



# WLCG Roadmap



**WLCG Roadmap for  
2009-2010**  
Prague, 21<sup>st</sup> March 2009

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LCG Project Leader

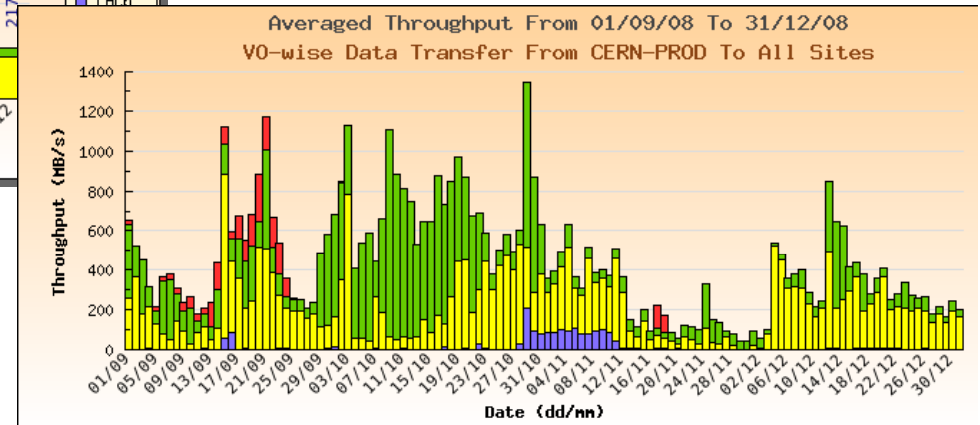
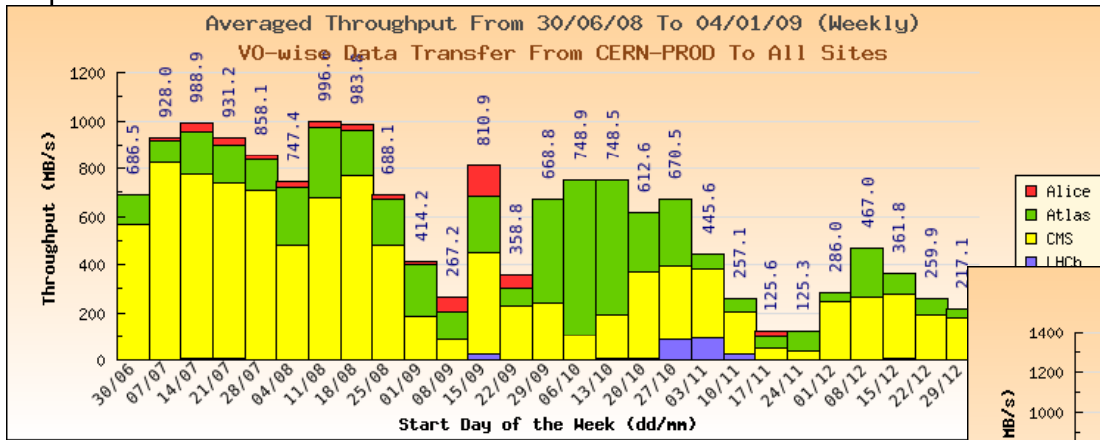
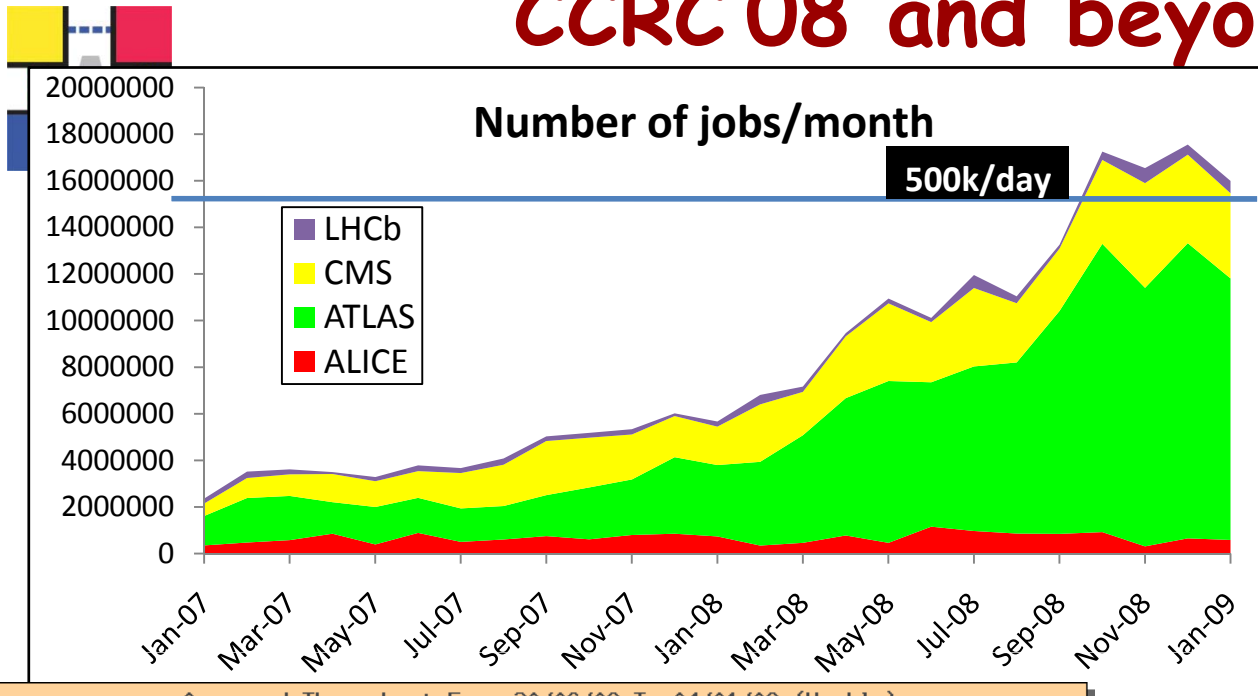


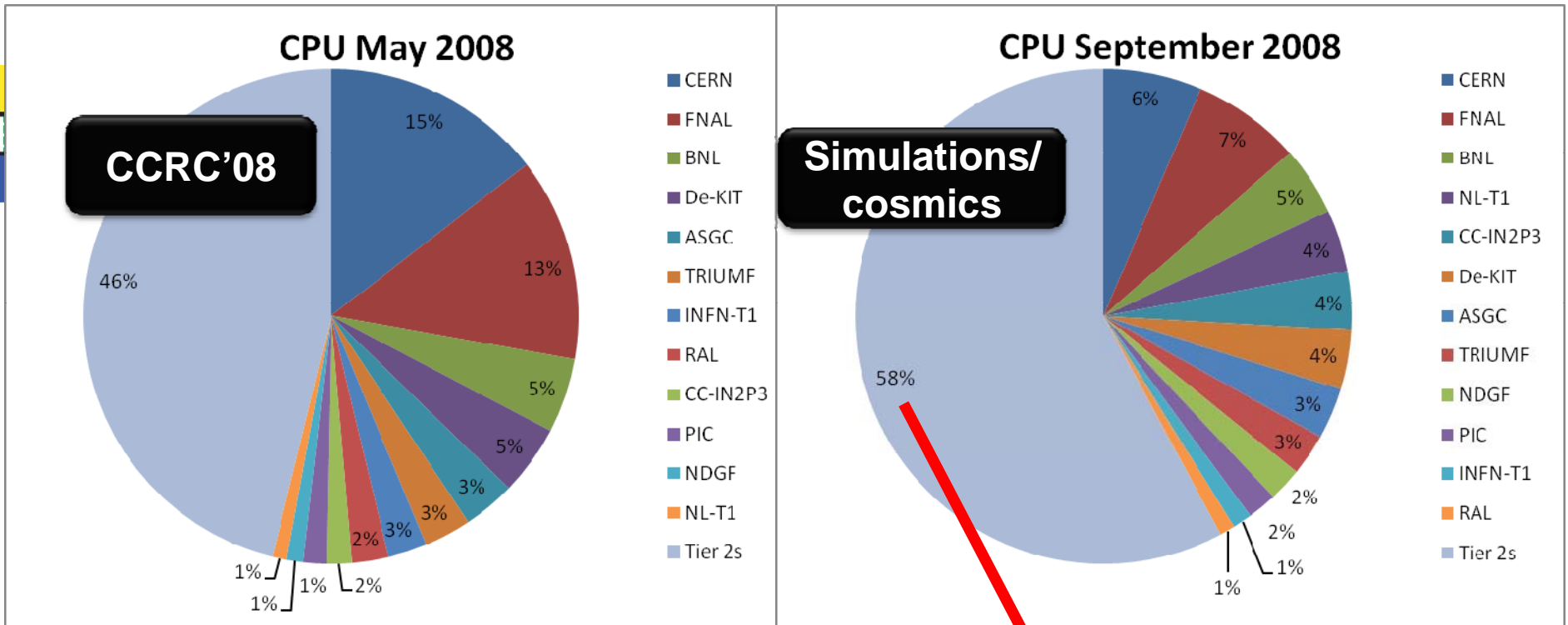


# Outline

- Roadmap: Where are we? Where next?
- Anticipated LHC schedule and timeline
  - WLCG timeline
- Resource planning
- CCRC'09
- Plans of the supporting infrastructures
  - EGEE – EGI
  - OSG
  - WLCG Planning – plan B?
- What else needs to be done?
  - Improving service reliability (status of reliabilities)
  - Tier 1 reviews?/Service reviews (Jamie's summary of incidents...)

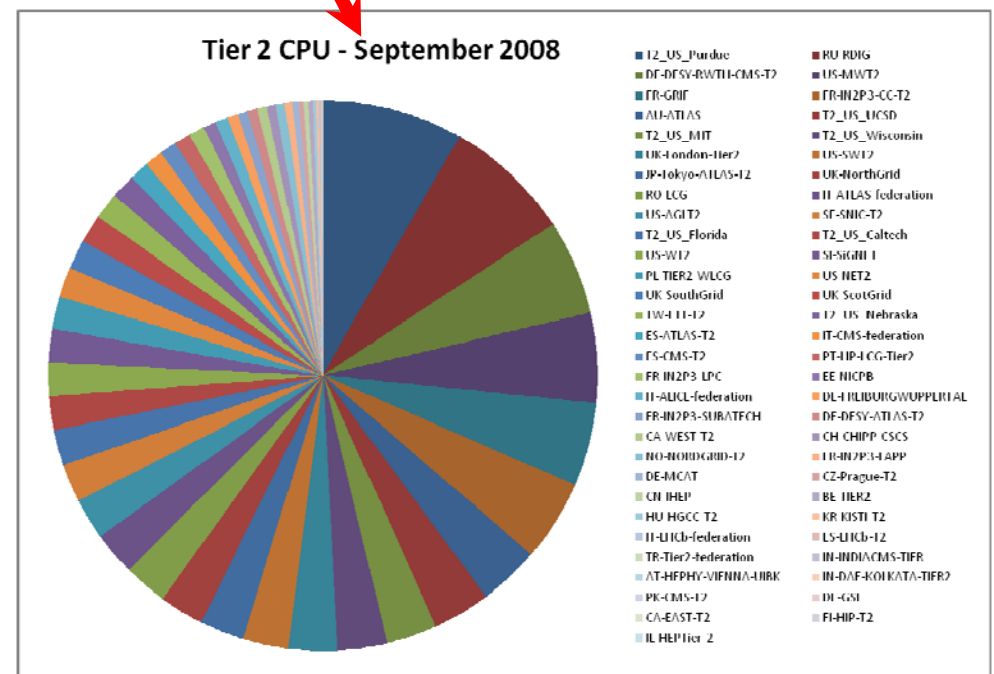
# CCRC'08 and beyond





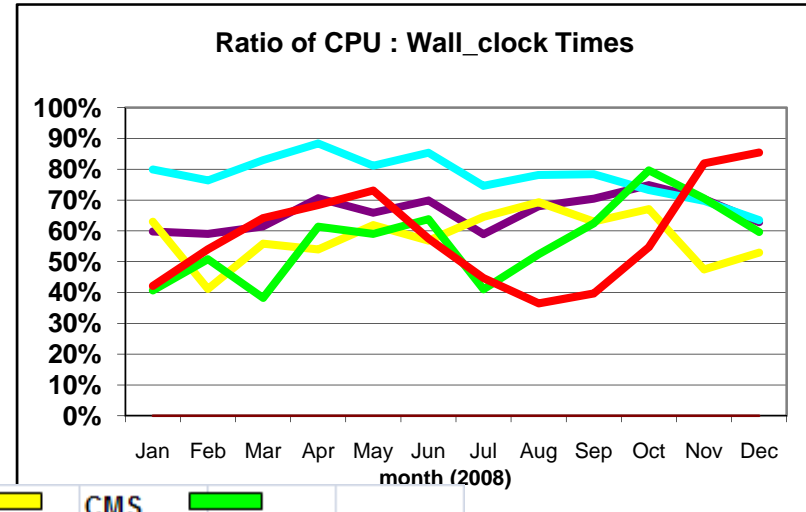
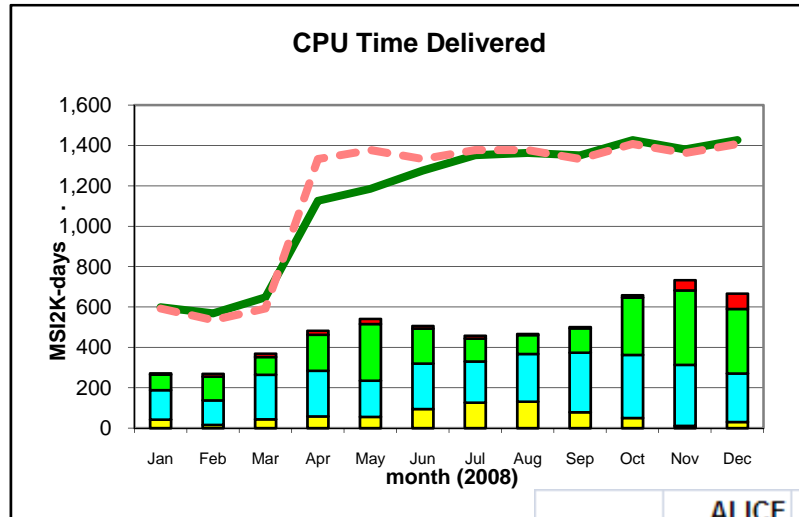
# Usage Patterns

- Can change significantly e.g. between CCRC'08 in May and cosmics/simulations in September
- Tier 2s consistently deliver ~50% of total

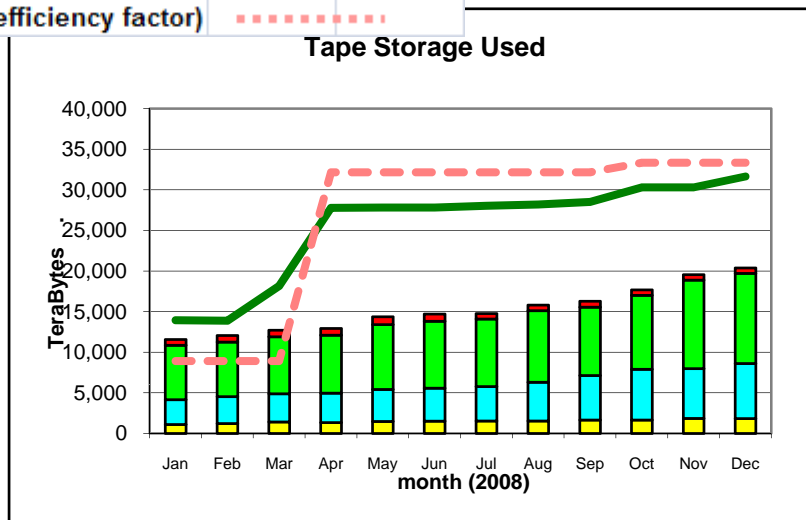
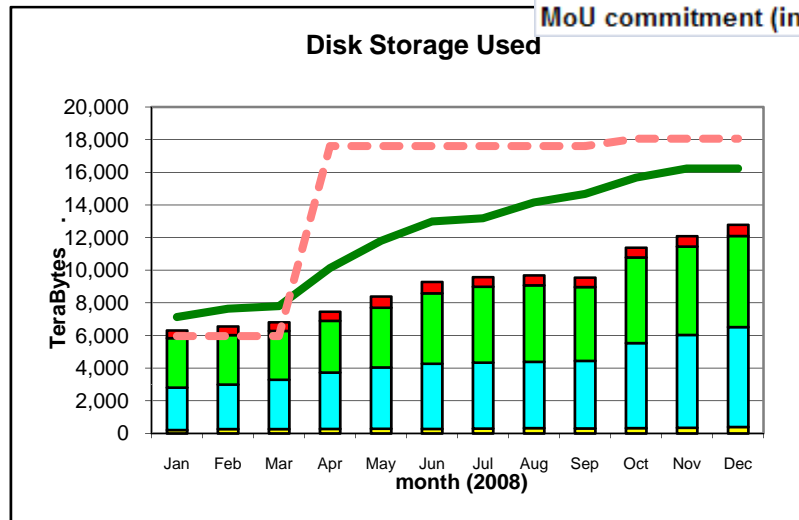




# CERN + Tier 1 accounting - 2008



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





# Schedule for 2009 - 2010

## Schedule with running in winter months

- Gains 20 weeks of LHC physics (independent of “slip”)

Year	2009												2010														
Month	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	
Baseline	SH	SH	SH	SH	SH	SH	SH	SH	SU	PH		SH	SH	SH	SH	SH	SH	SU	PH	PH	PH	PH	SH	SH	SH	SH	
	24 weeks physics possible																										
Base 1	SH	SH	SH	SH	SH	SH	SH	SH	SU	PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	SH	SH	SH	SH	SH	
	44 weeks physics possible																										
Gain 20 weeks of physics in 2010 by running during winter months																											
HIGH price Electricity																											
Delay (4W)	SH	SH	SH	SH	SH	SH	SH	SH	SU	PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	SH	SH	SH	SH	SH	
Delay (8W)	SH	SH	SH	SH	SH	SH	SH	SH	SH	SU	PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	PH	SH	SH	SH	SH	

From Chamonix summary: <http://indico.cern.ch/conferenceDisplay.py?confId=45433>



## Likely scenario

- Injection: end September 2009
- Collisions: end October 2009
- Long run from ~November 2009 for ~44 weeks
  - This is equivalent to the full 2009 + 2010 running as planned with 2010 being a nominal year
  - Short stop (2 weeks) over Christmas/New Year
- Energy will be limited to 5 TeV
- Heavy Ion run at the end of 2010
  - No detailed planning yet
- 6 month shutdown between 2010/2011 (?) – restart in May ?
  
- Now understand the effective amount of data taking in 2009+2010 will be  $\sim 6.1 \times 10^6$  seconds (cf  $2 \times 10^7$  anticipated in original planning)



# Implications for resources

- This extended run is equivalent to the original plans for 2009 + 2010
  - 2009
    - Start is delayed until October (we always planned to be ready for machine switch-on)
    - Thus should have full 2009 resources commissioned by September
  - 2010
    - For our planning, we assume starts in May
    - Need to have full 2010 resources commissioned by April (as planned)
      - NB have always said will stage installation of disk during 2010: April + August (?)
- ⇒ This is close to the original plan, but with an initial delay in 2009
- Allows newer equipment (in some cases!)





# Issues?

- How do experiment models deal with no shutdown?
- Tier 1 issues with installation schedules for 2010?
  - Installation while supporting data taking
- Experiments now re-assessing their requirements
  - LHCC – clarified running time/efficiency
  - However, must ensure that there are sufficient resources to rapidly exploit the data
- New requirements discussed on March 31
- Agreement on April 7 of what is to be presented to RRB at end of April



# Upgrade plans

- Since several software upgrades were postponed in anticipation of LHC start-up, we proposed that the following changes are addressed in the coming months:
  - SRM – agreed list of “short term” changes; available by end 2008
  - FTS on SL4 (+available for SL5?) – deployment was postponed
  - WN on SL5 to be available for deployment
  - glxec/SCAS to support pilot jobs with identity changing
  - CREAM CE – make available in parallel to existing CE which is known to have scaling issues when there are many different users;
- + a few other smaller changes ...
- Many of the above are deployments in parallel to existing production services and so non-disruptive



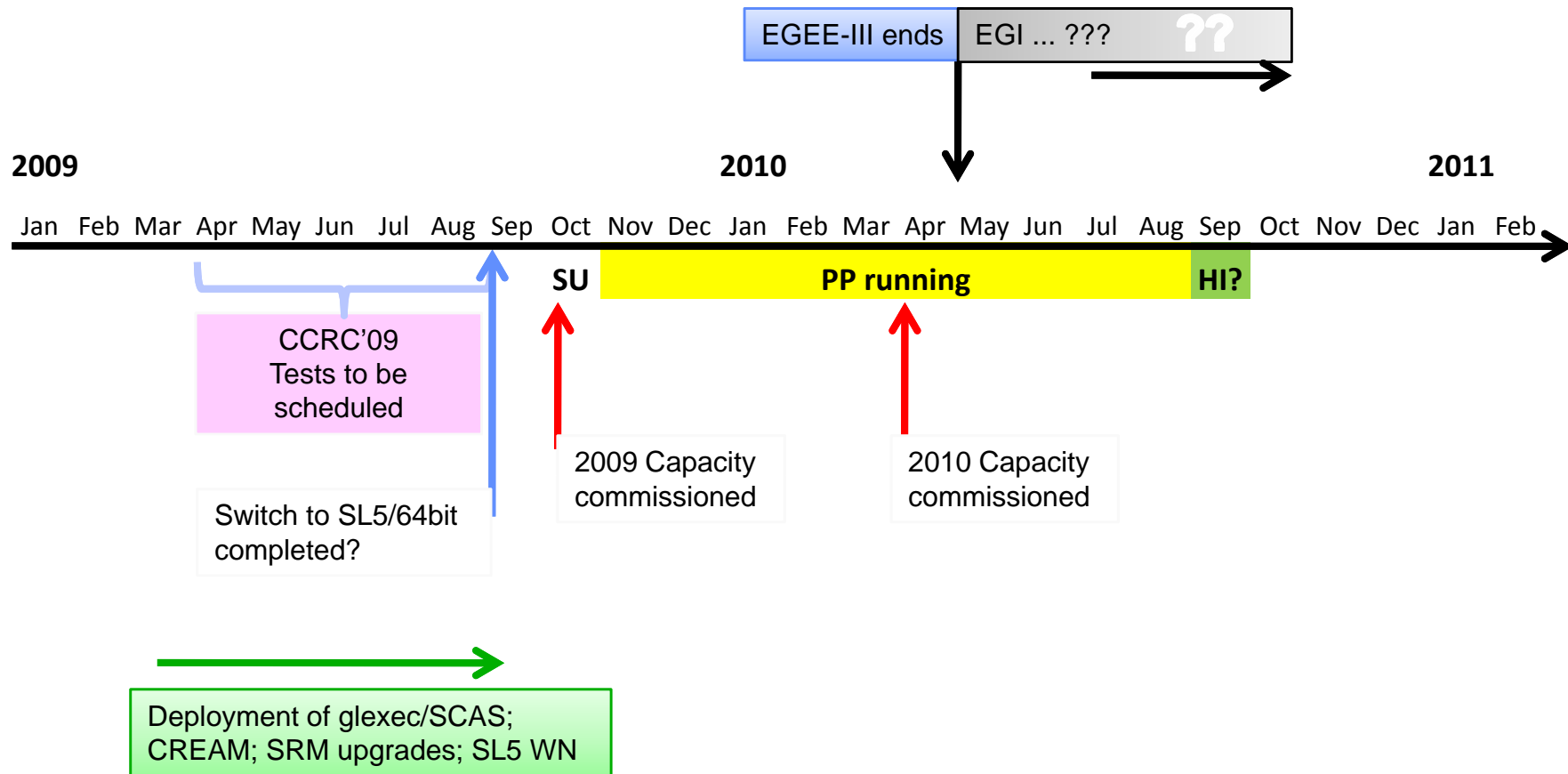
## CCRC'09 (revisited...)

- Originally a large combined test series did not fit with experiments' own testing schedules
- But,
- Tier 1s are concerned that we have not seen several/all experiments together testing tape recall/reprocessing at nominal rates, (and now we know we will need to do this while writing raw data to tape)
- All are concerned that we have not seen large scale tests of analysis
- LHCC mini-review conclusion:
  - "Recommend that there is a CCRC'09 in some form:"
    - At least CMS+ATLAS – but preferably with all 4 experiments
    - Testing reprocessing at Tier 1s (recall from tape) and massive/chaotic user analysis
    - Need metrics with which to evaluate this

**We urgently need to agree how this is done**



# WLCG timeline 2009-2010





# Resources ...

- **New benchmark agreed**
  - kSI2K → HEP-SPEC06 (based on SPEC06 c++ - mix of FP and Int tests)
  - Shown to scale well for LHC experiments
  - Simple conversion factor
  - Sites will benchmark existing capacity; vendors must run this benchmark suite (simple to run)
  - Process underway to convert requirements/pledges, and accounting
- **Automated gathering of installed capacity**
  - Process agreed between all parties – will be put in place to allow better understanding of available capacity; changes in information system will also improve normalisation between sites



# EGI Workshop in Catania

- Aggressive timescale to take over from EGEE on 1/5/10
  - Incomplete consensus on the set of international tasks (coordination and general services)
- Transition requires milestones to be satisfied:
  - Establish EGI.org (Amsterdam was agreed). Appoint director and staff.
    - Not clear how these appointments can be done
  - Prepare EC proposals for calls closing in Autumn (Nov 09)
    - Need coordinators for these proposals – who?
- For EGEE to proceed with transition plans; need to know which NGIs will be present; which tools will remain etc. Not clear.
- CERN role not clear – does it have a vote?
- Could EGEE-III be extended to help transition?
  - But no more money



# Role of CERN and WLCG

- Targeted call for EGI, in which they expect “full support for existing large communities” (i.e. WLCG)
  - Expect CERN to commit to using EGI services (but should be WLCG and not CERN, and cannot be a “commitment” no matter what)
  - BUT – if CERN/WLCG should participate – must have a voice
- Competitive call for Middleware, Repositories, and services for communities
- Call for Small communities and Specialised Support Centres (e.g. for HEP?)



## Statement from WLCG OB

- The WLCG Overview Board strongly supports the creation of a European Grid Infrastructure based on National Grid Initiatives with a European level coordination. In particular WLCG will rely on the National infrastructures to provide operational tools and services for the Tier 1 and Tier 2 sites in each country, and requires a European coordination body with which it, as an application community, can work together on requirements and evolution of the services. The Overview Board also supports the concept of a Specialised Support Centre for High Energy Physics, and WLCG would collaborate with EGI.org in the setting up of such an organisation.
- The Overview Board is concerned about the timescales involved, in particular the timing of a transition between EGEE and the EGI/NGI model, which comes at a time during the first year of accelerator running when the disruption of existing services will be least tolerable. To this end the WLCG will work together with EGEE and the EGI\_DS projects to propose and evaluate acceptable transition scenarios. There is also concern over the preparedness of the NGIs to be able to take over the core operation in 2010, and the Overview Board would like to see evidence of progress of the NGIs committing themselves to the EGI model.



# OSG Roadmap 2009-2010 - WLCG

- Operate an effective infrastructure and
  - Continue to extend the site monitoring, validation, accounting, information services for sites & VOs towards complete coverage of needed capabilities & fault checking; Continue work with interoperation/joint approaches with WLCG monitoring group.
  - Complete SLAs and Procedures for core services (security, policy etc).
- Work closely with the experiments and
  - Grid-wide deployment of pilot/pull-mode job routing and execution technologies (glidein-wms, panda). Meet the security requirements of the “experiment frameworks” WLCG group for interoperability between EGEE and OSG for glEXEC/SCAS enabled pilots.
  - Provide software/VDT updates released in a timely fashion, can be installed incrementally, and can be rolled-back when/as needed.
  - Develop policy/priority mechanisms (inter-VO and intra-VO) for when the resources become fully or over subscribed.
  - Complete evaluation of use of OSG by ALICE and support their production needs as requested. Ensure good integration of any additional needs from Heavy Ion parts of the experiment.

*WLCG Management Board, February 2009*



# OSG Roadmap 2009-2010 – Tier-3s

- Ramp up support for US LHC Tier-3s. Expect ~70 within a year.
  - Understand different types of Tier-3 and adapt OSG technologies, and processes to accommodate their needs. US ATLAS has identified 4 types of Tier-3: with Grid Services; Grid End-point; Workstation; and Analysis. We will work with them to understand what this means.
  - Identify Tier-3 liaison within the OSG staff, and work with the US ATLAS and US CMS Tier-3 support organizations.
- Develop support for experiment analysis across OSG sites.
- As needed, support opportunistic use of other OSG resources for US LHC physics.

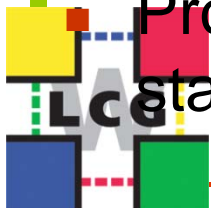


# OSG Roadmap 2009-2010 - broadening.

- Integrate other Identity systems as starting-points in the end-to-end security infrastructure (Shibboleth, OpenID, Bridge-CA)
- Solidify and extend the use of storage – currently evaluating Bestman/Hadoop as an SE for Tier-2 and Tier-3s.
- Ensure continued interoperation with EGEE including support for CREAM CE.
- Improve the usability of the infrastructure for new small communities; as new communities come to the table add tasks to meet their needs (Structural Biology Grid, other Biology groups)

Provide initial support for ad-hoc, dynamic VOs (initial stakeholder evaluation by SNS)

*WLCG Management Board, February 2009*



Open Science Grid 19

# OSG Roadmap 2009-2010 - sustaining

- Work with US agencies, US LHC, LIGO and other stakeholders to understand needs and plan for sustaining the OSG after the end of the current project in 2011.
  - Work to a model of “satellite” projects which can feed technologies, applications and new services into the core of the OSG.
  - Understand interfaces to TeraGrid.
- Work with WLCG, EGEE in the EGI-NGI era, bringing experience and methods of OSG to the table to inform and learn.



*WLCG Management Board, February 2009*



Open Science Grid 20



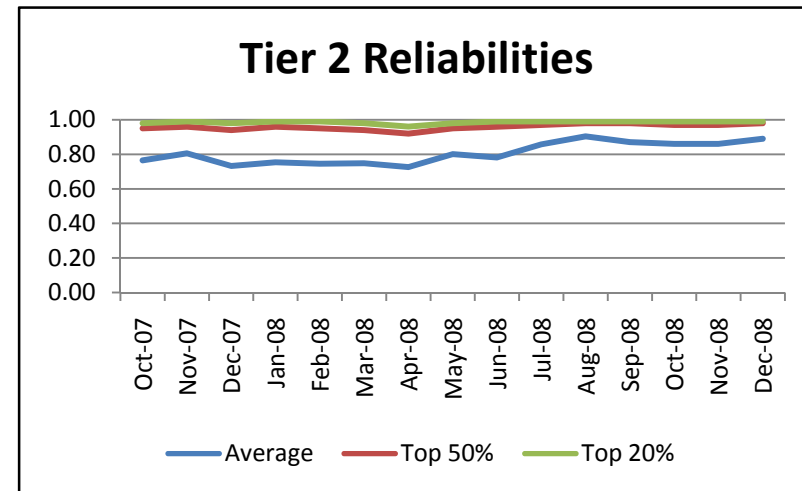
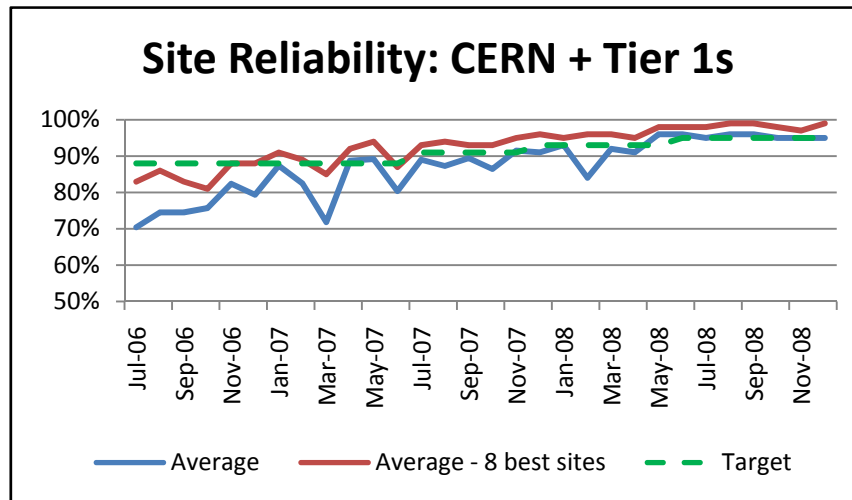
# EGEE Services needed by WLCG (Plan B)

- **GGUS**
  - Relies on connections to local support ticket systems – today in ROCs and sites
    - → Tier1 and Tier2 sites?
  - COD, TPM
- **Operations and Service coordination**
  - CERN + EGEE ROCs
- **ROCs:**
  - Support effort (TPM, COD) → moves to Tier 1s?
- **EIS team – CERN (largely LCG funded)**
- **ENOC**
  - Coordination of OPN operations- currently by IN2P3
- **Deployment support:**
  - m/w deployment/testing/rollout/support
  - Pre-production testing – effort and resources
- **Operational Security coordination**
- **Policy development**
- **Accounting:**
  - APEL – infrastructure/DB and service
    - NB Italy uses DGAS and publishes into APEL; OSG + ARC publish into APEL
  - Portal – CESGA
- **GOCDB: configuration DB**
  - Important for all configurations and definitions of sites and services
- **CIC Portal:**
  - Contact information, VO-ID cards, broadcast tool, Automated reporting,
- **Availability/Reliability:**
  - SAM framework (and migration to Nagios); SAM tests
  - Gridview/Algorithms etc:
  - GridMap:
  - MSG
- **Dashboards**
  - Service, framework and common services
  - Experiment-specifics
- **Middleware ...**



# Other important activities in 2009

- Reliability of services and sites must be improved: (see next talk)



- Overall looks OK, but... Site by site is not stable
  - Many service outages – services not reliable
  - Many sites continually have problems ...
  - This view does not expose all problems ... Look at VO measures
- Focus in this workshop – but we must take action to improve ...



# Pending issues for 2009

- Plan to have visits of Tier 1 sites – to understand service issues
  - MSS
  - Databases – seems to be often a source of problems
  - Share and spread knowledge of running reliable services
- SRM performance
  - Need good testing of Tier 1 tape recall/reprocessing, together with Tier 1 tape writing – for several experiments together
    - Encapsulated tests?
- Data access with many users for analysis – need to see experiment testing of analysis
- Transition plan for 2010 – to cover services today provided by EGEE
  - May be short or long term – but is probably going to be needed



# WLCG timeline 2009-2010

