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Belle II High Level Trigger at SuperKEKB

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A next generation B-factory experiment, Belle II, is now being constructed at KEK in Japan. The upgraded accelerator SuperKEKB is designed to have the maximum luminosity of 8 × 10ˆ35 cmˆ−2sˆ−1 that is a factor of 40 higher than the current world record. As a consequence, the Belle II detector yields a data stream of the event size ˜1 MB at a Level 1 rate of 30 kHz.
The Belle II High Level Trigger (HLT) is designed to reduce the Level 1 rate to 1/5 by performing the real time full event reconstruction and by applying the physics level event selection as the software trigger. The results of the processing are also fed back to the readout system of the pixel detector for the further data size reduction.
The event processing framework for HLT is intended to be the same as that used in offline so that the same reconstruction codes can be shared. The HLT framework is desired to be based on "basf2", which is the unified software framework for the Belle II data processing. The basf2 framework is designed to be used in a single node although it has the parallel processing capability utilizing multicores. For the HLT purpose, we need to extend the parallel processing to make use of multiple PC servers connected over the network, and therefore, a super-framework called hbasf2 is developed. The Belle II High Level Trigger system takes full advantages of multicore and network connected PC servers for the parallel processing with the hbasf2 framework. It also provides the control function of HLT such as the configuration management, the real time monitoring, etc.
In this contribution, the details of the design and implementation of hbasf2 are presented. The processing performance of hbasf2 measured using the prototype HLT test bench is also reported.

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Yes

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