EPICS PV Management and Method for RIBF Control System

Akito Uchiyama#, Misaki Komiyama, Nobuhisa Fukunishi (RIKEN Nishina Center)

Abstract
For the RIKEN Radioactive Isotope Beam Factory (RIBF) project, the Experimental Physics and Industrial Control System (EPICS)-based distributed control system is utilized in Linux and viewsWorks. Utilizing network attached storage (which has a high-availability system) as a shared storage, common EPICS programs (Base, Db, and so on) are shared by each EPICS Input/Output Controller (IOC). From the initial development of RIBF control system, it has continued to grow and consists of approximately 50 EPICS IOCs and more than 100,000 EPICS records. Because RIBF has been constructed by extending RIKEN Accelerator Research Facility (RAFR) in a previous project, the controllers for RAFR are also utilized for RIBF control system. In this case, the dependence between the EPICS records and EPICS IOCs becomes complicated. For example, it is not easy to know the accurate EPICS record name information using only the device information. Therefore, we constructed a new management system for the RIBF control system to easily call up the detailed information. In the system, by parsing startup script files (st.cmd) to run EPICS IOCs, all EPICS records and EPICS fields are stored in the PostgreSQL-based database. By utilizing these stored data, we succeeded in developing Web-based management and search tools.

Motivation
For system maintenance and development of Channel Access client, we need to identify the IOC hostname connected to the PVs.

• RIBF control system is constructed by extending RAFR control system (previous project).
• Relationship between controllers and IOCs is complicated.
• We would like to provide efficient system environment to search IOC hostname from PV name easily for developers and operators.

Method of System Construction
By reading the startup script files and accessing the EPICS runtime database files, the program can parse the runtime database files. Therefore, we developed a program such that the information is separately stored in the PostgreSQL-based database by parsing the file.

EPICS Substitution file and macro are also available.

Table Name | Information Stored in the Column | Number of Records
--- | --- | ---
include | Hostname of IOC | 51

Table: Database Structure Used for Management System in the RIBF Control System (October 2015).

Stored Information Usage for Command-line Tool
It is very easy to make PV lists by a program!!!

• We use this feature to make PV list for calMonitor and the electric logbook.
• Some command-line tools are developed to obtain the information from DB.

For example, making a list for all of the PVs including "psid_rpd: XXXX dac_set".

Sql1="SELECT * from Stable where PV like psid_rpd: %: dac_set and active=’1’ order by pv_id;"

Stored Information Usage for Web Application
Generally, alive monitoring is performed by a system that checks from the outside whether the computers continuously work.

• We can search EPICS IOC hostname from EPICS PV name. (sysinfo)
• Without requiring the completed EPICS record name, because of autocomplete feature.
• We can check all records and fields without source code.

RIBF Control System and Shared Storage
Common EPICS programs (EPICS-base, application programs, runtime database, and additional extensions programs) are stored in the NAS, and they are shared by all EPICS IOCs using the NFS or FTP.

| IOC Platform | Connected Control Device | Type | Number of IOCs |
--- | --- | --- | ---
Linux x86 N-DIM | PLC | GPIB | Other network-based devices |

Table: Current Status of the Type of EPICS IOC.

No. WEPGF032


mailto:a-uchi@riken.jp