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Role of Tier-0, Tier-1 and Tier-2 Regional Centres in CMS DC04

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The CMS 2004 Data Challenge (DC04) was devised to test several key aspects of the CMS Computing Model in three ways: by trying to sustain a 25 Hz reconstruction rate at the Tier-0; by distributing the reconstructed data to six Tier-1 Regional Centers (FNAL in US, FZK in Germany, Lyon in France, CNAF in Italy, PIC in Spain, RAL in UK) and handling catalogue issues; by redistributing data to Tier-2 centers for analysis. Simulated events, up to the digitization step, were produced prior to the DC as input for the reconstruction in the Pre-Challenge Production (PCP04).

In this paper, the model of the Tier-0 implementation used in DC04 is described, as well as the experience gained in using the newly developed data distribution management layer, which allowed CMS to successfully direct the distribution of data from Tier-0 to Tier-1 sites by loosely integrating a number of available Grid components. While developing and testing this system, CMS explored the overall functionality and limits of each component, in any of the different implementations which were deployed within DC04.

The role of Tier-1's is presented and discussed, from the import of reconstructed data from Tier-0, to the archiving on to the local mass storage system and the data distribution management to Tier-2's for analysis. Participating Tier-1's differed in available resources, set-up and configuration: a critical evaluation of the results and performances achieved adopting different strategies in the organization and management of each Tier-1 center to support CMS DC04 is presented.

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