

## Online testbench for LHCb High Level Trigger validation

*Tuesday 24 March 2009 17:50 (20 minutes)*

The High Level Trigger and Data Acquisition system selects about 2 kHz of events out of the 40 MHz of beam crossings. The selected events are consolidated into files on an onsite storage and then sent to permanent storage for subsequent analysis on the Grid. For local and full-chain tests a method to exercise the data-flow through the High Level Trigger when there are no actual data is needed.

In order to test the system as much as possible under identical conditions as for data-taking the solution would be to inject data at the input of the HLT at a minimum rate of 2 kHz. This is done via a software implementation of the trigger system which sends data to the HLT. The application has to simulate that the data it sends come from a real LHCb readout-boards. Both simulation data and previously recorded real data can be re-played through the system in this manner. As the data rate is high ( $\sim 100$  MB/s), care has been taken to optimise the emulator for throughput from the SAN.

The emulator can be run in stand-alone mode or run as a pseudo-subdetector of LHCb, allowing to use all the standard run-control tools, down to the trigger control.

The architecture, implementation and performance results of the emulator and full tests will be presented.

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**Session Classification:** Online Computing

**Track Classification:** Online Computing