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An In-Network Event Builder for the Mu2e TDAQ System

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The muon campus program at Fermilab includes the Mu2e experiment that will search for a charged-lepton flavor violating processes where a negative muon converts into an electron in the field of an aluminum nucleus, improving by four orders of magnitude the search sensitivity reached so far.

The Trigger and Data Acquisition System (TDAQ) of the Mu2e projects consists of commercial, off-the-shelf (COTS) servers that receive digitized data from the read-out controllers (ROC) over a custom optical links protocol through a commercial PCIe FPGA card, which then conducts real-time event building over a commodity Ethernet network.

This talk describes the first hardware prototype of an in-network program that is applied to DAQ real-time event building networking. This program executes on a commodity programmable Ethernet switch that interconnects the commercial PCIe FPGA card (i.e., the Data Transfer Controller).

This prototype is being built to explore performance and programmability features that exceed the original Mu2e design specification, to study the use of programmable network hardware for use in future HEP experiments.

Early Career

Yes

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