

A DAQ System for CAMAC controller CC/NET using DAQ-Middleware



Eiji Inoue, Yoshiji Yasu, Kazuo Nakayoshi, Hiroshi Sendai
KEK, High Energy Accelerator Research Organization, Japan

CHEP 2009
International Conference on Computing
in High Energy and Nuclear Physics
23 - 27 March 2009
Prague, Czech Republic

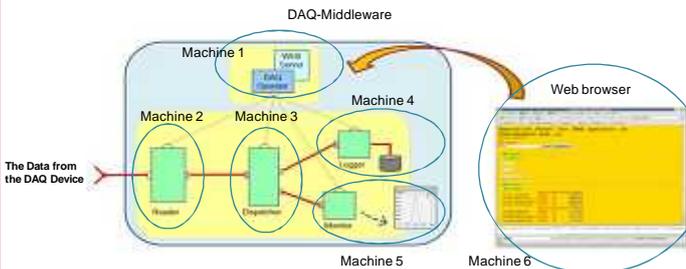
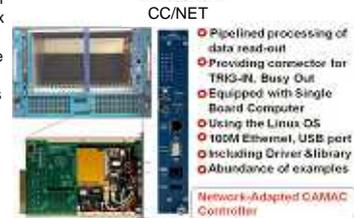
- Distributed Data Acquisition System
- Web-based GUI
- Effective Component-Based Reuse System
- Enhanced Scalability
- Extensible Configuration Details Based on XML
- Simple and Reliable System

Abstracts

We constructed a DAQ system for the CC/NET using DAQ-Middleware. DAQ-Middleware is made up of some DAQ component which has basic function of the DAQ. So, with DAQ-Middleware, you can easily construct your own DAQ system. As an example, we constructed the DAQ system for the CC/NET by the addition of GUI part and CAMAC readout part. DAQ-Middleware is a framework for the DAQ system which is based on distributed network management system. The basic concept of DAQ-Middleware is to develop a component base DAQ system based on RT-Middleware. Since it has functionally-differentiated of DAQ function into a component, it is very easy to adding the feature of the DAQ.

CC/NET

The CC/NET, the CAMAC controller was developed by KEK and TOYO Corporation from a joint research to accomplish high speed read-out of CAMAC data. The CC/NET has the ability to perform read-out at 2.9MB/sec (1.04usec/cycle), almost CAMAC specification limited speed, from the CAMAC device. The CC/NET was developed to take advantage of a lot of CAMAC assets which we have been used for many year. There is a Linux driver program to perform read-out of CAMAC data. On the other hand, the SBC(Single Board Computer) have an Ethernet port, it allows easy to access to the internet. The basic design concept of CC/NET is to realize data taking through networks. So, it is perfectly consistent with the DAQ-Middleware concept and can be used CAMAC resources effectively.

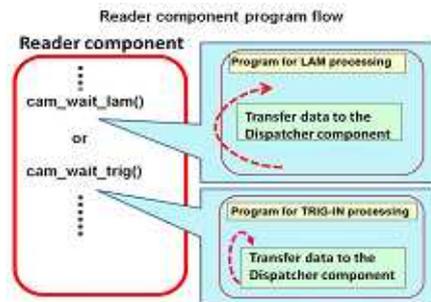
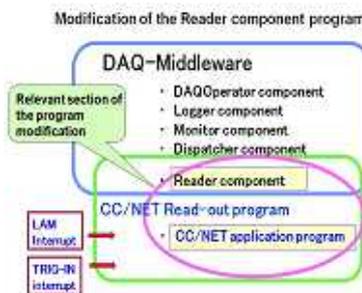
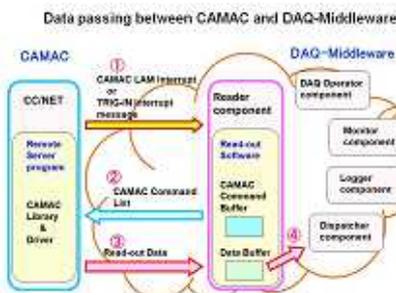


DAQ-Middleware

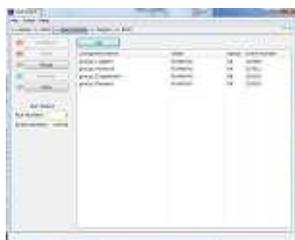
We proposed DAQ-Middleware, which is a framework based on RT-Middleware(Robot Technology Middleware) and dedicated to making DAQ systems. RT-Middleware is a software framework for robot systems and is an international standard. DAQ-Middleware is constructed from uniform components, DAQ-component, communicating through well-defined interfaces and provides a common platform on RT-Middleware. DAQ-Middleware is organized as a distributed network of uniform components connected by standard interfaces. Currently, it is available to use some kind of components such as DAQ Operator, Dispatcher, Logger, Monitor and Reader. The DAQ-component has a state machine such as configured state and pause state and so on. For communication between DAQ-Middleware and the Web client, the specific DAQ-component called DAQ Operator coupled with the Web server, controls other DAQ-components running in whole system.

DAQ System for the CC/NET

The DAQ-Middleware has some components with a basic function for the DAQ, so you are able to construct your own DAQ system very simply. It is only necessary to add a minimal software needed for you. We added a GUI part to control the DAQ-Middleware and a read-out part to access the CC/NET in our DAQ system. We constructed GUI by using Eclipse RCP. In order to develop this DAQ system, we used VMware image, on which performs the DAQ-Middleware. This is expected to be useful for making DAQ software development environment, because it is a portable development tool which include all software packages depend on the DAQ-Middleware needed for software development. The view on a GUI screen is selectable by using the tabs. In the GUI screen, you are able to perform a controlling DAQ and a viewing the various aspects of the machine status. We modified the Reader component which is software of the DAQ-Middleware, to access the CC/NET.



A screenshot of the GUI Client screen view



An execution example of the DAQ system for the CC/NET



Conclusion

With DAQ-Middleware, you can easily construct your own DAQ system. So DAQ-component is organized by DAQ function and is standardized data exchange between component, it is easy to make reuse of the software and the expansion of the DAQ function is simple, too. Because the system configuration performs in accordance with the description of XML file, it is easy to change the configuration of the DAQ system. It is easy to construct the your own DAQ system using DAQ-Middleware and you can get a highly-reliable DAQ system. DAQ-Middleware provides the user-friendly Web interface. We were able to construct the DAQ system for the CC/NET using DAQ-Middleware only by modifying one component and adding a GUI part.