

LHCb experience during the LHC 2015 run

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LHCb is one of the four high energy physics experiments currently in operation at the Large Hadron Collider at CERN, Switzerland. After a successful first running period (Run1 from 2011 to 2012), the LHC just entered the second exploitation phase (Run2, 2015-2017).

The technical break between these two running periods, known as Long Shutdown 1 (LS1), was the opportunity for LHCb to adapt, among other area of development, its data acquisition and computing models.

The operational changes on the data acquisition aspect include a clear split of the High Level Trigger (HLT) software in two distinct entities, running in parallel and in an asynchronous mode on the filtering farm, allowing a higher output rate to the final offline storage for further physics processing. A very challenging and innovative system performing full calibration and reconstruction in real time has been put in place. Thanks to this system, a fraction of the output of the HLT can be used directly for physics, without any intermediate step: this output is named “Turbo stream”.

Many changes were operated on the offline computing side as well. Besides the use of more modern and/or more scalable tools for the pure data management aspect, the computing model itself and the processing workflow were revisited in order to cope with the increased load and amount of data. The new Turbo stream requires new operational management compared to the other “standard” streams. The clear separation between the different levels of Tier (0, 1 and 2) has been abandoned for a more flexible, dynamic and efficient “Mesh” processing model, in which any site can process data stored at any other site. Validation and probing procedures were established and automatized before the start of massive Monte Carlo Simulation.

This paper presents the changes that were operated, and gives some feedback on their usage during the running period of 2015.

Primary author: Dr HAEN, Christophe (CERN)

Co-authors: Dr CATTANEO, Marco (CERN); Dr CHARPENTIER, Philippe (CERN); Dr ROISER, Stefan (CERN)

Presenter: Dr HAEN, Christophe (CERN)

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