

artdaq: DAQ Software Development Made Simple

Monday 10 October 2016 14:00 (15 minutes)

For a few years now, the *artdaq* data acquisition software toolkit has provided numerous experiments with ready-to-use components which allow for rapid development and deployment of DAQ systems. Developed within the Fermilab Scientific Computing Division, *artdaq* provides data transfer, event building, run control, and event analysis functionality. This latter feature includes built-in support for the *art* event analysis framework, allowing experiments to run *art* modules for real-time filtering, compression, disk writing and online monitoring; as *art*, also developed at Fermilab, is also used for offline analysis, a major advantage of *artdaq* is that it allows developers to easily switch between developing online and offline software.

artdaq continues to be improved. Support for an alternate mode of running whereby data from some subdetector components are only streamed if requested has been added; this option will reduce unnecessary DAQ throughput. Real-time reporting of DAQ metrics has been implemented, along with the flexibility to choose the format through which experiments receive the reports; these formats include the Ganglia, Graphite and syslog software packages, along with flat ASCII files. Additionally, work has been performed investigating more flexible modes of online monitoring, including the capability of being able to run multiple online monitoring processes on different hosts, each running its own set of *art* modules. Finally, a web-based GUI interface through which users can configure details of their DAQ system has been implemented, increasing the ease of use of the system.

Already successfully deployed on the LArIAT, DarkSide-50, DUNE 35ton and Mu2e experiments, *artdaq* will be employed for SBND and is a strong candidate for use on ICARUS and protoDUNE. With each experiment comes new ideas for how *artdaq* can be made more flexible and powerful; the above improvements will be described, along with potential ideas for the future.

Tertiary Keyword (Optional)

Secondary Keyword (Optional)

Primary Keyword (Mandatory)

DAQ

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Session Classification: Track 1: Online Computing

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