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Updates of the ATLAS High-Level Trigger in Run 3

The main reconstruction and simulation software framework of the ATLAS experiment, Athena, underwent a major change during the LHC Run 3 in the way the configuration step of its applications is performed. The new configuration system, called ComponentAccumulator, emphasises modularity and provides a way for standalone execution of parts of a job, as long as the inputs are available, which allows unit-testing of individual components or groups of components, as well as easier debugging.

The switch to the new configuration system of the High-Level Trigger (HLT) software, which utilises Athena algorithms for object reconstruction and hypothesis testing, required designing a special approach to prevent disruption of data taking during the code migration to ComponentAccumulator. An additional challenge is brought by a large amount of HLT chains, where in many cases copies of the same algorithm with varying configurations are used, which significantly increases the number of configured parameters compared to offline reconstruction jobs.

This report describes migration of the HLT software to ComponentAccumulator along with further improvements in the data acquisition introduced for Run 3 data taking.

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