



CMS Status Report

Outline:

- **Progress report Q3/08**
 - Infrastructure improvements
 - Progress in Integration
 - Improvements in the T0 processing
 - preparing analysis at Tier-2 centers
 - Data Operations achievements
 - Preparation for Data Taking
- **CMS plans for Q4/08**

Matthias Kasemann



CMS Computing achievements

Improvements after CSA08 and CCRC:

- Several “Integration Campaigns” improved data handling, monitoring and analysis job submission
- Effort came from developers, Facility and Data Operations and the Integration team.
- These “Campaigns” are successful to achieve mini-milestones.

Active Campaigns

- [PhEDEx Transfer Tails Campaign](#)
- [CMS Monitoring Requirements Campaign](#)
- [Production Rollout of CRAB Server](#)
- [Two File Rollout Analysis and Production](#)
- [Rollout of data consistency checking tools](#)
- [Scale testing and Rollout of gLite threaded PA components](#)
- [Open Trigger Scenario Qualification](#)

Closed Campaigns

- [MadGraph Production Campaign](#)

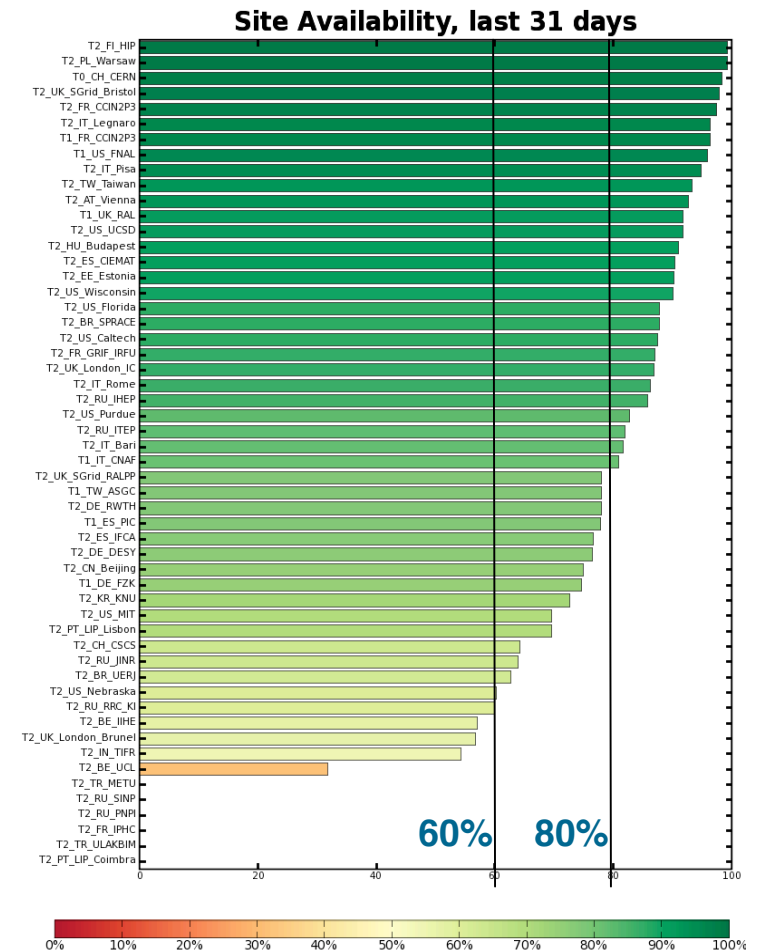
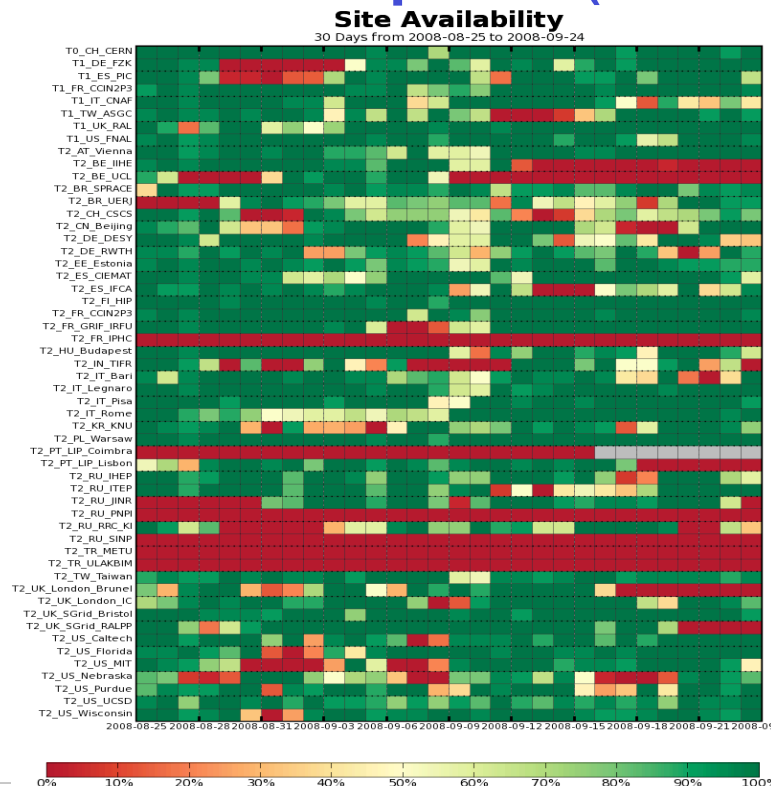
Potential Campaigns

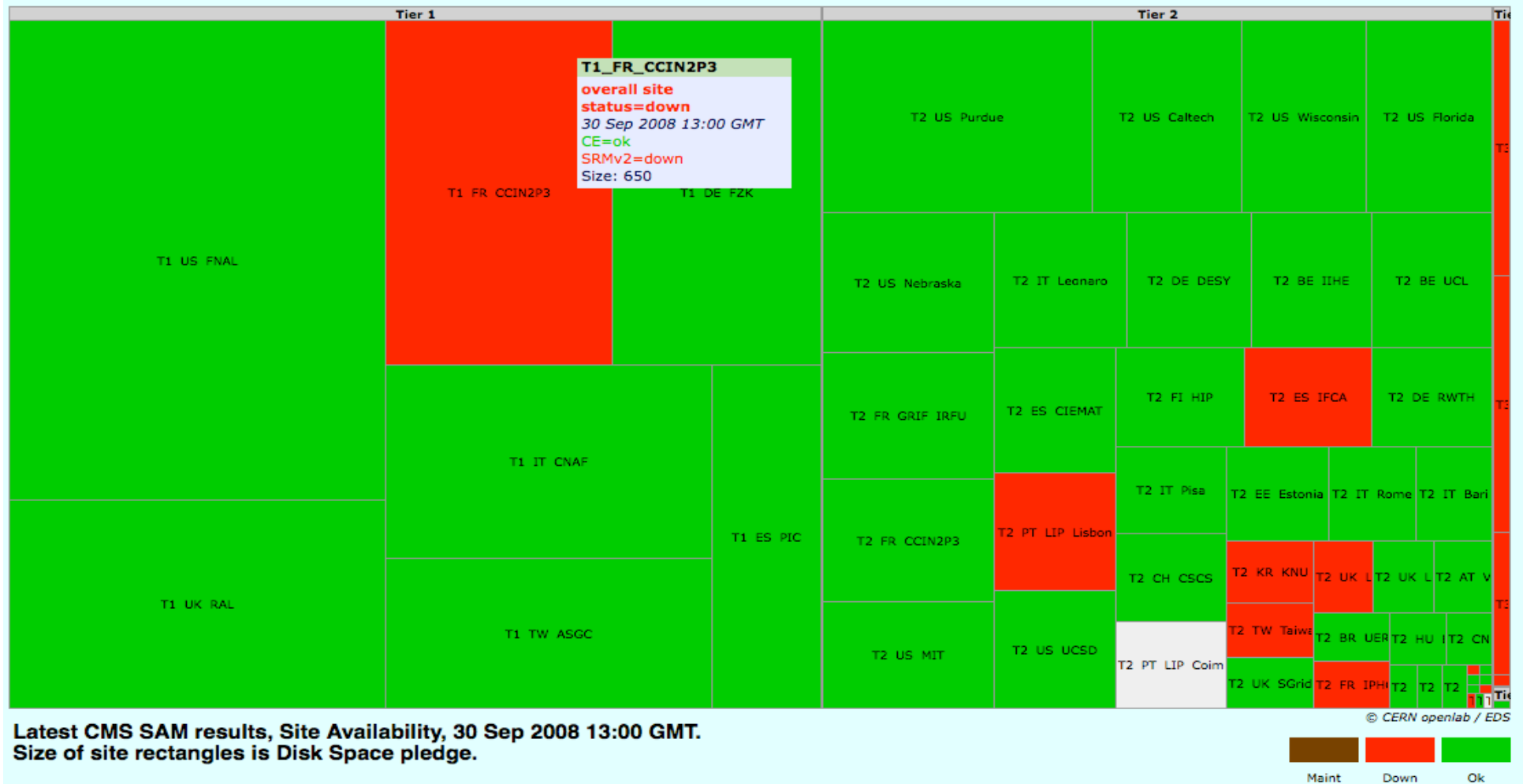
- [Glide-In Rollout for Ops](#)
- [Pre-Staging at Tier-1 Centers](#)
- Commission the PhEDEx DLS ?
- [TOAST Scale testing](#)



Improving site availability...

- ... very tedious work of many central and remote people
 - Scheduled (and unscheduled) infrastructure work reduces availability
 - Regular monitor and quick error detection required (-> shifts)





- Detailed work on T1 and T2 fault detection and status monitoring in “Facility Operation” improved site availabilities substantially.
 - Plot: Site Availability for Sept. 30, scaled by disk size.

Site Commissioning PADA Task

- The CMS site commissioning (SC) is one of the activities of PADA (Processing and Data Access) Task Force.
- Aimed objectives of the task:
 - *Guarantee that data processing workflows at T1 and T2 sites can be performed efficiently and reliably.*
 - *Verify that CMS sites are complying with their resource pledges and are able to sustain both Data analysis and MC production activities.*
- The site commissioning makes use of several sources of information to assess the readiness of a site to run CMS workflows:
 - *The average site availability according to the CMS SAM tests*
 - *The success rate of analysis-like jobs submitted by the Job Robot*
 - *The number of commissioned transfer links with other sites*

<https://twiki.cern.ch/twiki/bin/view/CMS/PADASiteCommissioning>

Commissioning criteria: Daily rules + Site Status

- The evaluation of the global site status relies on daily rules to be satisfied for the T1 and T2 sites:

Daily Rules for Tier-1 sites
daily SAM availability \geq 90%
daily JR-MM efficiency \geq 95% \rightarrow 90% (debug)
having commissioned the downlink with the Tier-0
having \geq 10 commissioned downlinks to Tier-2 sites
having \geq 4 commissioned downlinks/uplinks to other Tier-1 sites

Daily Rules for Tier-2 sites
daily SAM availability \geq 80%
daily JR-MM efficiency \geq 90% \rightarrow 80% (debug)
having a commissioned uplink with at least 1 Tier-1
having a commissioned downlink with \geq 2 Tier-1 sites

(for Tier-2s: failing metrics on weekends do not count)

- The global SC status is determined as follows:
 - **COMMISSIONED:** *daily rules are satisfied during the last 2 days, or during the last day and at least 5 days in the last 7*
 - **WARNING:** *daily rules are not satisfied in the last day but satisfied during at least 5 days in the last 7*
 - **UNCOMMISSIONED:** *daily rules satisfied for less than 5 days in the last 7*

- The Site Commissioning tool is almost in place, and we hope to have it commissioned and in production soon.



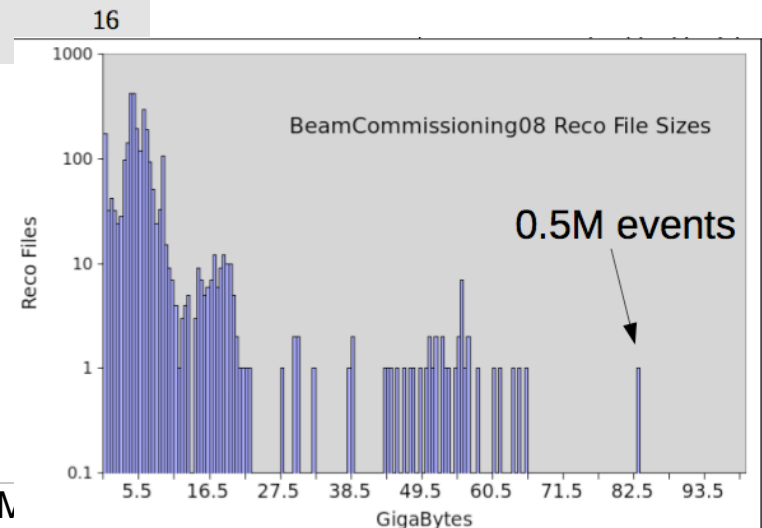
Progress automating Tier-0 processing

- Many parts of Tier-0 system deployed in the last several months
- System designed around Computing Model
 - Has been stretched by current and proposed usage (eg one Primary Dataset for all data, Open Trigger data taking, who defines complete luminosity sections)
- Using double RAW size on tape
 - Must validate cmsRun repack process
- Need to evaluate plans given new data taking expectations

Sep 2008

SJ Gowdy - Tier-0/CAF

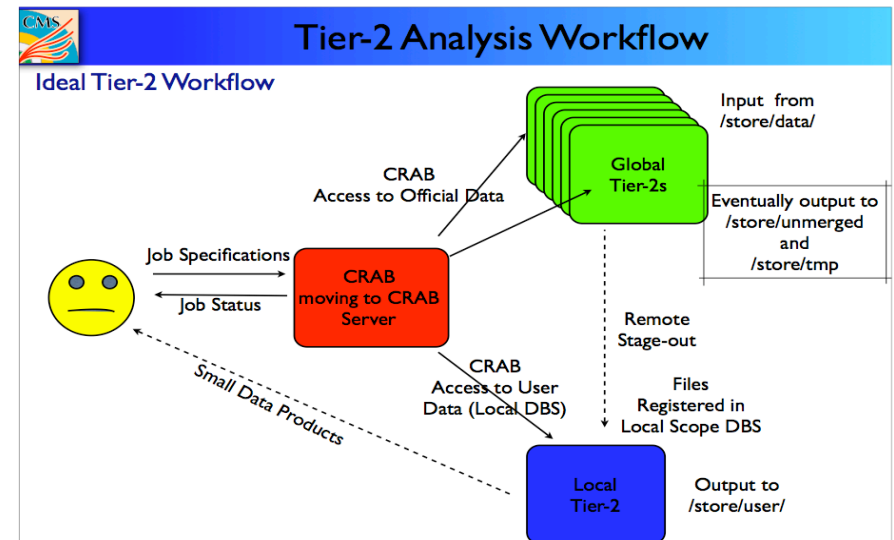
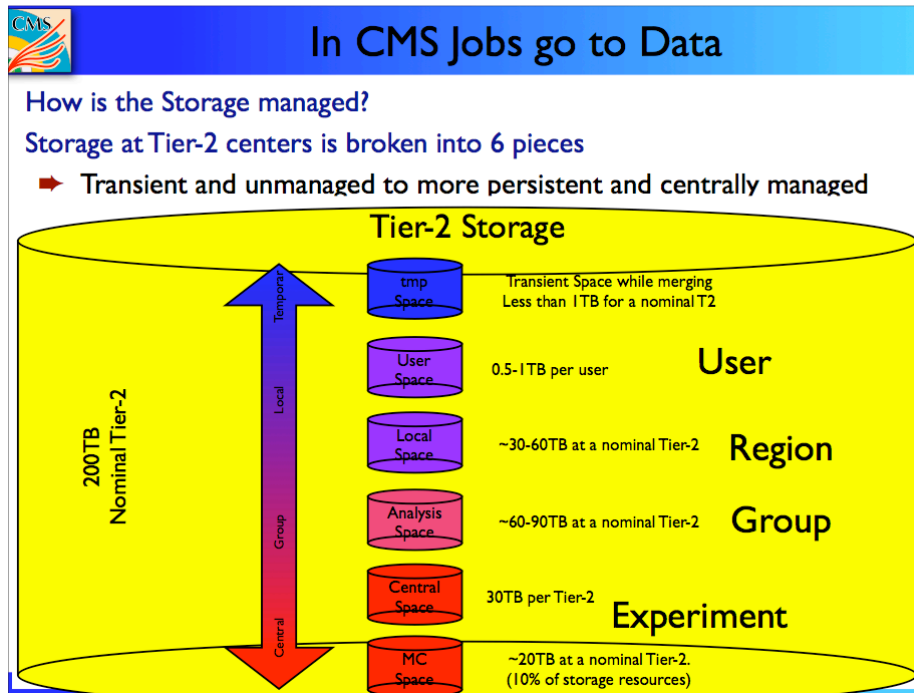
- **During Commissioning data streams are not as expected in the computing model**
 - **Small number of streams,**
 - **Large rate, large events**





CMS Analysis at Tier-2 centers

- We coordinate which T2 is hosting which physics analysis (this was a delicate and long process to reach agreement)
- Tier-2 disk space is divided:
 - Tier-2 Analysis based on CMS Remote Analysis Builder (“CRAB”)
 - Input data: mainly T2 local data
 - Output for group analysis: Group space
 - Output for individual users: assigned user space at one T2





Monte Carlo production

Monte Carlo Production

- **Continuous request of MC samples produced to support commissioning and studies for Primary Dataset definitions**
- **Large Startup MC production (> 200M events) started with release 2_1_7/2_1_8 for start of data taking**
- **Status of current production (after 12 days):**
see <http://mthomas.web.cern.ch/mthomas/Summer2008production.htm>
 - **DPG sample:**
26M produced, 22M reconstructed
 - **Physics sample:**
97M produced, 14M reconstructed
- **Production is running smoothly**
 - we were able to use > 8000 T2 slots (nominal is ~5600)



Data Processing and Distribution

- **Data taking over the summer:**
 - CMS global data taking every week (Mid-Week-Runs)
 - CruZet3 and CruZet4 runs
- **CAF used for Commissioning and Calibration and Alignment tasks**
- **Data were routinely processed and distributed**
 - Main focus was on actualizing the T0 processing step (see next talk)
 - Several reprocessing steps performed at Tier-1 centers
- **The data processing is running without principle problems.**
 - Closely steered and monitored by the Data Operations team.



The Computing Run Coordinator is responsible to oversee the operations of the CMS Computing infrastructure including the Tier-0, Tier-1, and Tier-2 centers and the services that interconnect the tiers for data transfer.

The CRC will attend relevant meetings, especially the daily run meeting and to report on data processing and data availability status and issues.

The CRC is responsible for deciding when to contact an offline or computing expert on-call in case of emergencies.

From Offline:

A Field Manager provides first-line of support to shift crew.

The Field Manager performs first-level diagnosis of problem and when necessary contacts relevant expert-on-call.

- **Specific duties will include:**
 - **monitoring the ELOG**
 - **Communication with shift crews, presence in the CMS Centre**
 - **Contact Expert-On-Call (EOC) as and when problems arise**
 - **Problem tracking and follow-up with the relevant expert**
 - **report at the daily run meeting (11.00-12.00)**
 - **Coordinate meetings on issues, news, problem handling**



A computing shift will be operated from the CMS centre/FNAL ROC for at least 16h/day

- **The duty of the CSP is to monitor the computing infrastructure and services and to identify problems and to trigger actions and calls.**
- **The CSP will follow a shift checklist, create E-log shift reports and Savannah tickets.**
- **Facility Operations is organizing the computing shifts, i.e. make the shift plan.**

Experts-On-Call / Rapid-Response-Teams are being defined for computing and offline to react to operational problems and deal with errors quickly.

Post 9/19:

- **We redefined the operational tasks to be performed**
- **Will run CRC&shift organization in lighter mode**
- **Increase presence for important data taking**



CMS CAF, especially CAF-T2 plans



CAF major use cases (~ordered by priority)

- **Detector and trigger performance monitoring and commissioning**
 - The major monitoring use case at the CAF
- **Controlled Alignment and Calibration activities**
 - high priority AL/CA activities required for prompt reconstruction
- **Physics performance monitoring**
 - Monitor the physics quality of the data
- **Short latency physics analysis**
 - execution of selected physics analyses with short latency
- **Interactive access login facilities for access by all CMS.**
 - A la lxbatch/lxplus
 - Needs high-quality disk space management

CAF-T1

CAF-T2

April 24, 2008

CMS presentation to WLCG CB

2

Status and Plans for CAF-T2:

- CERN based CMS scientists use LXBATCH/LXPLUS for individual data analysis
- For User output we will use the CASTOR user pool “CMS-CAF-T2”
- We plan to test another technology for user space in parallel:
 - NFS space provided by BLueArc network storage devices
 - storage accessible by the large array of collaboration desktop computing systems at CERN

We need to discuss what help we can get from CERN-IT for this prototype.

Status of CAF-T1:

- In operation, tested in CCRC&CSA08
- Major portion of CAF resources deployed

Others users perform analysis at “their” Tier-2 center

- User space assigned and allocated by proximity and association



CMS plans for Q4/08

- **Monte Carlo production:**
 - Large (full Geant) MC samples and many Fast Simulation productions will be required for the coming months
- **Data Taking (Cosmics and commissioning) planed until end November**

Week 40	Week 41	Week 42	Week 43	Week 44 (local school holiday, Halloween)	Week 45	Week 46	Week 47	Week 48
LR MWGR	LR MWGR	GR	CRAFT	LR MWGR	CRAFT	CRAFT	LR MWGR	LR MWGR

- LR = local readout of individual components
- MWGR = Mid Week Global Run (Wed-Thu)
- GR/CRAFT = Global Run, Oct. 13-27, Nov. 3-17



CMS Computing Summary

- **CSA08 and CCRC08** Demonstrated all key performances of the T0, CAF, T1 T2 infrastructure
- **During the summer we**
 - Improved infrastructure reliability, production tools (Tier-0,...), monitoring and operations
 - started Computing and Offline Run Coordination and Computing shifts
- **Routine Cosmics and Commissioning Data taking performed over the summer**
 - Processed at T0, Calibration&Alignment performed, distributed on demand to several T1/T2 centers
- **Production of requested Monte Carlo samples performed routinely**
 - Huge production of MC Startup Sample (>200M) started when final software and configuration became available

Computing tasks for the coming months:

- **consolidate operations,**
- **commission Tier-2 sites**
- **roll-out improved production tools,**
- **work on the monitoring and fault detection.**
- **Configure and get experience with the CAF-T2 resources**
- **Global running and Cosmics data dating will allow for more systematic checks of the whole production and transfer chain.**
- **The Analysis of Data and Monte Carlo will move to Tier-2 centers.**