



Contribution ID: 72

Type: **Oral presentation to parallel session**

Prototype of a File-Based High-Level Trigger in CMS

Tuesday, 15 October 2013 16:25 (20 minutes)

The DAQ system of the CMS experiment at the LHC is redesigned during the accelerator shutdown in 2013/14. To reduce the interdependency of the DAQ system and the high-level trigger (HLT), we investigate the feasibility of using a file-system-based HLT. Events of ~1 MB size are built at the level-1 trigger rate of 100 kHz. The events are assembled by ~50 builder units (BUs). Each BU writes the raw events at ~2GB/s to a local file system shared with O(10) filter-unit machines (FUs) running the HLT code. The FUs read the raw data from the file system, select O(10⁻³) of the events, and write the selected events together with monitoring metadata back to a disk. This data is then aggregated over several steps and made available for offline reconstruction and on-line monitoring. We present the challenges, technical choices, and performance figures from the prototyping phase. In addition, the steps to the final system implementation will be discussed.

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Session Classification: Data Acquisition, Trigger and Controls

Track Classification: Data acquisition, trigger and controls