A general-purpose control functionality of DAQ-Middleware

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Introduction:
DAQ-Middleware is a software framework of a network-distributed data acquisition system based on Robot Technology Middleware, RTM, for a small or middle size experiment. The basic functionalities of a DAQ system are already prepared in this framework. It is enough to acquire data from detectors, but it has only a few simple functionalities to control a whole system.

We, therefore, developed a new framework that has a general-purpose control functionality. We can reconfigure values on modules, such as values of high voltage power supplies, easily with using the new functionality.

DAQ-Middleware:
DAQ-Middleware consists of two kinds of nodes, DAQ-Component and DAQ-Operator. Basic components, which have a functionality of gathering, recording, etc., can be developed with using DAQ-Component. On the other hand, an operator to control all of those components can be developed with DAQ-Operator.

A control functionality:
We developed a general-purpose control functionality in DAQ-Middleware to reconfigure values in modules. The values which should be reconfigured are read from files by Operator and transmitted to a controller in a special state.

The framework works as a state machine system. There are four basic states and one special state, CHANGED. The transition between these states occurs by a command transmitted by Operator.

Fig.3 State transition diagram of DAQ-Middleware

The performance of DAQ-Middleware with the new control functionality was measured and compared with the existing system in which the values were changed by restarting the system.

The elapsed time from stopping a RUN until starting the next RUN was measured. The developed system is 420 msec faster than existing system.

Fig.4 Measurement result of elapsed time

Summary
The new DAQ-Middleware with the general-purpose functionality was developed. It was confirmed to implement functionalities of not only acquiring data but also controlling modules on components easily with using it.