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Next-Generation Supervisory Control System Capable of Integrated Management of Power Transmission and Distribution Systems

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Abstract

With the ongoing electricity system reform in Japan, including full retail competition and legal unbundling of power transmission and distribution sectors, transmission and distribution sectors of general electric utilities are endeavoring to maintain the reliability of electricity supplies and to ensure low operation costs. Therefore, efforts to enhance the sophistication and efficiency of power transmission and distribution business activities are being made by realizing smarter operation and maintenance of their grid facilities as well as by reducing the costs of their supervisory control systems for the facilities.

For this purpose, Toshiba has developed a next-generation power supervisory control system capable of integrated management of power transmission and distribution systems. It is based on the company's technologies and experiences obtained from distributed supervisory control systems on wide-area internet protocol (IP) network with a large number of its delivery records.

The features of the next-generation supervisory control system are:

(1) To make maximum centralization of systems,

(2) To unify all data from the bulk power system to the distribution system, where CIM (Common Information Model) of the electric power network model based on the international standard are applied, and

(3) To implement the security measures necessary for an important infrastructure.

As an actual case, outline of the next-generation supervisory control system for TEPCO power grid, Inc. is introduced. The system will be delivered and start operation in stages from the end of the 2018 fiscal year.

The system will integrate supervisory control for sub transmission control centers and distribution control centers, encompassing both transmission and distribution, while the same level of operation quality is maintained. It is compliant with CIM, international standards, and will provide high interoperability with external systems, allowing data exchanges between organizations and systems.

In addition, the paper also describes the security measures against cyber risks considered in the supervisory control systems, which are more and more important issues in recent years.