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Physics-level Job Configuration

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The offline and high-level trigger software for the ATLAS experiment has now fully migrated to a scheme which allows large tasks to be broken down into many functionally independent components. These components can focus, for example, on conditions or physics data access, on purely mathematical or combinatorial algorithms or on providing detector-specific geometry and calibration information. In addition to other advantages, the software components can be heavily re-used at different levels (sub-detector tasks, event reconstruction, physics analysis) and on different running conditions (LHC data, trigger regions, cosmics data) with only little adaptations. A default setting therefore has to be provided for each component allowing these adaptations to be made. End-user jobs contain many of these small components, most of which the end-user is totally unaware. There is therefore a big semantic discrepancy between how the end-user thinks about a specific job's configuration and how the configuration is packaged with the individual components making up the job. This paper presents a partly automated system which allows component developers and aggregators to build a configuration ranging over all the above levels, such that e.g. component developers can use a low-level configuration, sub-detector coordinates work with functional sequences and the end user can think in physics processes. This system of python-based job configurations is flexible but easy to keep internally consistent and avoids possible clashes when a component is re-used in a different context. The paper also presents a working system used to configure the new ATLAS track reconstruction software.

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