



LHC Computing Grid

Status of Resources and Financial Plan

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Agenda

- WLCG MoU status
- Funding and expenditure for WLCG at CERN
 - 2005-2008 WLCG Phase 2 final financial status
 - 2009-2013 estimates
- Resource usage accounting
 - external Tier-1s and CERN
 - Tier-2s
- Computing Resource Requirements and Pledges
 - Current pledge situation
 - Revised experiment requirements
 - Expectations for Autumn C-RRB meeting
- Conclusions

Supporting information can be found in:

- Written report (CERN-RRB-2009-045)
- WLCG web pages: Lcg.web.cern.ch/LCG



WLCG MoU Signature Status

- Since the November 2008 C-RRB the following MoUs as Tier-2 sites have been signed:
 - Austria - supporting ATLAS and CMS (already announced for mid-November 2008, received 12/11/08)
 - Germany, University of Goettingen - supporting ATLAS
 - Republic of Korea, CHEP - supporting CMS (signature on 11/11/08)
- Progress has been made with the São Paulo Regional Analysis Center (SPRACE), Brazil:
 - MoU for the Brazilian Tier-2 SPRACE supporting CMS is currently in the signature circuit



WLCG MoU Signature Status

Member States	Non-Member States
Austria	Australia
Belgium	Brazil (on-going)
Czech Republic	Canada
Denmark	China
Finland	Estonia
France	India
Germany	Israel
Hungary	Japan
Italy	Korea
The Netherlands	Pakistan
Norway	Romania
Poland	Russia
Portugal	Slovenia
Spain	Taipei
Sweden	Turkey
Switzerland	Ukraine
United Kingdom	USA



WLCG Phase 2 final status (MCHF)

	2005	2006	2007	2008	TOTAL
Funding					
- Personnel	1.5	19.8	21.1	19.3	61.7
- Materials	1.8	21.3	18.6	27.0	68.7
Total Funding	3.3	41.1	39.7	46.3	130.4
Expenditure					
- <u>Personnel</u>	1.5	19.8	21.1	19.3	61.7
- <u>Materials</u>	1.8	21.3	18.6	26.3	68.0
Total Planned Expenditure	3.3	41.1	39.7	45.6	129.7
Balance Personnel	0.0	0.0	0.0	0.0	0.0
Balance Materials	0.0	0.0	0.0	0.6	0.6
Balance	0.0	0.0	0.0	0.6	0.6



WLCG Budget Estimates in MCHF 2009-2013

	2009	2010	2011	2012	2013	TOTAL
Funding						
Total						
- Personnel	15.8	16.2	14.6	13.9	13.9	74.5
- Materials	25.3	23.5	23.5	23.5	23.5	119.4
Total Funding	41.1	39.8	38.1	37.5	37.4	193.9
Expenditure						
- Personnel	16.1	16.5	15.0	14.4	14.5	76.4
- Materials	24.5	23.3	24.9	21.9	22.9	117.5
Total Planned Expenditure	40.6	39.8	39.9	36.3	37.3	193.9
Balance Personnel	-0.3	-0.2	-0.4	-0.4	-0.5	-1.8
Balance Materials	0.8	0.2	-1.4	1.6	0.6	1.8
Balance	0.5	0.0	-1.7	1.1	0.1	0.0

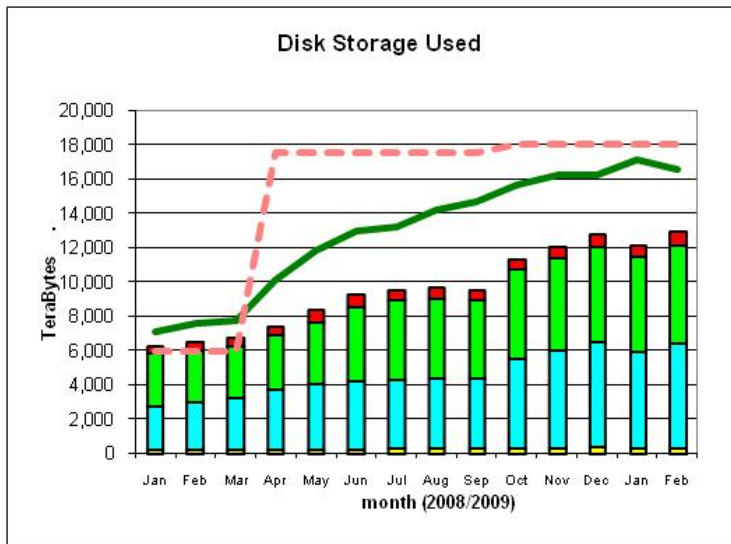
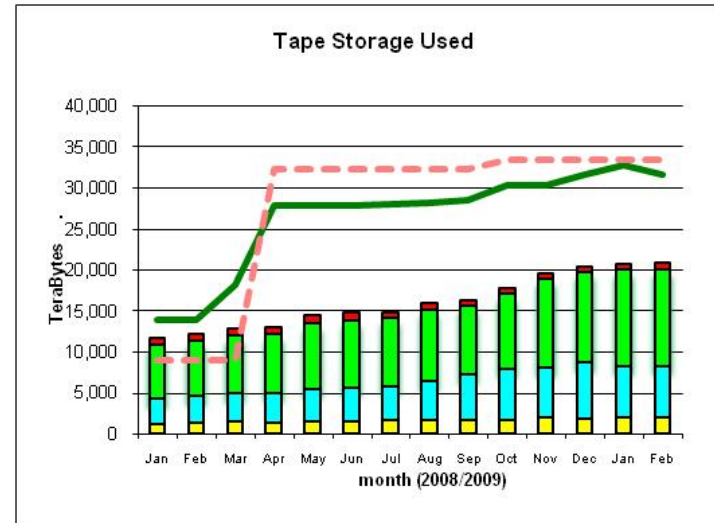
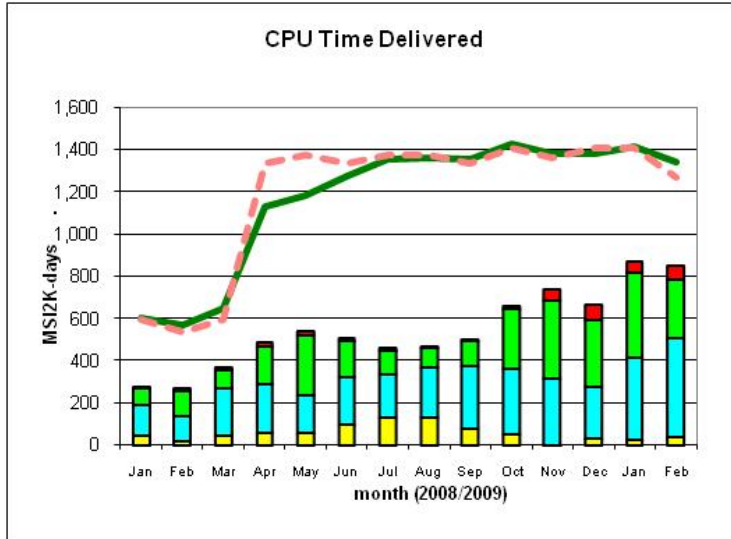


WLCG Budget

- Slide 5 shows the final position of WLCG Phase 2 2005-2008
 - Personnel balance of 0
 - Materials balance of 0.6 MCHF
- Slide 6 shows CERN funding and planned expenditure for 2009-2013 of the WLCG project at CERN in MCHF
- The current estimates show a slight personnel overspend however this will depend on actual dates of staff movements
- The materials expenditure is not yet finalised in view of the recent requirements changes and waiting for input from the LHCC and RSG bodies
- Based on the current Medium Term plan and current plans, the project does not look likely to run into major financial difficulties



CERN and Tier-1 Accounting January 2008-February 2009



	ALICE		CMS		
	ATLAS		LHCb		
	installed capacity (inc. efficiency factor)				
	MoU commitment (inc. efficiency factor)				

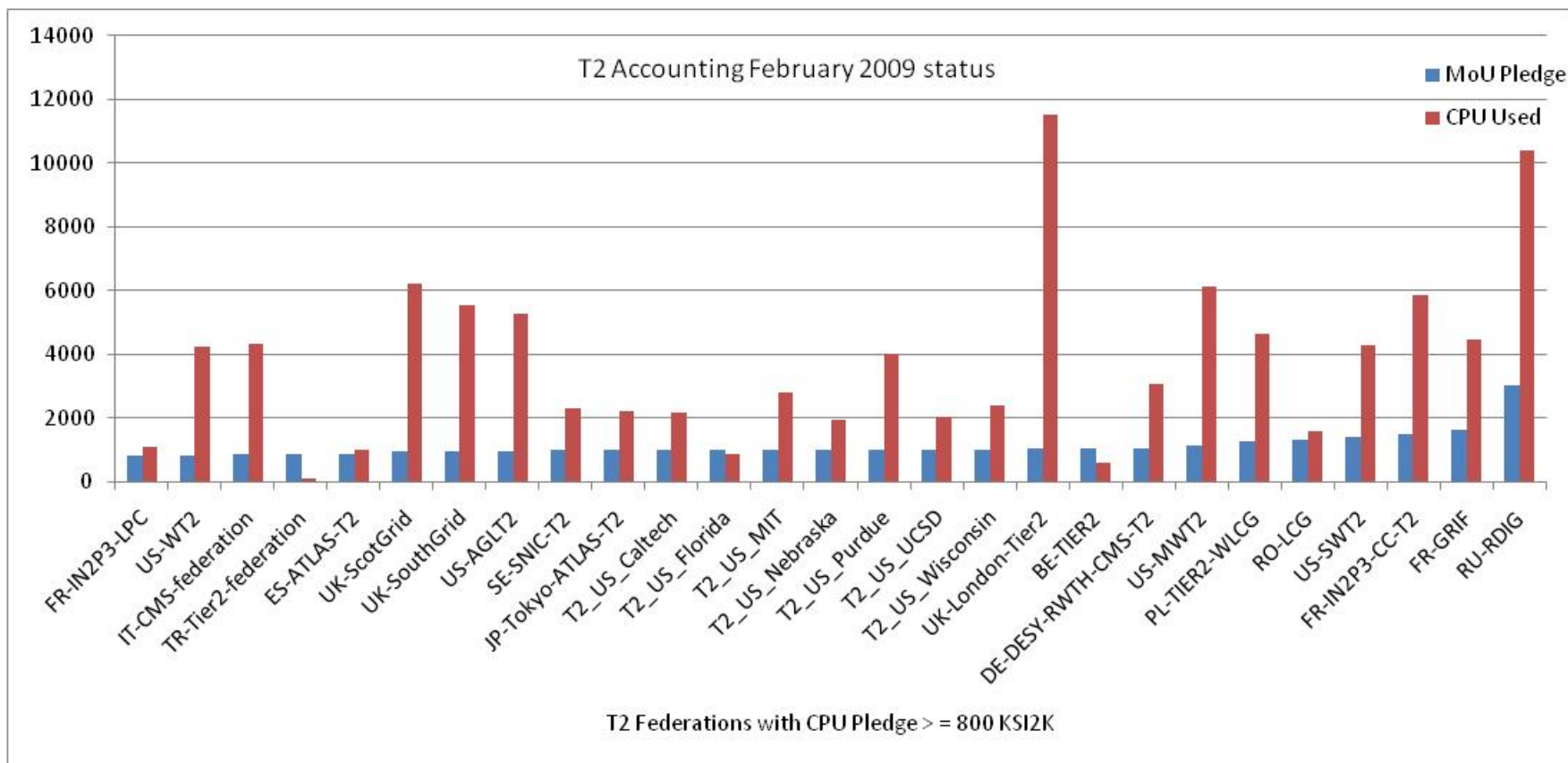


Accounting for CERN and the Tier-1s

- Tier-1 reporting started in 2006. Monthly & annual reports available on WLCG website
- The graphs on slide 8 show a summary of CPU, Disk and Tape Storage accounting for January 2008 - February 2009 for CERN and the Tier-1s
 - green line indicates installed capacity
 - pink dotted line indicates the pledged capacities
 - bars show the usage of the resource, colour-coded for each of the four experiments
- 2008 pledges started in April 2008 explaining the rise in pledge values from April onwards
- Globally pledge levels were met for CPU, largely met for disk and tape

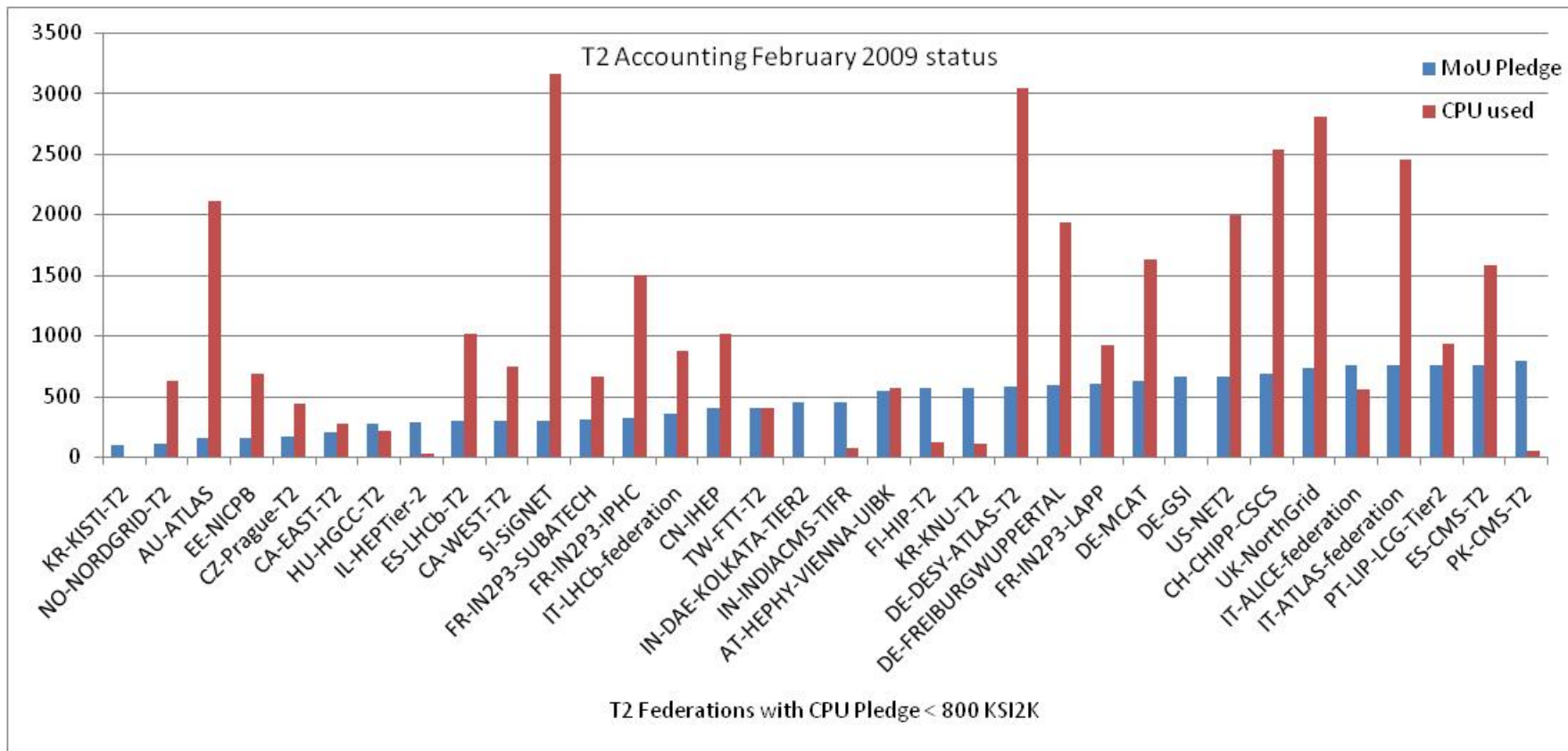


T2 Accounting February 2009 status





T2 Accounting February 2009 status



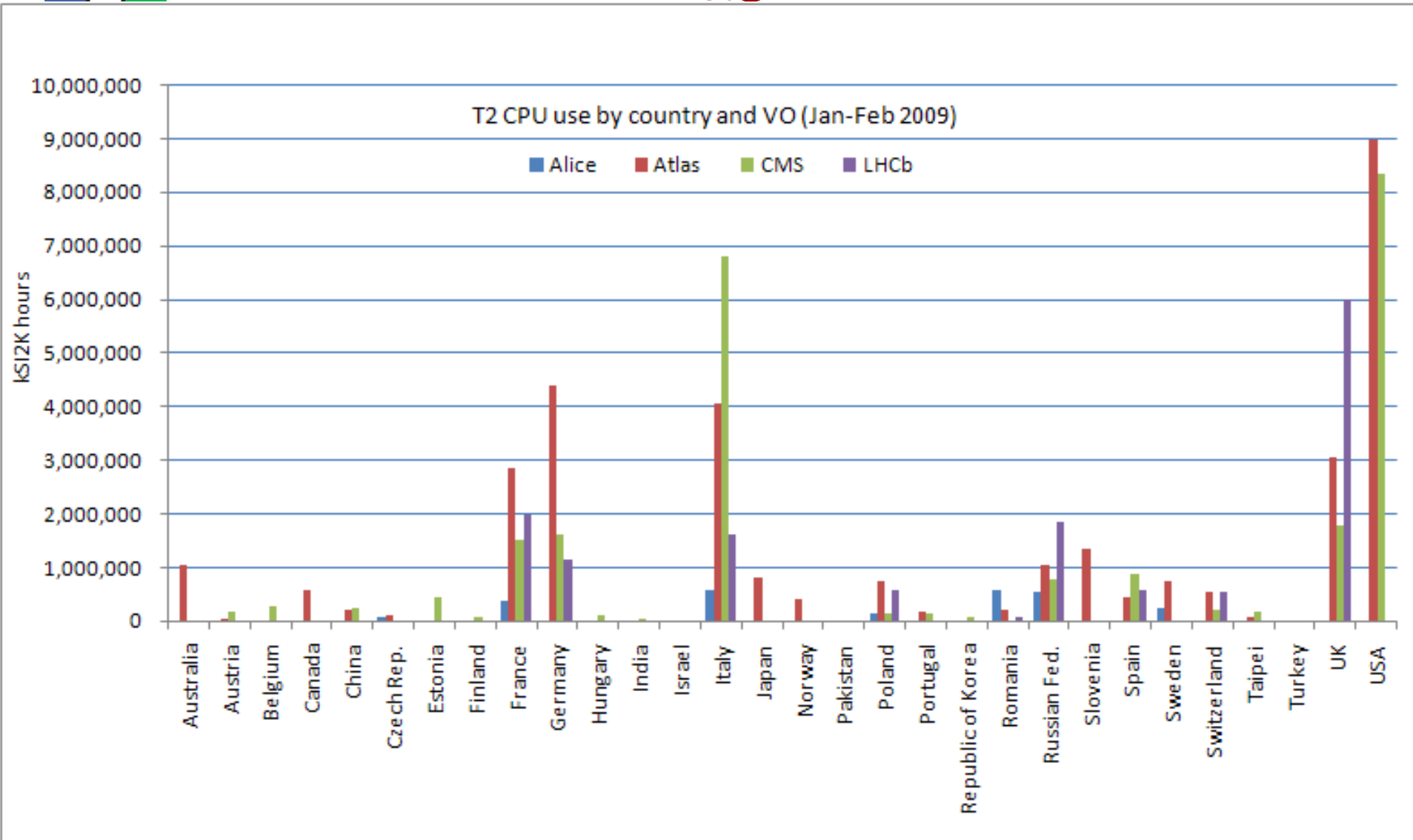


Accounting for Tier-2s

- Since September 2007 monthly reports are produced, circulated for comment and published on the WLCG website
- Slides 10 and 11 show the comparison of MoU pledge with CPU used for February 2009, ordered by pledge value
- Graphs show globally CPU used is well above 100%
 - January 2009 : 125%
 - February 2009 : 175%
 - March 2009 : 125%
- Currently most of the 61 Tier-2 Federations are reporting accounting data over a total of 115 sites
 - Follow-up required with Ukraine to include them in the accounting reporting
- Slide 13 shows Tier-2 CPU use in January and February 2009 by country and experiment
- Work is on-going to automatically obtain installed capacity from T1 and T2 sites to enhance reporting



Accounting by Country for Tier-2s





Revised Computing Resource Pledges and Experiment Requirements



Changes to Pledge Tables since last C-RRB meeting

- Resource Tables dated 27/10/08 were annexed to the CERN-RRB-2008-104 report containing the results of the last pledge collection exercise by the deadline
- Latest Resource tables dated 05/02/09 contain the following changes for Tier-2s:
 - pledge values for France, Strasbourg included
 - pledge values for Germany, Goettingen included
 - pledge values for Korea, Kyungpook National University included
 - 2009 pledge values for Belgium reduced
 - 2009 Russian pledge split across experiments included
 - CPU pledges are now expressed in the HEP-SPEC06 unit
- These tables still cover the timeframe up to 2013, however the next pledge collection exercise will conform to the newly agreed timeframe of
 - +1 year (confirmed pledges) i.e. 2010 for Autumn C-RRB
 - +2 years (planned pledges) i.e. 2011,2012 for Autumn C-RRB



Changes to Requirements since last C-RRB meeting

- Experiment requirements have been revised early April 2009 following the new LHC schedule concentrating on 2009 and 2010
- These requirements are undergoing discussion and conclusions are not yet known from the LHCC and RSG bodies
- Comparing confirmed 2009 pledge data with these new requirements (slide 17) the main problems are
 - CPU at CERN
 - Disk at the Tier-1s
- This assumes that all 2009 pledged resources are commissioned before October 2009
- Exceptionally October rather than April for 2009 resources based on revised LHC schedule



Pledge Balance in 2009

- 2009 confirmed pledges against new (unconfirmed) requirements
- % indicates the balance between offered and required

2009	ALICE	ATLAS	CMS	LHCb	Sum 2009
CERN CPU	8%	-54%	14%	-75%	-20%
CERN Disk	88%	-42%	32%	27%	16%
CERN Tape	97%	-20%	-2%	89%	13%
T1 CPU	-4%	34%	19%	-35%	13%
T1 Disk	-10%	-17%	30%	-3%	-7%
T1 Tape	5%	30%	53%	151%	39%
T2 CPU	11%	6%	114%	18%	34%
T2 Disk	-36%	-15%	68%	-	1%



Pledge Balance 2009-2010

- The table below shows the global picture for 2009-10 based on current requirements and pledges
- % indicates the balance between offered and required

	2009	2010
T1 CPU	13%	-18%
T1 Disk	-7%	-7%
T1 Tape	39%	30%
T2 CPU	34%	-17%
T2 Disk	1%	-27%

- Input and conclusions now needed from LHCC and RSG
- Confirmed experiment requirements needed for 2009-2012 for pledge collection exercise
- Confirmed 2010 pledge data and planned 2011,2012 data needed by end September for Autumn C-RRB



Conclusions

- MoU: Brazil needs follow-up as do any new countries wishing to join the WLCG collaboration
- WLCG Funding & Expenditure: Phase 2 (2005-2008) is now officially closed with a 0.6 MCHF balance. The estimates up to and including 2013 do not give rise to major concern
- Tier-1 and Tier-2 accounting reporting is evolving with most sites now reporting. Development to automatically obtain installed capacity and translation to new CPU HEP-SPEC06 unit is currently ongoing
- Revised experiment requirements soon to be confirmed including LHCC and RSG input. To be used for the upcoming pledge collection exercise
- Outcome of the pledge collection exercise to be presented at the Autumn C-RRB meeting
 - Confirmed pledge data for 2010
 - Planned pledge data for 2011-2012

Input required before end September 2009