

# The ATLAS Data Acquisition System LHC Run 2

*Thursday, 13 October 2016 16:30 (15 minutes)*

The LHC has been providing pp collisions with record luminosity and energy since the start of Run 2 in 2015. In the ATLAS experiment the Trigger and Data Acquisition system has been upgraded to deal with the increased event rates. The dataflow element of the system is distributed across hardware and software and is responsible for buffering and transporting event data from the Readout system to the High Level Trigger and on to event storage. The dataflow system has been reshaped in order benefit from technological progress and to maximize the flexibility and efficiency of the data selection process.

The updated dataflow system is radically different from the previous implementation both in terms of architecture and performance. The previous two level software filtering architecture, known as L2 and the Event Filter, have been merged with the Event Builder function into a single process, performing incremental data collection and analysis. This design has many advantages, among which are: radical simplification of the architecture, flexible and automatically balanced distribution of computing resources, and the sharing of code and services on nodes. In addition, logical farm slicing, with each slice managed by a dedicated supervisor, has been dropped in favour of global management by a single farm master operating at 100 kHz. This farm master has also since been integrated with a new software based region of interest builder, replacing the previous VMEbus bases system.

The Data Collection network, that connects the HLT processing nodes to the Readout and the storage systems has evolved to provide network connectivity as required by the new dataflow architecture. The old Data Collection and Back-End networks have been merged into a single Ethernet network and the Readout PCs have been directly connected to the network cores. The aggregate throughput and port density have been increased by an order of magnitude and the introduction of Multi-Chassis Trunking significantly enhanced fault tolerance and redundancy. The Readout system itself has been completely refitted with new higher performance, lower footprint server machines housing a new custom front-end interface card.

This presentation will cover overall design of the system, along with performance results from the start up phase of LHC Run 2.

## Tertiary Keyword (Optional)

Distributed data handling

## Secondary Keyword (Optional)

Data processing workflows and frameworks/pipelines

## Primary Keyword (Mandatory)

DAQ

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