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Streamlining LHCb's GPU High Level Trigger for online and offline environments

The triggerless readout of data corresponding to a 30 MHz event rate at the upgraded LHCb experiment together with a software-only High Level Trigger will enable the highest possible flexibility for trigger selections. During the first stage (HLT1), track reconstruction and vertex fitting for charged particles enable a broad and efficient selection process to reduce the event rate to 1 MHz. Tracking and vertexing at 30 MHz represents a significant computing challenge. LHCb utilizes the inherent parallelism of the triggering process to meet throughput requirements with GPUs. This implies a major change in software that has to be integrated with data acquisition and the second HLT stage. This talk focusses on efficient task scheduling to process event batches and seamless integration and translation into existing trigger software to enable smooth operation in online and offline environments, with or without GPUs available.

Significance

We introduce scalable control flow into the GPU project Allen and streamline its operation such that it seamlessly integrates with the Gaudi project. It can now be executed as a Gaudi job, even without the existence of GPUs, reaping all the benefits from the existing infrastructure like the WLCG.

References

Speaker time zone

Compatible with America

Primary author: NOLTE, Niklas (Massachusetts Institute of Technology (US))

Presenter: NOLTE, Niklas (Massachusetts Institute of Technology (US))

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