

The ToolDAQ DAQ software Framework and its use in the Hyper-K, E61 & ANNIE detectors

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Data Acquisition (DAQ) systems are a vital component of every experiment. The purpose of the underlying software of these systems is to coordinate all the hardware components and detector states, providing the means of data readout, triggering, online processing, persistence, user control and the routing of data. These tasks are made more challenging when also considering fault tolerance, scalability, computing and data distribution, tolerance to hardware changes and usability.

We will present ToolDAQ a C++ DAQ framework which has been designed to be easy and fast to adapt in a modular and simple way. It has many features like in built service discovery, dynamic reconfiguration, remote control/monitoring via web and terminal interfaces and a highly scalable fault tolerant network communication infrastructure provided by ZMQ built in. It also is compatible with newer and older hardware, both being very lightweight and with low dependencies.

The framework is currently in use on the ANNIE experiment in Fermilab and has been used to develop the DAQ for Hyper-Kamiokande and the E61 intermediate water Cherenkov detector at J-PARC. We will report on the experience gained in adapting and running the framework for the ANNIE experiment as well as the Hyper-Kamiokande and E61 developments and use cases

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