A general-purpose control functionality of DAQ-Middleware

Y Nagasaka[1], H Hori[1], H Sendai[2], E Hamada[2], T Kotoku[3], N Ando[3], S Ajimura[4] and M Wada[5]

[1]Hiroshima Institute of Technology, [2]High Energy Accelerator Research Organization (KEK),
[3]The National Institute of Advanced Industrial Science and Technology (AIST),
[4]Research Center for Nuclear Physics (RCNP), Osaka University, [5]Bee Beans Technologies Co. Ltd.

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.
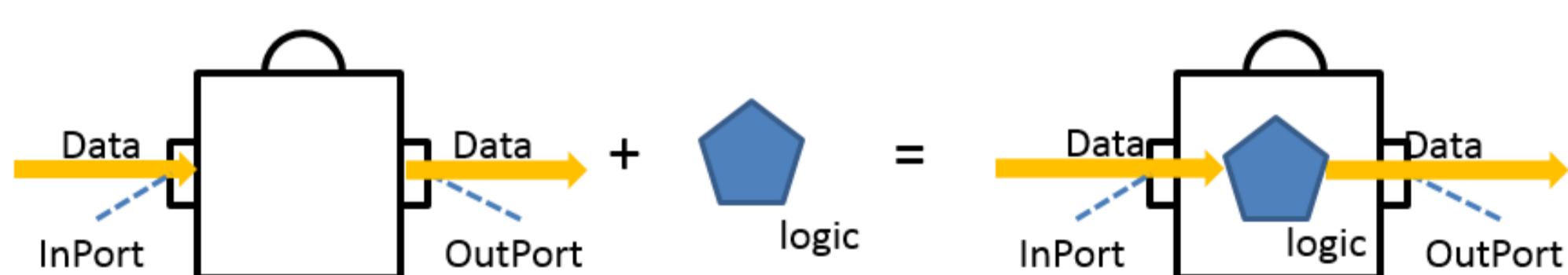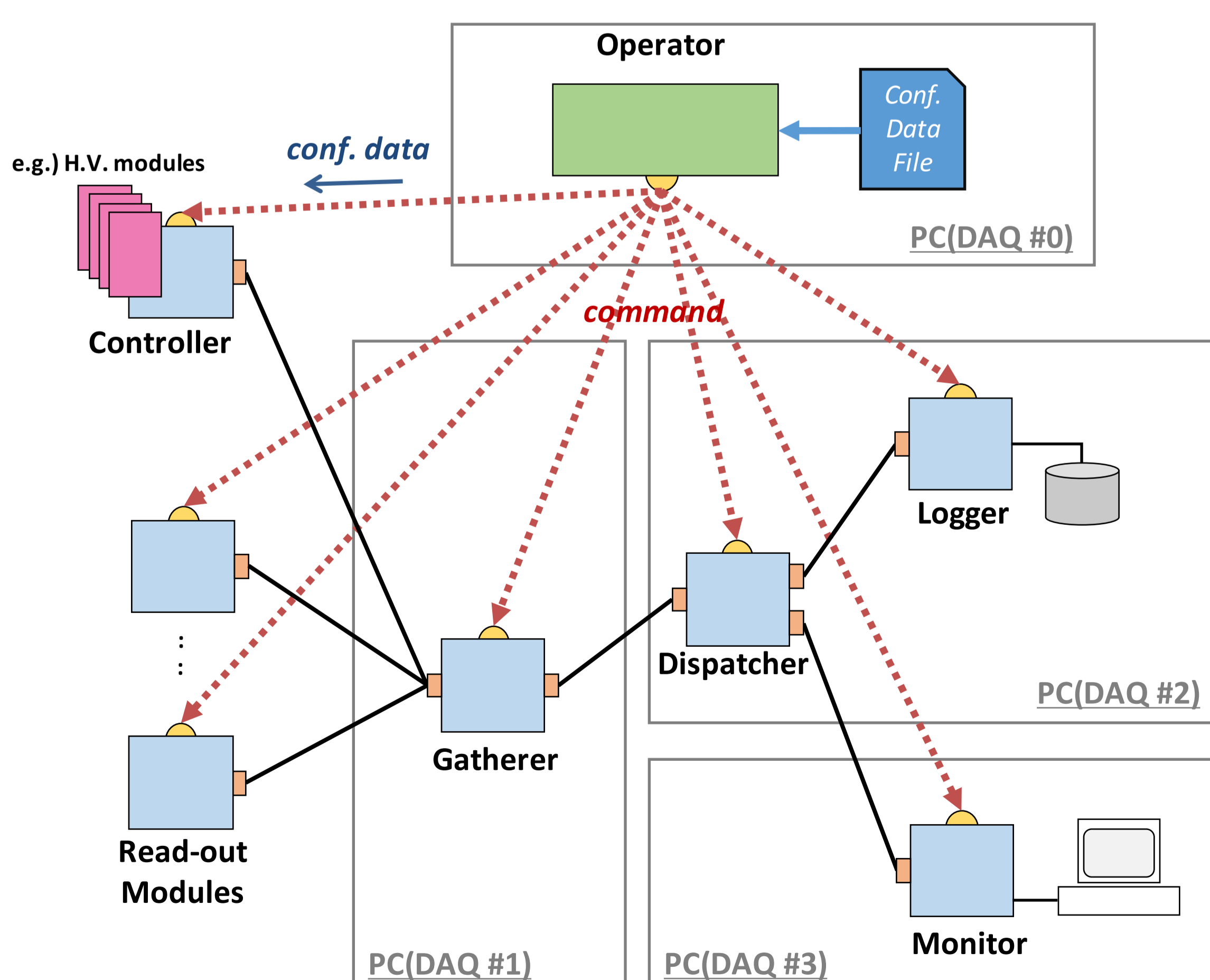

Fig.1 Concept of DAQ-Component

Fig.2 Typical example of a system architecture with using DAQ-Middleware

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.
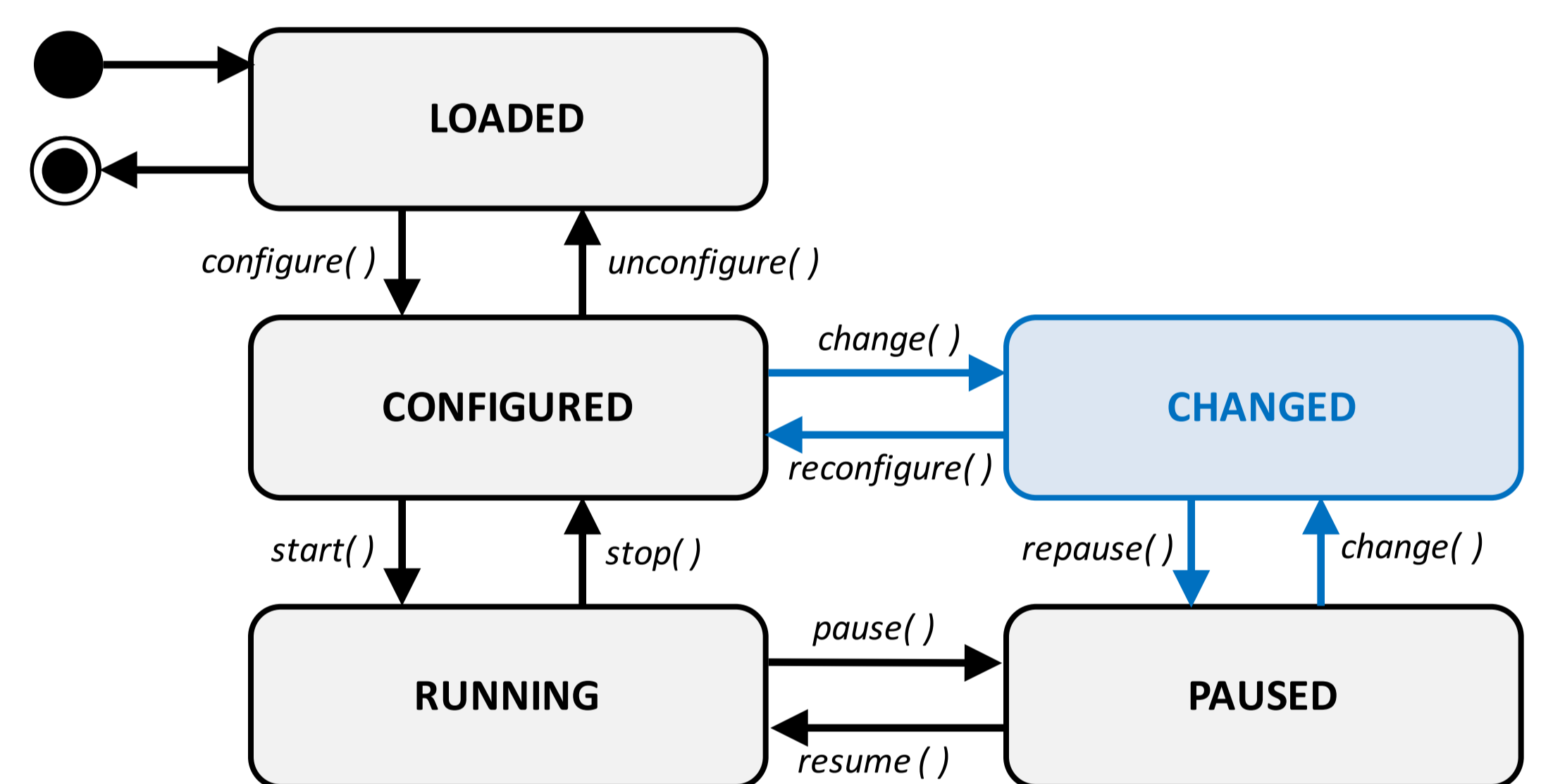

Fig.3 State transition diagram of DAQ-Middleware

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.
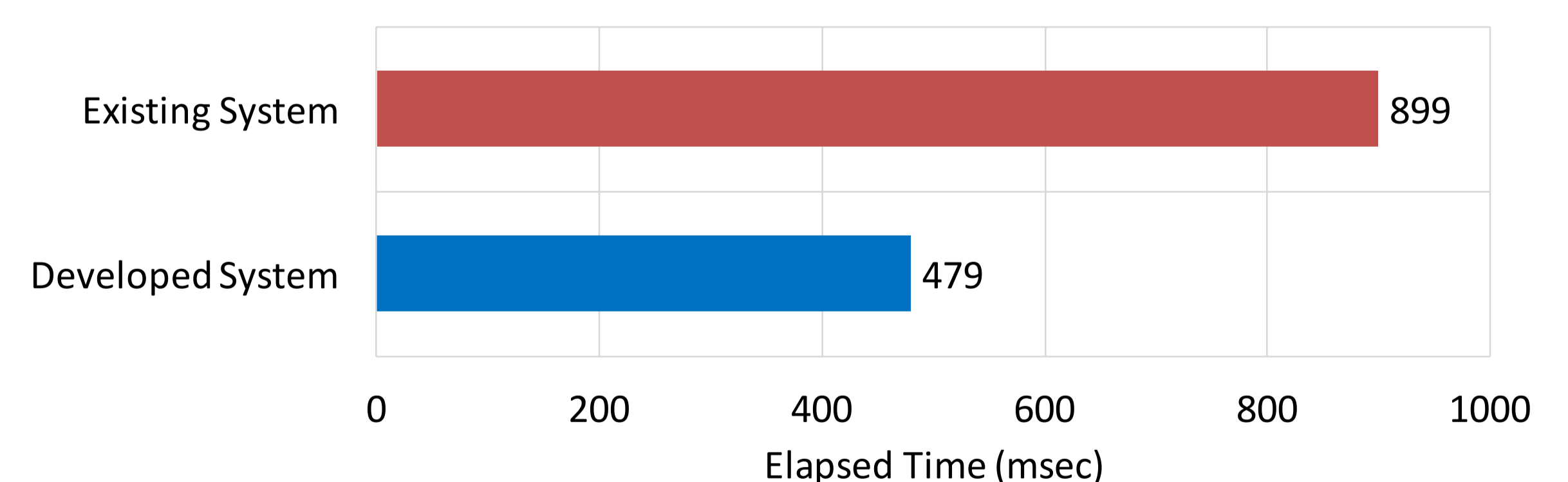

Fig.4 Measurement result of elapsed time

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.