature from the Czech Republic is pending budget approval. It is currently unclear when this will be received.





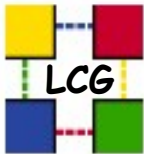
Additional Tier-2 Centres

- The following centres are planning to join the WLCG collaboration.

Tier-2 Centres	ALICE	ATLAS	CMS	LHCb
Brazil CBPF, UERJ, UFRJ, UNESP	X	X	X	X
Canada East		X		
Canada West		X		
Estonia, NICPB, Tallinn			X	
Hungary KFKI, SZTAKI, Eotvos & Debrecen Universities	X		X	
Korea	X		X	
Turkey		X	X	

Already
presented
at April
C-RRB

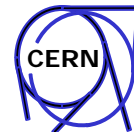




Breaking News

A new Tier-2 has been added on 12/10/07:

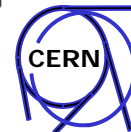
- France - LAPP, Annecy serving ATLAS and LHCb with priority
- 2 MoU signatures are planned to take place today:
 - Korea for an ALICE Tier-2
 - Finland for the NDGF Tier-1 and their CMS Tier-2
- 4 countries have provided pledge information and requested preparation of the MoU for signature:
 - Norway on 11/10/07 for the NDGF Tier-1 and their ATLAS Tier-2
 - Hungary on 16/10/07 for their ALICE and CMS Tier-2
 - Canada on 17/10/07 for their East and West ATLAS Tier-2s
 - Estonia on 18/10/07 for their CMS Tier-2
- It increases the current number of Tier2 Federations from 53 (as documented in CERN-RRB-2007-103) to 55 by the end of today and 59 very soon....
- WLCG continues to grow!





LCG Budget Estimates in MCHF 2005-2008

	2005	2006	2007	2008	TOTAL
Total					
- Personnel	1.5	19.9	22.5	20.5	64.4
- Materials	1.8	21.3	14.4	31.2	68.7
Total Funding	3.3	41.2	36.9	51.6	133.0
Expenditure					
- <i>Personnel **</i>	1.5	19.8	21.9	19.9	63.1
- <i>Materials</i>	1.8	21.3	14.1	30.3	67.4
- Physics Operations		5.0	4.6	4.9	14.6
- Tier 0 and CERN Analysis Facility	1.8	16.3	9.4	25.3	52.8
Total Planned Expenditure	3.3	41.1	35.9	50.1	130.5
Balance Personnel	0.0	0.0	0.7	0.6	1.3
Balance Materials	0.0	0.0	0.3	0.9	1.2
Balance	0.0	0.0	1.0	1.5	2.5





LCG Budget Estimates in MCHF 2009-2012

	2009	2010	2011	2012	TOTAL
Total					
- Personnel	14.6	15.4	13.7	13.6	57.3
- Materials	23.4	22.2	22.2	22.2	89.9
Total Funding	37.9	37.6	35.9	35.8	147.2
Expenditure					
- Personnel	14.1	15.5	14.0	13.2	56.9
- Materials	24.7	24.1	22.3	23.4	94.5
Total Planned Expenditure	38.8	39.6	36.4	36.6	151.4
Balance Personnel	0.4	-0.1	-0.3	0.4	0.4
Balance Materials	-1.3	-1.9	-0.1	-1.2	-4.6
Balance	-0.9	-2.0	-0.5	-0.8	-4.2



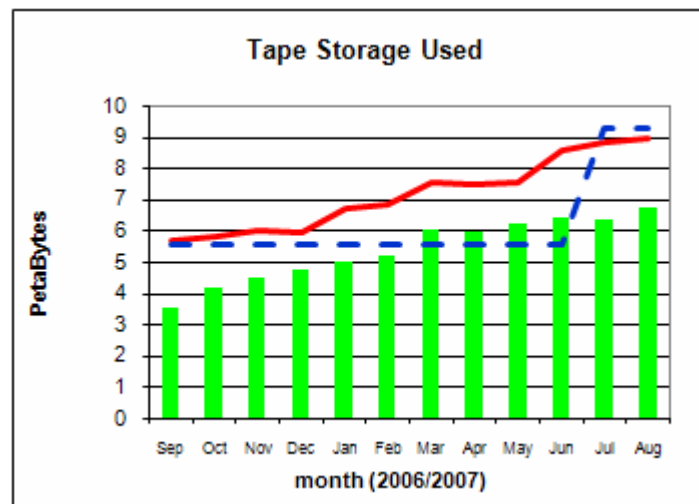
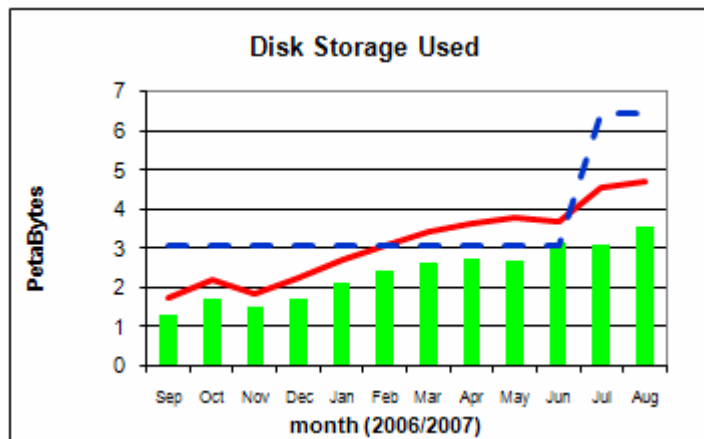
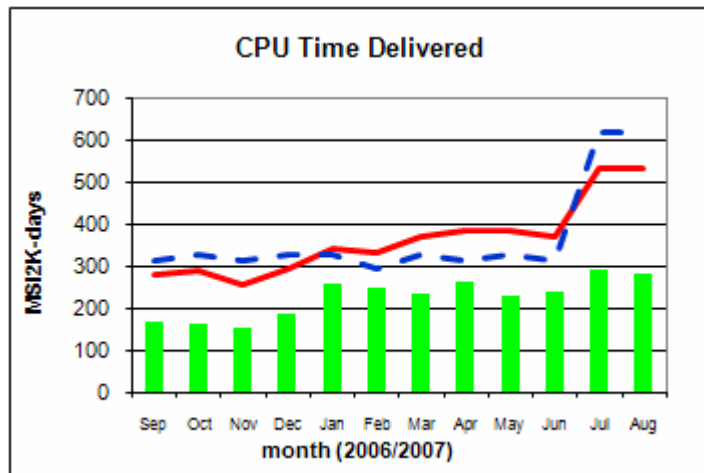
LCG Budget Estimates at CERN 2005-2012

- Slides 7 & 8 show CERN funding and planned expenditure for 2005-2008 and 2009-2012 of the LCG project at CERN in MCHF.
- It should be noted that the LCG personnel planning at CERN assumes that a successor project to EGEE2 delivers 14 FTE to Grid Deployment activities from April 2008-March 2010.
- The future estimated materials expenditure includes:
 - the latest requirements data from the experiments up to 2012
 - an allowance for adapting the CERN infrastructure to the increased power and cooling requirements

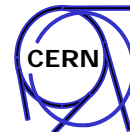


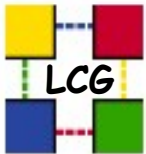


CPU, Disk and Tape used September 2006-August 2007



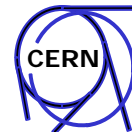
installed capacity ————
MoU commitment - - - - -





Accounting for Tier-1s and CERN

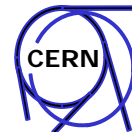
- The graphs on slide 10 shows a summary of CPU, Disk and Tape Storage accounting from September 2006 to August 2007 for Tier-1s and CERN.
- How to interpret the graphs:
 - red line indicates installed capacity
 - blue dotted line indicates the pledged capacities
 - green bars show the usage of the resource, summing up all four experiments
- Despite the increase in installed capacity the MoU pledge levels are not reached particularly for disk and CPU.
- It becomes **urgent**:
 - that 2007 commitments are fully honoured
 - that 2008 commitments are installed and **fully in production** by April 2008

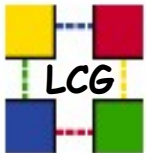




Accounting for Tier-2s (1)

- In June an information campaign started amongst the Tier-2 sites to inform them that formal reporting of CPU usage would begin from September 2007 onwards on a monthly basis.
- Test reporting took place in July and August to:
 - give sites an opportunity to see what their data looked like in a global context
 - help sites who were not reporting data to the accounting portal to do so
- Of the 53 Federations asked to identify sites to participate in the reporting, 5 have not yet provided this information:
 - Finland, Germany (ATLAS Federation, Munich), Norway, Sweden, Ukraine
- 48 Federations provided the information:
 - 108 sites were identified
 - of which 94 reported accounting data in September





Accounting for Tier-2s (2)

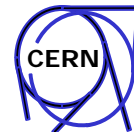
- The first formal report was produced mid October for September data.
- The report is available on the LCG web site giving details of the breakdown by Federation.
- Globally 48% of the pledged CPU was delivered in September
 - many sites are far from their pledge value
- Work is still required to identify remaining sites, and ensure that all sites report data
 - federations who have not yet identified sites are urgently requested to do so
- A more complete report for the first 6 month period will be given in the April C-RRB meeting.





Revised Capacity Pledges (1)

- The 4 LHC experiments were asked to revise and update their computing requirements for 2008-2012 in July 2007.
- The information was received from ATLAS in July, and ALICE, CMS and LHCb later in the summer.
- All Tier-1 and Tier-2 federations were asked to confirm their pledge values for 2008 and provide values for 2009-2012 inclusive in accordance with the MoU.
- A majority of federations have not yet responded:
 - Tier-1s: 5/11 have responded
 - Tier-2s: 24/54 have responded
- From the data received so far, particularly from Tier-2s, many pledge values for 2011 and 2012 remain as for 2010.
- This is a major cause for concern, as if this trend continues there will be major discrepancies between rising requirements and pledges which do not rise as expected.





Revised Capacity Pledges (2)

- The table below shows the picture as we know it for 2008 from the responses received from the Tier-1 and Tier-2 sites.
- The following data have been used:
 - Where a new pledge value was provided => new pledge
 - Where no information provided => old pledge
- % indicates the balance between offered and required.
- New pledge values will change the picture...better or worse ?

	ALICE	ATLAS	CMS	LHCb	Sum 2008
T1 CPU	-46%	13%	8%	100%	1%
T1 Disk	-39%	8%	-28%	84%	-8%
T1 Tape	-48%	-1%	-7%	67%	-12%
T2 CPU	-47%	6%	30%	-3%	-2%
T2 Disk	-10%	-24%	-11%	-	-16%



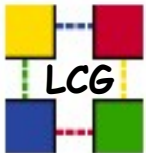


Revised Capacity Pledges (3)

- The table below shows the picture as we know it for 2008-2012 from the responses received from the Tier-1 and Tier-2 sites.
- The following data have been used:
 - Where new pledge values were provided => new pledges
 - Where no information => last existing value reused
- % indicates the balance between offered and required.
- A very pessimistic picture emerges.

	Sum 2008	Sum 2009	Sum 2010	Sum 2011	Sum 2012
T1 CPU	1%	-11%	-13%	-25%	-35%
T1 Disk	-8%	-13%	-18%	-26%	-36%
T1 Tape	-12%	-14%	-19%	-31%	-41%
T2 CPU	-2%	-18%	-38%	-47%	-57%
T2 Disk	-16%	-10%	-4%	-18%	-36%

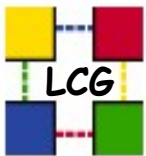




Revised Capacity Pledges (4)

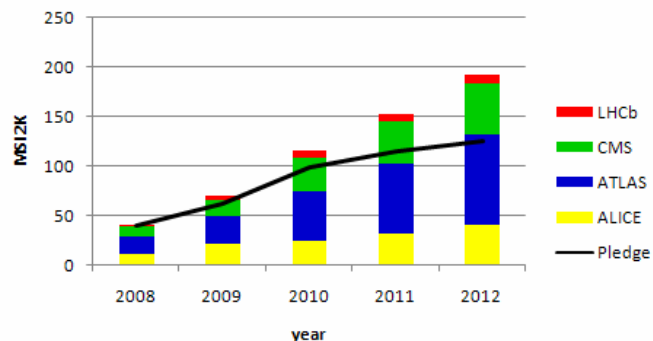
- It becomes urgent that all remaining federations reply as soon as possible :
 - confirming or updating their pledge for 2008
 - providing pledges for 2009-2012
- Federations should plan to renew their computing resources in the future to enable increased pledges to be guaranteed.
- Slides 18 and 19 show graphically the same information and what will happen if nothing changes.
- Your participation and commitment are essential to improve these trends.



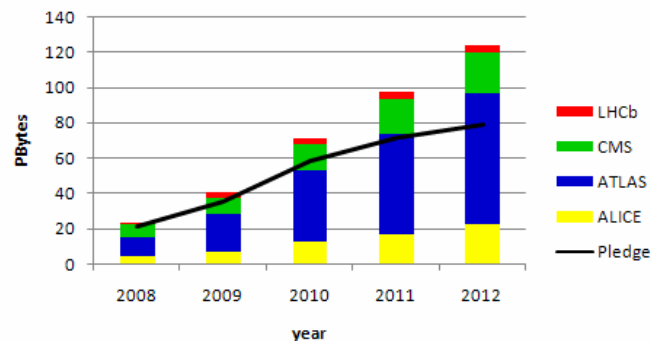


Requirements v's Pledges 2008-2012 for Tier-1s

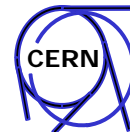
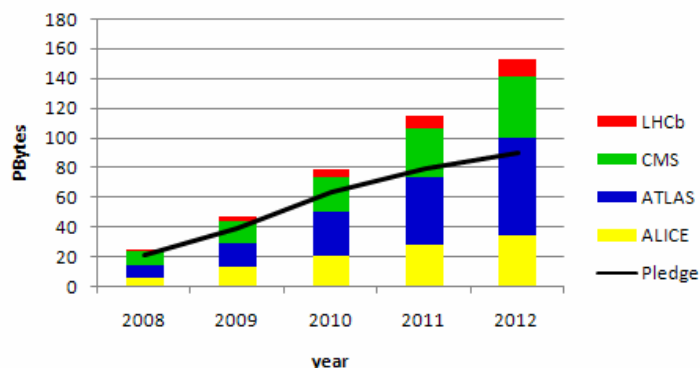
**CPU Requirements v. Pledges
Tier-1s (excl. CERN)**

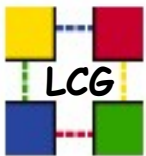


**Disk Requirements v. Pledges
Tier-1s (excl. CERN)**

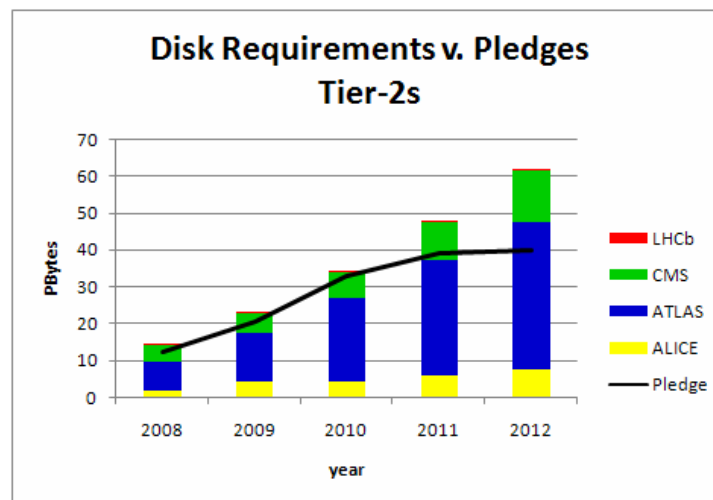
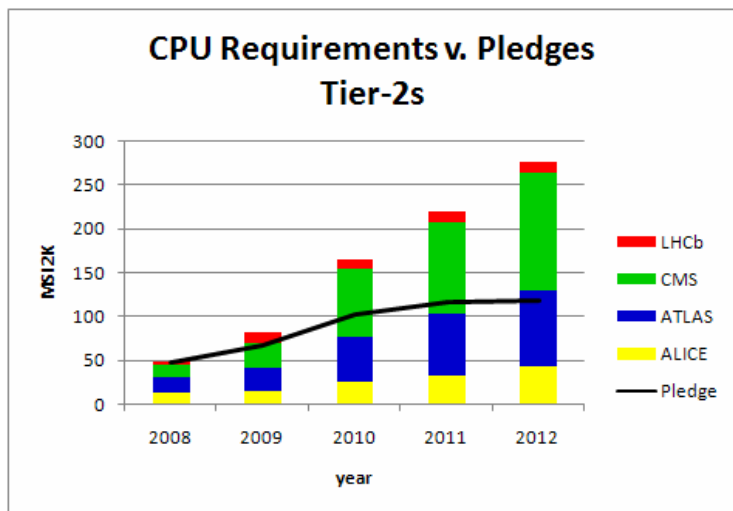


**Tape Requirements v. Pledges
Tier-1s (excl. CERN)**





Requirements v's Pledges 2008-2012 for Tier-2s





Conclusions/Key Messages

- MoU: The signing of the 2 remaining NDGF countries (Norway and Sweden), Austria, Germany (LMU and ALU) are expected very soon.
- Conclusion and signing of the MoU for the additional announced T2 centres before the next C-RRB meeting.
- MoU pledge levels for 2007 must be fully honored and for 2008 installed and in production by April 2008 to ensure sufficient time for full-scale testing.
- Tier-2 Federations must ensure that their sites are identified and reporting data for accounting purposes, and their pledge level is reached.
- Tier-1 and Tier-2 Federations **MUST** confirm their 2008 pledges and provide pledge values from 2009-2012:
 - New deadline: **Friday 30/11/07**

