Integration of the Communication Driver for the HANARO control system

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1. Introduction

HANARO research reactor and some installations, which are CNS (Cold Neutron System) and FTL (Fuel Test Loop) installed in reactor, were using the RTP controller to control their system. They are commercial products and being upgraded according to ICT (Information & Communication Technology) development. The version of each RTP controller are different depending on the year of adoption. The versions are RTP 3000 for HANARO research reactor, RTP 2300 for CNS and RTP 2200 for FTL. The versions are RTP3000 for HANARO research reactor, RTP2300 for CNS and RTP2200 for FTL. The OPC (OLE for Process Control) protocol provided basically by manufacturer was used for communication between each RTP controller and HMI (Human Machin Interface) which is called as OWS (Operator work Station), but we had difficulty in keeping stable communication due to burden on Tag server. We developed the communication network driver in order to reduce the load of Tag server and to fulfill the stable communication between RTP controllers and HMI.

2. Communication Network Configuration

RTP Controllers of HANARO, CNS and FTL are connected to Tag-server. The controller used in each facility was equipped with the communication system for interface with the Tag server. The OPC protocol of three controllers provided by manufacturer for communication with the Tag server are different version, so they had to installed in Tag server of each OPC protocol respectively. The communication network configuration of HANARO is shown in Figure 1.

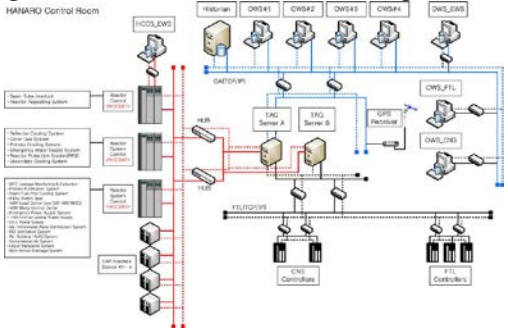

Figure 1. HANARO network configuration

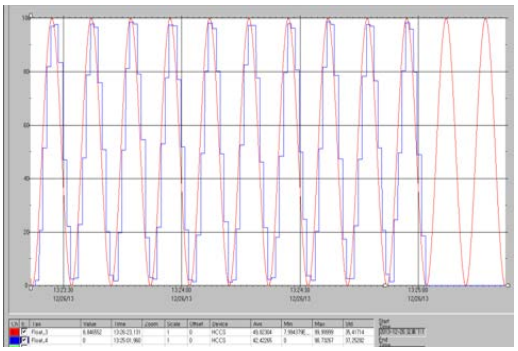

Figure 2. HANARO network traffic

As shown in Figure 2, use of different OPC protocols caused data loss from HMI Tag server. We decided to develop the integrated communication driver that can replace OPC protocols in order to prevent loss of data.

3. Development of Integrated Communication Network Driver

In order to integrate three kinds of OPC protocols into one communication network driver, controller protocol was required to review and analyze. Controller protocol for RTP 3000 was provided by manufacturer and protocols for RTP 2300 and RTP 2200 were acquired by analysis of communication packet. Open software Wireshark, shown in Figure 3, was used for collection communication packet of RTP2300 and RTP2200.

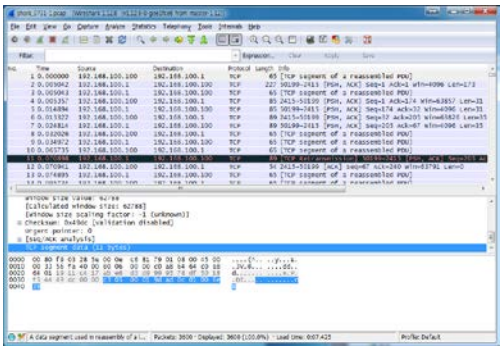

Figure 3. Data collection of the RTP controller

New communication network driver was equipped in Tag server and connected to three RTP controllers. Reducing network load needs to be taken into account in developing new communication network driver because the driver communicates with three controllers.

In order to reduce time delay, the communication method of the new network driver was designed to communicate with the required block unit, as shown Figure 4.

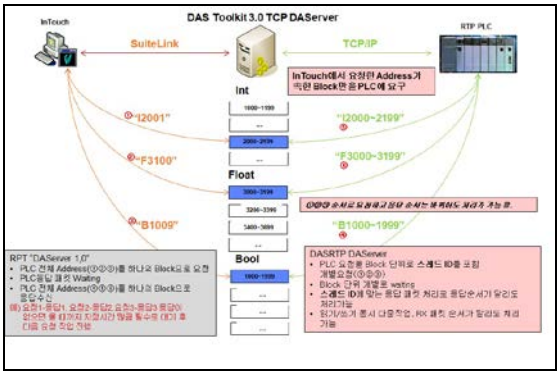

Figure 4. Configuration of the new communication driver

5. Test of the communication driver

After the integrated communication driver install at the Tag server, we confirmed that the communication is normally connected HMI tag and RTP controller tag. This state is the same as connected to Tag server using three OPC protocols.

In order to confirm the communication status of new communication network driver, one arbitrary analog signal was sent from Tag server to RTP controller. If the RTP controller received the signal from the Tag server, RTP controller retransmitted the received signal to the Tag server. We compared two signals once the Tag server received the signal from RTP controller,

We tested the new communication driver under the same conditions as before the driver development, and confirmed that the communication was good without any loss of data, as shown Figure 5.

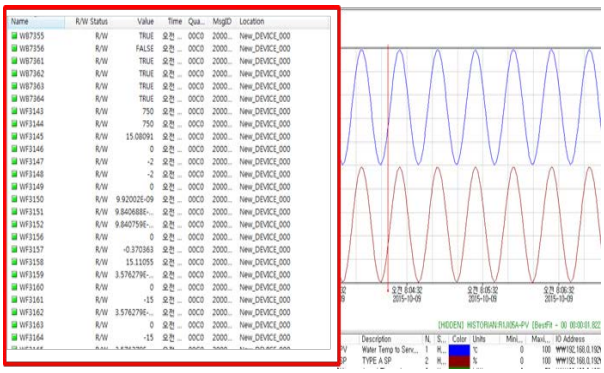

Figure5. Test result

7. Conclusion

New integrated communication driver was developed prevent data loss occurred when using three different RTP controllers.

New communication driver has been verified to communicate without any loss of data.

This communication driver will be useful for controlling three facilities (HANRO, CNS, FTL).

REFERENCES

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