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CMS DAQ Event Builder based on Gigabit Ethernet

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The CMS Data Acquisition system is designed to build and filter events originating from approximately 500 data sources from the detector at a maximum Level 1 trigger rate of 100 kHz and with an aggregate throughput of 100 GByte/sec. For this purpose different architectures and switch technologies have been evaluated. Events will be built in two stages: the first stage, the FED Builder, will be based on Myrinet technology and will pre-assemble groups of about 8 data sources. The next stage, the Readout Builder, will perform the building of full events. In the baseline configuration the FED Builders merge events from 8 data sources and forward them to 8 independent Readout Builder slices, each made up of 64 Readout Units. The Readout Units send data to 64 Builder Units that build complete events and send them to PC farms responsible for the High Level Trigger selection. The finalization of the design of the Readout Builder is currently under study in view of the installation and commissioning of the FED Builder and the first slices of the Readout Builder foreseen in early 2007. In this paper we present the prospects of a Readout Builder based on TCP/IP over Gigabit Ethernet. Other Readout Builder architectures that we are considering are also discussed. The results of throughput measurements and scaling performances are outlined as well as the preliminary estimates of the final performances. All these studies have been carried out at our test-bed farms that are made up of a total of 130 dual Xeon PCs interconnected with Myrinet and Gigabit Ethernet networking and switching technologies.

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