# Renewal of Centralized Monitoring System for Kazusa Wide-Area Waterworks Authority

Masaki Mihara

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**Abstract**

**For getting higher efficiencies for water supply services in Kimitsu District of Chiba Prefecture, Kimitsu Wide-Area Waterworks Authority and water utilities of Kisarazu City, Kimitsu City, Futtsu City, and Sodegaura City were merged in 2019 to make Kazusa Wide-Area Waterworks Authority as a single water supply service provider.**

**Under the construction project, a single server system was installed for controlling water supply facilities of Kisarazu City and Kimitsu City to centrally manage data on related waterworks facilities. It established a means to monitor and control facilities in an integrated manner.**

**As a result, efficient data control and system monitoring for waterworks facilities of two municipal organizations is possible.**

## 1 Preface

To improve the efficiencies of water supply services, Kazusa Wide-Area Waterworks Authority was established by unifying five water supply organizations: Kisarazu City, Kimitsu City, Futtsu City, Sodegaura City, and Kimitsu Wide-Area Waterworks Authority. It is important to realize efficient water supply operations through the merger of organizations and also improving data control efficiencies supported by unifying water facilities information.

Under this construction project, a data server system was installed to merge the data of the waterworks facilities of Kisarazu City and Kimitsu City. We realized unified data control. This paper introduces major features of the system adopted under this construction project.

## 2 Introduction of System

Meiden's MEISVY VS6000 server ("VS6000" hereafter) was installed in a computer room at the target monitoring site, the Ootera Drinking Water Treatment Plant. The VS6000 is of the redundant system (duplex system) to increase reliability.

For monitoring and operation by control room operator, two monitoring terminal units are installed in the central control room. Fig. 1 shows a view of an installed monitoring terminal. The information-related network (I-NET) between the VS6000 server and the monitoring terminal is devised to realize the system redundancy by using "teaming technology" by which a server and a network adapter installed at the monitoring terminal are assembled into a unified virtual network adapter system.

**Fig. 1 View of Installed Monitoring Terminal**

Terminal equipment installed in the centralized control room is shown. It is ready for operation and control by control room operator.

In such a system configuration, the system reliability is raised and failure resistance is reinforced. To avoid misalignment between the clock function and network clock time, FM waves are always received at the FM antenna so that the radio time signal is continually monitored.

For the network with external waterworks facil-

ities, facility weighting is carried out and the most important facility is programmed to adopt wide-area network services by which frequency bands are guaranteed and a higher reliability is assured.

On the waterworks facility side, Meiden UNISEQUE ADC6000 (“ADC6000” hereafter) is adopted for the network controllers. All the waterworks facilities are provided with functions of uninterruptible electric power generation such as uninterruptible power supply units (mini-UPS). For a water service reservoir situated at higher ground, for example, a surge-proof transformer was installed at the power source section for lightning surge protection. **Fig. 2** shows a network configuration of four cities covered by Kazusa Wide-Area Waterworks Authority.

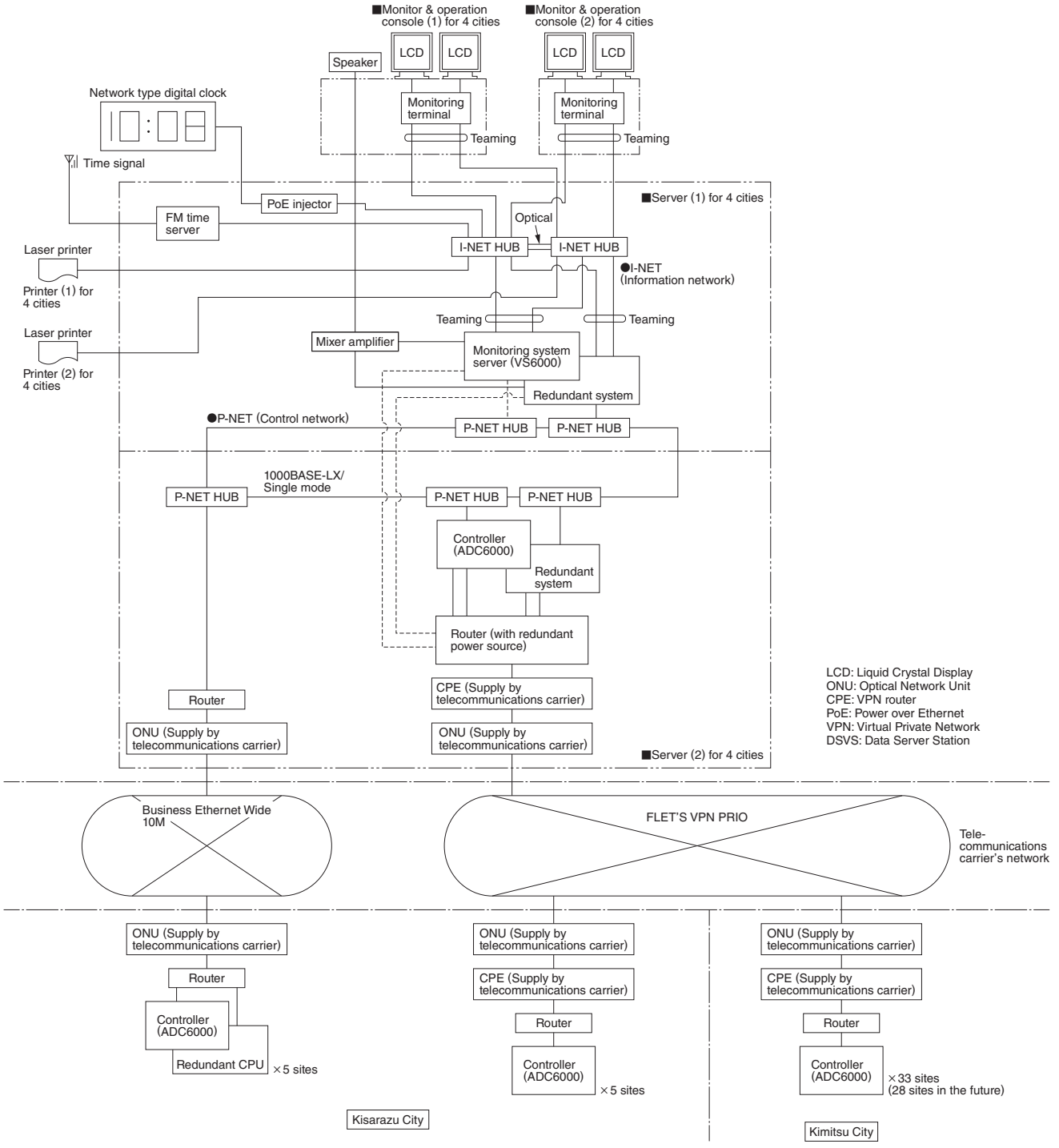


**Fig. 2** **Network Configuration of Four Cities Covered by Kazusa Wide-Area Waterworks Authority**

The centralized control room conducts batch monitoring of various waterworks facilities. For mission critical facilities, highly reliable communication lines were used. We used inexpensive communication lines for facilities rated medium importance.

## 3 Considerations for Large-Scale Network

The purpose of this IT system construction work is to achieve centralized control of information on waterworks facilities by using data server equipment located in approximately 40 sites. On the data server side, a delay in data delivery time in the case of expansion of data traffic from waterworks facilities and the occurrence of network malfunction are matters of concern. To eliminate such challenges, parallel processing is carried out by the routers adopted to make high-speed connections by using multi-core processors. The amount of data for water supply facilities that will be added in the future can also be managed.

## 4 Future Measures

This construction work was carried out the water facilities in Kisarazu City and Kimitsu City. The server capacity was selected, and the network system strength was studied so that Sodegaura City and Futtsu City can also join the system in the future. In the event of such future joining, we expect that only setting up additional monitoring terminals would be needed.

If all water supply facilities are connected to a single network, the system will be able to supply water to residents with optimal water pressure, water volume, and water quality, and contribute to efficiency improvements and power reductions on the water supply facility side.

## 5 Postscript

We introduced the solutions to the IT problems unique to water supply facilities. These measures were considered in this construction work. It is important to obtain and understand the following information when constructing an information network system for water supply facilities.

(1) Volume of information about each waterworks facility

(2) Importance of waterworks facilities

(3) Conditions of water flow among waterworks facilities

(4) Method of operation for control room operator

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