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Application of Virtualization Technology to the New Supply and Demand Adjustment Support System

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1 Introduction

With the objectives of enhancing adjustment capabilities and maximizing profits through unified operation of in-house supply and demand-related functions for power supply and demand operation, fuel adjustments and power transactions, Kyushu Electric Power Company plans to construct a new supply and demand adjustment support system, operation of which will be launched in April 2017.
The new system is an important ICT infrastructure that provides functions indispensible to the daily adjustment of supply and demand, including functions to support simulations of the most economic operation for in-house supply and demand adjustment and functions to support the unified operation of supply and demand adjustment and transactions on the wholesale electricity transaction market. For this reason, it is required to be in stable operation 24 hours a day, 365 days a year with no downtime.
On the other hand, to win out in an era in which ongoing electricity system reforms are making competition ever more severe, innovations using ICT technology are essential to realize the maximum effects with the minimum investment.
With the goal of realizing an infrastructure capable of continuous uninterrupted operation through the simultaneous achievement of high reliability and low costs, Kyushu Electric Power Company is conducting studies into the construction of a system that combines virtualization and other diverse technologies, an overview of which is presented in this paper.

2 Supply and Demand Adjustment Support System

With the aim of realizing an infrastructure with no downtime, the new system is configured with the three features described below. (For an illustration of the system configuration, see Fig. 1.)

(1) Multiple function-specific virtual servers are deployed in integrated physical servers based on system processing characteristics and the number of physical servers required minimized to reduce the rate of incidence of physical failures and cut costs.

(2) As well as the above physical servers, a shared standby server is deployed so that virtual servers can be instantaneously switched to the standby server in the event of physical server failure, thus ensuring continuity of operation.

[Realized by a combination of virtualization functions (VMware High Availability and VMware VMotion)]

(3) Physical servers with the same functions are deployed at two data centers, active and standby, and databases are synchronized in real time so that, in the event of incidents such as a major disaster or simultaneous failures on multiple physical servers, operation can be switched to the servers at the standby data center, thus ensuring continuity of operation.

[Realized by a combination of a virtualization function (VMWare Site Recovery Manager), a DBMS function (Oracle Data Guard) and a storage function (EMC VMAX SRDF)]

3 Conclusion

The new system will further grow in importance with the future planned addition of new functions such as supply and demand portfolio optimization and risk management support functions. In addition, to cope with the vast amount of data handled created by the spread of smart meters, we will continue with our efforts to further improve reliability based on the operational status after the launch of the system.

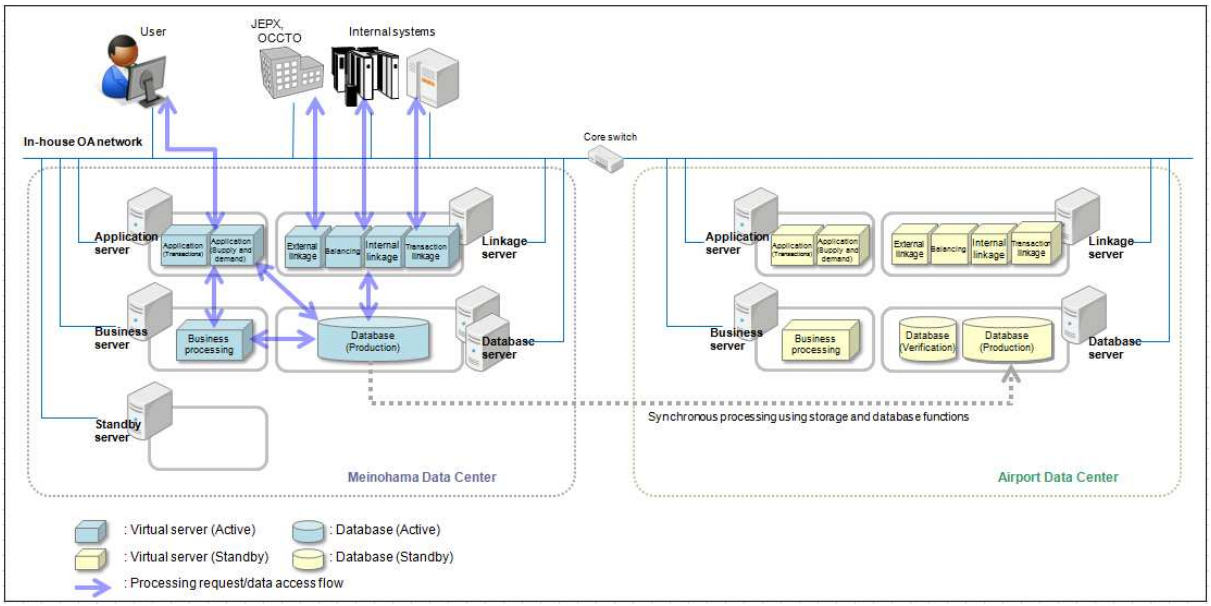

Fig. 1: Configuration of the Supply and Demand Adjustment Support System