Contribution ID: **341**   Type: **Parallel**

CMS Data Transfer operations after the first years of LHC collisions

Monday, May 21, 2012 3:10 PM (25 minutes)

CMS experiment possesses distributed computing infrastructure and its performance heavily depends on the fast and smooth distribution of data between different CMS sites. Data must be transferred from the Tier-0 (CERN) to the Tier-1 for storing and archiving, and time and good quality are vital to avoid overflowing CERN storage buffers. At the same time, processed data has to be distributed from Tier-1 sites to all Tier-2 sites for physics analysis while MonteCarlo simulations synchronized back to Tier-1 sites for further archival. At the core of all transferring machinery is PhEDEx (Physics Experiment Data Export) data transfer system. It is very important to ensure reliable operation of the system, and the operational tasks comprise monitoring and debugging all transfer issues. Based on transfer quality information Site Readiness tool is used to create plans for resources utilization in the future. We review the operational procedures created to enforce reliable data delivery to CMS distributed sites all over the world. Additionally, we need to keep data consistent at all sites and both on disk and on tape. In this presentation, we describe the principles and actions taken to keep data consistent on sites storage systems and central CMS Data Replication Database (TMDB/DBS) while ensuring fast and reliable data samples delivery of hundreds of terabytes to the entire CMS physics community.

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Session Classification: Computer Facilities, Production Grids and Networking

Track Classification: Computer Facilities, Production Grids and Networking (track 4)