

## Efficient Filtering and Access Control for the PEFP Control System

Eun-Mi An\*, Young-Gi Song, Hyeok-Jung Kwon, Yong-Sub Cho  
PEFP, KAERI, 150, Deokjin-dong, Yousung-gu, DaeJeon, 350-353, Korea  
\*Corresponding author: aem@kaeri.re.kr

### 1. Introduction

Proton Engineering Frontier Project (PEFP) has developed a 20MeV proton accelerator, and established a distributed control system based on EPICS[1] for sub system components such as vacuum unit, beam diagnostics and power supply system.

The PEFP has a single subnet, where most of the IOCs(Input Output Controller) and other servers are located. The single network of the control system for accelerator operating is shared by both IOCs and office personnel. Therefore the single network divides into machine network and control network. To access IOC PVs (Process Variables) between the separate network, EPICS Channel Access Gateway[2] has been applied in the PEFP network.

This paper provides an overview of the gateways at the PEFP and describes the procedures that have been set up to use.

### 2. Requirement and Design

To build a CA Gateway, several software development tools should be installed in advance. The tools installed are EPICS 3.14.9 for a channel accessing, MEDM[3] and StripTool[4] for PV monitoring and controlling.

#### 2.1 Distributed Network

The single network of the PEFP is divided into two separate different subnets. In order to access IOC PVs, CA Gateway has been applied in the PEFP network. The new network layout at the PEFP is shown in Fig 2.

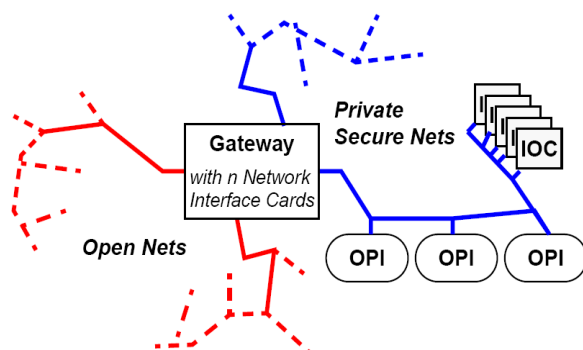


Fig. 1. New network layout

#### 2.2 Reduction of Network Traffic

CA gateway allows many clients to access a PVs while making only one connection to the remote server, thus reducing the load on critical IOCs or other servers. Monitors from many clients to the same IOC are bundled. Saves broadcast traffic with many clients of the same channel because already connected channels are not searched again.

#### 2.3 Filtering and Access Control

PEFP network lacks security support because the secured data can be access by any client user. To solve the weak using Gateway.pvlist in CA Gateway. Filtering is done by PV name patterns and only configured patterns are forwarded, others are blocked. Thus, saves broadcast traffic if channel is blocked and administrator can access starting, stopping, making, viewing and editing access security files. [5]

### 3. Implementation

The PEFP currently operate a gateway running on a workstation to provide access. There is one main gateway, which connect the machine network with control network. The most of channel access traffic are focused in the gateway server that is running on Linux.

Gateway.pvlist configuration for the filtering and access control is shown in Fig 2. Gateway.pvlist in the main gateway provides filtering and access control using regular expressions for PVs names and specification by user and host to either deny or allow access to these PVs patterns.

```
EVALUATION ORDER ALLOW, DENY
#RFQ Gauge
HVME01:*.CH1:.* ALLOW
HVME02:*.CH2:.* ALLOW

#DTL Gauge 1
*.DEV6.CH1:.* ALLOW
*.DEV6.CH2:.* ALLOW
*.DEV6.CH3:.* ALLOW
*.DEV6.CH4:.* ALLOW

#special Security
HVME03.DEV4.CH1:.* ALLOW Admin 1
HVME03.DEV4.CH2:.* ALLOW Admin 1
HVME03.DEV4.CH3:.* ALLOW PowerSupply 1
HVME03.DEV4.CH4:.* ALLOW Gateway Admin 1

#block everything
HVME7.3IL:.* DENY FROM 147.43.48.70
```

Fig. 2. Configuration of GATEWAY.pvlist for filtering and access control

Some panels are created using MEDM and StripTool for Monitoring of the main gateway as shown in the

Fig3. Such internal statistics as the number of connected, active, inactive, and dead process variables; the number of virtual connection; and the number of client process variables are shown in Fig3, along with event rates and the CPU usage.[5]

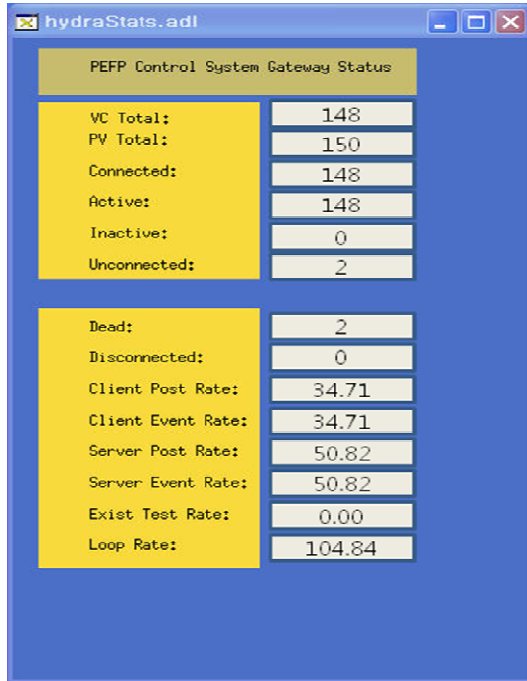


Fig. 3. MEDM for network traffic monitoring

#### 4. Conclusions

The gateway has put into operation. The current version of the gateway installed on control network has been found to be quite stable and capable of handling a large number of process variables along with high update rates. It will become an important part of the PEFP control system and will be relied upon by more and more users.

#### 5. Acknowledgements

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#### REFERENCES

- [1] EPICS, <http://www.aps.anl.gov/epics/>
- [2] Gateway, The Process Variables Gateway, <http://www.aps.anl.gov/epics/extensions/gateway/index.php>
- [3] MEDM, Motif Editor and Display Manager, <http://www.aps.anl.gov/epics/extensions/memd/index.php>
- [4] StripTool, <http://www.aps.anl.gov/epics/extensions/striptool/index.php>
- [5] Kenneth Evans, Martin Smith, "Experience with the EPICS PV Gateway at the APS", 2005 Particle Accelerator Conf., Knoxville, TN, May 16-20