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## Configuration and scheduling of the LHCb trigger application

*Monday, November 4, 2019 12:00 PM (15 minutes)*

The high-level trigger (HLT) of LHCb in Run 3 will have to process 5 TB/s of data, which is about two orders of magnitude larger compared to Run 2. The second stage of the HLT runs asynchronously to the LHC, aiming for a throughput of about 1 MHz. It selects analysis-ready physics signals by O(1000) dedicated selections totaling O(10000) algorithms to achieve maximum efficiency. This poses two problems: correct configuration of the application and low-overhead execution of individual algorithms and evaluation of the decision logic.

A python-based system for configuring the data and control flow of the Gaudi-based application, including all components, is presented. It is designed to be user-friendly by using functions for modularity and removing indirection layers employed previously in Run 2. Robustness is achieved by fully eliminating global state and instead building the data flow graph in a functional manner while keeping configurability of the full call stack.

A prototype of the second HLT stage comprising all recent features including a new scheduling algorithm, a faster data store and the above mentioned configuration system is benchmarked, demonstrating the performance of the framework with the expected application complexity.

### Consider for promotion

No

**Primary authors:** MATEV, Rosen (CERN); NOLTE, Niklas (CERN / Technische Universitaet Dortmund (DE)); PEARCE, Alex (CERN)

**Presenter:** NOLTE, Niklas (CERN / Technische Universitaet Dortmund (DE))

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