

# Software-based data acquisition system for Level-1 end-cap muon trigger in ATLAS Run-3

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In 2019, the ATLAS experiment at CERN is planning an upgrade in order to cope with the higher luminosity requirements. In this upgrade, the installation of the new muon chambers for the end-cap muon system will be carried out. Muon track reconstruction performance can be improved, and fake triggers can be reduced. It is also necessary to develop readout system of trigger data for the Level-1 end-cap muon trigger.

We have decided to develop software-based data acquisition system. Therefore, we have implemented SiTCP technology, which connects a FPGA with the network, on FPGA of new trigger processor boards.

Due to this implementation, this new DAQ system can take advantage of the latest developments in computing industry. This new readout system architecture is based on multi-process software, and can assemble events at a rate of 100 kHz. For data collection, the 10 Gbit Ethernet network switch is used. Moreover, we have optimized these processes to send data to the following system without any error. Therefore, the built events can be sent with an average throughput of  $\sim 211$  Mbps.

Our newly developed readout system is very generic and it is flexible for modifications, extensions and easy to debug. In this talk, we will present the details of the new software-based DAQ system and report the development status for ATLAS Run-3.

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