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Evaluation of the flow-based programming (FBP) paradigm as an alternative to standard programming practices in physics data processing applications

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The majority of developed physics data processing applications (PDP) are single, sequential processes that start at a point in time, and advance one step at a time until they are finished. In the current era of cloud computing and multi-core hardware architectures this approach has noticeable limitations.

In this paper we present a detailed evaluation of the FBP-based Clas12 event reconstruction program that was deployed and operated both in cloud and in batch processing environments. We demonstrate the programming methodology and discuss some of the issues and optimizations affecting performance. We will also discuss our choice of using the Petri-Net process modeling formalism for the representation of the Clas12 PDP application building blocks which exhibit concurrency, parallelism, and synchronization.

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