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Design and Commissioning of the first 32 Tbit/s event-builder.

Wednesday 3 August 2022 11:00 (30 minutes)

The LHCb experiment is a forward spectrometer, designed to study beauty and charm quarks Physics at the LHC. To exploit of the higher luminosity that will be delivered during Run3, the full experiment needed a substantial upgrade, from the detector to the DAQ and HLT. In this paper, we will focus on the new DAQ system for the LHCb experiment; that represents a substantial paradigm shift compared to the previous one, and to similar systems used by similar experiments in the past and present times. To overcome the inefficiencies introduced by a local selection implemented directly with the readout hardware, the Run3 system is designed to perform a full software reconstruction of all the produced events. To achieve this, both the DAQ and the HLT need to process the $\sim$ 30 MHz full event-rate. In particular, this paper will introduce the final design of the system; it will provide a focus on the hardware and software design of the event-builder and how we integrated technologies designed for the high performance computing world - like InfiniBand HDR (200 Gb/s)- into the DAQ system; we will present performance measurements of the full event building system under different operational conditions; and we will provide a feedback on the event-builder operation during the beginning of the data-taking.

Minioral

No

IEEE Member

No

Are you a student?

No

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