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The new software based read out driver for the ATLAS experiment

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In order to maintain sensitivity to new physics in the coming years of LHC operations, the ATLAS experiment is upgrading a portion of the front-end electronics and replacing parts of the detector with new devices that can operate under the much harsher background conditions of the future LHC. The legacy DAQ system features detector-specific custom VMEbus boards (Readout Drivers or 'RODs') devoted to data processing, configuration and control. Data are then received by a common Readout System (ROS), responsible for buffering during High-Level Trigger (HLT) processing. From Run 3 onward, all new trigger and detector systems will be read out using new components, replacing the RODs and ROS. This new path will feature an application called the Software Readout Driver (SW ROD), which will run on a commodity server receiving front-end data via the Front-End Link eXchange (FELIX) system. The SW ROD will perform event fragment building and buffering as well as serving the data on request to the HLT. The SW ROD application has been designed as a highly customizable high-performance framework providing support for detector specific event building and data processing algorithms. The Run 3 implementation is capable of building event fragments at a rate of 100 kHz from an input stream consisting of up to 120 MHz of individual data packets.

This document will cover the design and the implementation of the SW ROD application and the results of performance measurements taken with the server models selected to host SW ROD applications in Run 3

Minioral

Yes

IEEE Member

No

Are you a student?

No

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