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SFrame - A high-performance ROOT-based framework for HEP analysis

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In a typical offline data analysis in high-energy-physics a large number of collision events are studied. For each event the reconstruction software of the experiments stores a large number of measured event properties in sometimes complex data objects and formats. Usually this huge amount of initial data is reduced in several analysis steps, selecting a subset of interesting events and observables. In addition, the same selection is applied to simulated MC events and the final results are compared to the data. A fast processing of the events is mandatory for an efficient analysis.

In this paper we introduce the SFrame package, a ROOT-based analysis framework, that is widely used in the context of ATLAS data analyses. It features (i) consecutive data reduction in multiple user-defined analysis cycles performing a selection of interesting events and observables, making it easy to calculate and store new derived event variables; (ii) a user-friendly combination of data and MC events using weighting techniques; and in particular (iii) a high-speed processing of the events. We study the timing performance of SFrame and find a highly superior performance compared to other analysis frameworks.

More information can be found at: http://sourceforge.net/projects/sframe/

Summary

The structure and performance of SFrame is presented, which is a light-weight analysis-framework built around ROOT.

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