



CMS

Compact Muon Solenoid

Proposed scope for

Common VO Computing Readiness Challenge 08

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CCRC f2f meeting 071009



Motivation and Goals

- Next year
 - LHC will be operating and all experiments will take real data
 - All experiments will use the computing infrastructure simultaneously
 - The data rates and volumes to be handled at the Tier0, the Tier1 and Tier2 centers will be the sum of ALICE, ATLAS, CMS and LHCb as specified in the experiments computing models
- Each experiment has done data challenges, computing challenges, tests, dress rehearsals, at a schedule defined by the experiment
- Then the computing infrastructure at CERN, the Tier-1 and Tier-2 centers must function at the scale planned and pledged to support the 4 LHC experiments.
 - We need to prepare for this ... together

A combined challenge by all Experiments should be used to demonstrate the readiness of the WLCG Computing infrastructure before start of data taking at a scale comparable to the data taking in 2008.

This should be done well in advance of the start of data taking in order to identify flaws, bottlenecks and allow to fix those.

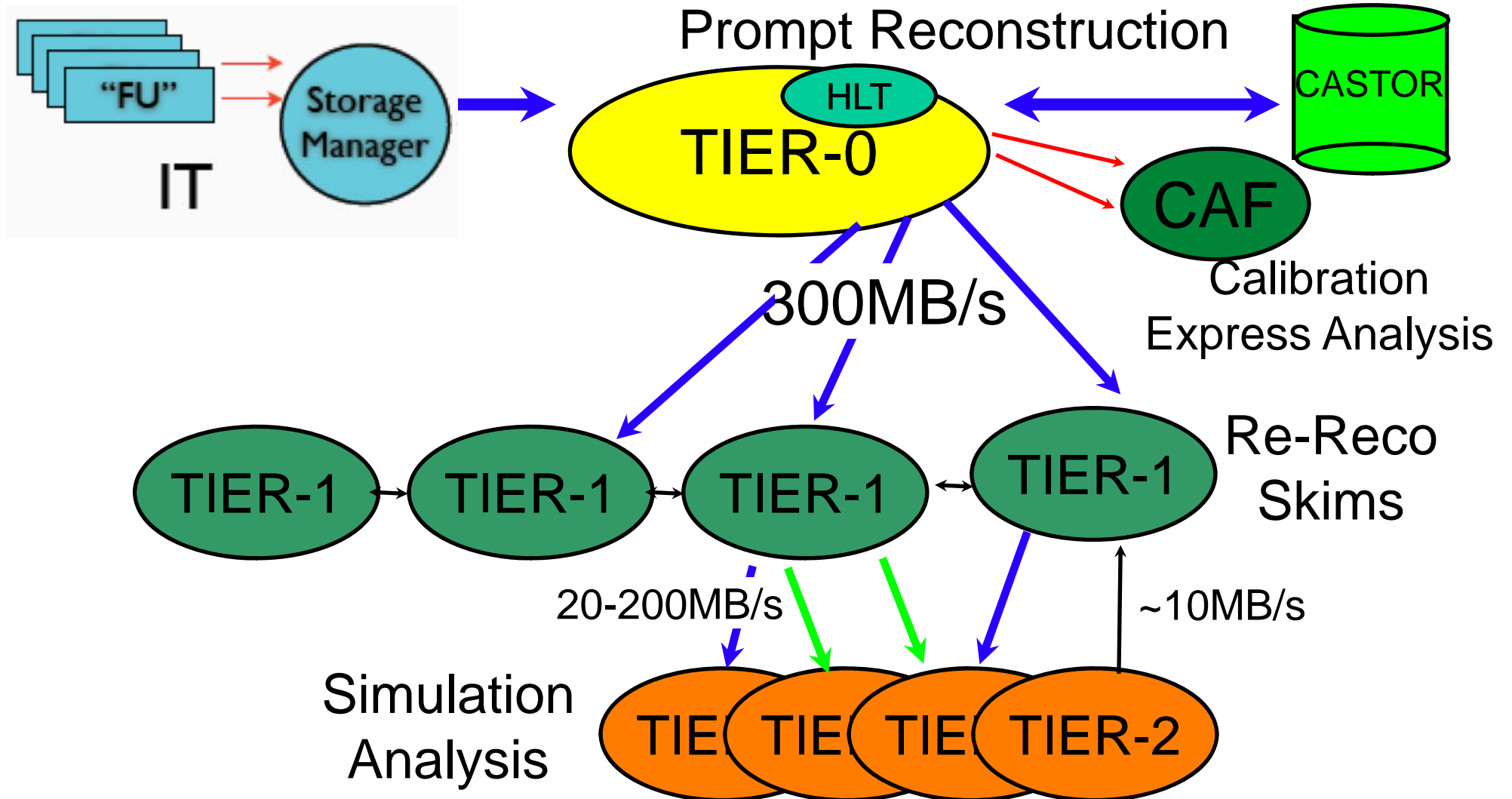
CMS fully supports the plan, to execute this CCRC in two phases:

- a set of functional tests in February 2008
- the final challenge in May 2008

We must do this challenge as WLCG collaboration: Centers and Experiments together



CSA07 Workflows





CSA07

- Computing, Software and Analysis (CSA) challenge (Sep-Oct 2007)
 - **Mimic in detail what is needed in 2008 (at a scale of 50%)**
- 200 Mevt mis-calibrated/mis-aligned (for 10-100pb⁻¹)
- Making (at the T0) and distributing (to all T1 centers) the AOD data.
 - **Placement of data in the Tier-1 centers**
- Running of skims at Tier-1 centers
- Re-reconstruction at the T1 centers
- Re-making of the full AOD samples after a re-reconstruction step.
- Copying of the skimmed datasets to Tier-2 centers and execution of analysis exercises at these centers.
 - **Migrate the bulk of analysis activities to Tier-2 centers.**
- Parallel (with the processing of the CSA07 data at the Tier-0) Monte Carlo production of signal events at the Tier-2 centers
- CAF (CERN Analysis Facility): first test of “Express Line” for fast turnaround of a few analyses.

1) Detector Installation, Commissioning & Operation

2) Preparation of Software, Computing & Physics Analysis

Tracker Inserted

Test Magnet at low current

Last Heavy Element Lowered

Tracker cabled

CMS Cosmic Run CCR_0T
(defined periods Dec-Mar)
(Several short periods Dec-Mar)

Beam-pipe Closed and Baked-out

1 EE endcap Installed, Pixels installed

Cosmic Run CCR_4T



S/w Release 1_6 (CSA07)

CSA07
S/w Release 1_7 (CCR_0T, HLT Validation)

2007 Physics Analyses Completed

S/w Release 1_8 (Lessons of '07)

CCRC08 functional tests (in series)
S/w Release 2_0
(CCR_4T, Production of startup MC samples)
MC Production for Startup

CCRC08 = CSA08_[CMS]



Proposed Scope: CSA08 = 2 x CSA07

- Test data transfers at 2008 scale:
 - Experiment site to CERN mass storage (with Cosmics / artificial data)
 - CERN to Tier1 centers
 - Tier1 to Tier1 centers (full mesh)
 - Tier1 to Tier2 centers (full/realistic mesh)
 - Tier2 to Tier2 centers
- Test Storage to Storage transfers at 2008 scale:
 - Required functionality
 - Required performance
- Test data access at Tier0, Tier1 at 2008 scale:
 - CPU loads should be simulated in case this impacts data distribution and access
- Tests should be run concurrently (all VO's and all tests)
- Real user analysis load to be discussed in CMS, otherwise artificial load
- CMS proposes to use REAL (Cosmics) data and artificial data
 - Most of it can probably be deleted after the Challenge



Basic Scaling Items to Check in CSA08

Service	CSA08 Goal	CSA07 Goal	CSA06 Goal	Status 2006
Tier-0 Reco Rate (Hz)	150 - 300	100Hz	50Hz	Achieved
Network Transfers between T0-T1	600MB/s	300MB/s	150MB/s	Achieved All (6/7 continuous)
Network Transfers between T1-T2	50-500 MB/s	20-200 MB/s	10-100 MB/s	Achieved (15 sites)
Network Transfers T1-T1	100MB/s	50MB/s	NA	NA
Job Submission to Tier-1s	50k jobs/d	25k jobs/d	12k jobs/d	3k jobs/d
Job Submissions to Tier-2s	150k jobs/d	75k jobs/d	48k jobs/d	Achieved
MC Simulation	1.5 10 ⁹ /year = 100M /month	50M per month	NA	Not Attempted



Constraints & Preconditions

- Mass storage systems are prepared
 - SRM2.2 deployed at all participating sites
 - CASTOR, dCache and other data management systems installed with appropriate version
- Data transfers are commissioned for CMS
 - Only commissioned links can be used
- Participating centers should have 2008 capacity pledged



Proposed Schedule

- Phase 1 - February 2008:
 - Possible scenario: blocks of functional tests, Try to reach 2008 scale for tests at...
 1. CERN: data recording, processing, CAF, data export
 2. Tier-1's: data handling (import, mass-storage, export), processing, analysis
 3. Tier-2's: Data Analysis, Monte Carlo, data import and export
- Phase 2: Duration of challenge: 1 week setup, 4 weeks challenge

Ideas:

- Use February (pre-)GDB to review metric, tools to drive tests and monitoring tools
- Use March GDB to analysis CCRC phase 1
- Launch the challenge at the WLCG workshop (April 21-25, 2008)
- Schedule a mini-workshop after the challenge to summarize and extract lessons learned
- Document performance and lessons learned within 4 weeks.



CCRC08 Proposed Organization

Coordination: (1+4+nT1)

- WLCG overall coordination (1)
 - Maintains overall schedule
 - Coordinate the definition of goals and metrics
 - Coordinates regular preparation meetings
 - During the CCRC'08 coordinates operations meetings with experiments and sites
 - Coordinates the overall success evaluation

- Each Experiment: (4)
 - Coordinates the definition of the experiments goals and metrics
 - Coordinates experiments preparations
 - Applications for load driving
(Certified and tested before the challenge)
 - During the CCRC'08 coordinates the experiments operations
 - Coordinates the experiments success evaluation

- Each Tier1 (nT1)
 - Coordinates the Tier1 preparation and the participation
 - Ensures the readiness of the center at the defined scale and schedule
 - Contributes to summary document