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iFDAQ for the COMPASS experiment

Thursday 14 June 2018 09:20 (20 minutes)

COMPASS, a fixed target experiment at the Super Proton Synchrotron (SPS) at CERN, developed a new Data Acquisition System (DAQ) using a novel approach to implement the event building network. The system exploits the application-optimized computation technology of Field Programmable Gate Arrays (FPGAs). In contrast to traditional event builders which base on distributed online computers interconnected via an Ethernet network, the building task is executed in hardware. A fast reaction time, higher parallelism of data processing, reduced costs, higher reliability, flexible topology, scalability, and compactness are the advantages of the FPGA-based event builders over the traditional architecture. Since the commissioning in 2014, the system extended and intelligent features were added. In 2017, the system was running with on spill data rate of 1.5 GB/s and achieved uptime of more than 99 percent. This performance is a result of perfect synchronization and intelligent data processing. The computational algorithms resolve inconsistency of data, ensure synchronous event assembly and delivery of consistent information to online computers. The data flow is controlled by throttling mechanism, which protects the system from crashes in case of high event and data rates. The last but not least is a continuous mode of data taking which performs stop and start of runs without downtime.

Minioral

No

Description

General DAQ

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