Contribution ID: **373** Type: **Oral**

Performance of Belle II High Level Trigger in the First Physics Run

Tuesday 5 November 2019 11:45 (15 minutes)

The Belle II experiment is a new generation B-factory experiment at KEK in Japan aiming at the search for New Physics in a huge sample of B-meson dacays. The commissioning of accelerator and detector for the first physics run has been started from March this year. The Belle II High Level Trigger (HLT) is fully working in the beam run. The HLT is now operated with 1600 cores clusterized in 5 units of 16 processing servers, which is the 1/4 of full configuration.

In each unit, the event-by-event basis parallel processing is implemented using the IPC-based ring buffers with the event transport over the network socket connection. The load balancing is automatically ensured by the ring buffers. In each processing server with 20 cores, the parallel processing is implemented utilizing the multi-process approach to run the same code for different events without taking a special care. The copy-on-write fork of processes efficiently reduces the memory consumption.

The event selection is done using the same offline code in two steps. The first is the track finding and the calorimeter clustering, and the rough event selection is performed to discard off-vertex background events efficiently. The full event reconstruction is performed for the selected events and they are classified in multiple categories. Only the events in the categories of interest are finally sent out to the storage. The live data quality monitoring is also performed on HLT.

For the selected events, the reconstructed tracks are extrapolated to the surface of pixel detector(PXD) and lively fed back to the readout electronics for the real time data reduction by sending only the associated hits.

Currently the accelerator study is still on-going to increase the luminosity and the physics data taking is being performed by sharing the time. During the data taking, sometimes the background rate becomes high and the L1 trigger rate reaches close to 10kHz, which is the 1/3 of maximum design rate. In this condition, the performance of Belle II HLT is discussed with the detailed report on various kinds of troubles and their fixes.

Consider for promotion

No

Authors: Prof. ITOH, Ryosuke (KEK); BRAUN, Nils (KIT); LI, Chunhua

Co-authors: NAKAO, Mikihiko (KEK); YAMADA, Satoru (KEK); SUZUKI, Soh; KONNO, Tomoyuki (Tokyo Institute of Technology); LIU, Zhen-An (IHEP,Chinese Academy of Sciences (CN)); Dr ZHAO, Jinzhou (IHEP)

Presenter: Prof. ITOH, Ryosuke (KEK)

Session Classification: Track 1 –Online and Real-time Computing

Track Classification: Track 1 –Online and Real-time Computing