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Data Acquisition Backbone Core DABC

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For the new experiments at FAIR like CBM new concepts of data acquisition systems have to be developed like the distribution of self-triggered, time stamped data streams over high performance networks for event building. The DAQ backbone DABC is designed for FAIR detector tests, readout components test, data flow investigations, and DAQ controls. All kinds of data channels (front-end systems) are connected by plug-ins into functional components of DABC like data input, combiner, scheduler, event builder, analysis and storage. Several software packages (uDAPL, OpenFabric IB verbs, MPI2) have been used to measure the performance of InfiniBand on a cluster. One can achieve about 80% of the bidirectional nominal IB bandwidth (measured with up to 22 nodes).

The XDAQ package developed for the CMS experiment has been chosen as infrastructure for DABC. The IB transport has been implemented in XDAQ. Measurements showed that the XDAQ transport causes too much overhead. Therefore a new faster (zero copy) transport layer is implemented. To be flexible in the selection of DAQ controls a DIM server has been implemented connecting the XDAQ InfoSpace to arbitrary DIM clients. For EPICS and LabView such clients are implemented.

Summary

General purpose DAQ backbone for high speed event building over fast networks, i.e. InfiniBand, supports synchronized or self-triggered data channels. Data flow engine uses application plug-ins for custom front-end systems.

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