

Software Validation Infrastructure for the ATLAS Trigger

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The ATLAS trigger system is responsible for selecting the interesting collision events delivered by the Large Hadron Collider (LHC). The ATLAS trigger will need to achieve a $\sim 10^{-7}$ rejection factor against random proton-proton collisions, and still be able to efficiently select interesting events. After a first processing level based on hardware, the final event selection is based on custom software running on two CPU farms, containing around two thousand multi-core machines. This is known as the high-level trigger.

Running the trigger online during long periods demands very high quality software. It must be fast, performant, and essentially bug-free. With more than 100 contributors and around 250 different packages, a thorough validation of the HLT software is essential. This relies on a variety of unit and integration tests as well as on software metrics, and uses both in-house and open source software. This paper describes the existing infrastructure used for validating the high-level trigger software, as well as plans for its future development.

Summary

This paper gives an overview of the procedures and infrastructure used in the ATLAS high level trigger to validate the selection and steering software before it goes online. The ATLAS high level trigger consists of around 250 different software packages, and has in addition many algorithmic and structural components in common with the offline ATLAS software framework. Quality assurance of this software is essential, due to its complexity and the critical nature of its use: online time is intrinsically very valuable and downtime needs to be minimized.

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