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PS3 – Developing secure and reliable ICT systems infrastructure

A Development of NMS (Network Management System) for AMI (Advanced Metering Infrastructure) Network Devices

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An increase of power demand and carbon emissions problem have provoked utilities to increase the generation of renewable energies and the needs of integration within the existing power system such as the Smart Grid. The Smart Grid has potential Applications such as AMI, DR (Demand Response), T&D Automation, OMS (Outage Management System) and etc. AMI is an essential system for implementing Smart Grid.

Basically, AMI system is consisted of FEP (Front End Processor), DCU (Data Concentration Unit), Communication Modem, and Smart Meter. KEPCO developed meter reading system based on AMI (Advanced Metering Infrastructure) over PLC (Power Line Communication) network for low-voltage customers. Currently, meter reading system of KEPCO operates 2.5 million low-voltage customers and will be 22 million until 2020. This paper introduces the AMI NMS (Network Management System) to monitor the network operating status of DCU and PLC modem for AMI network operation. AMI NMS collects property data of network device, network topology information, communication performance information, fault information, and etc. using SNMP (Simple Network Management Protocol). It analyzes collected data and controls network devices by remote access.

Main systems of AMI Servers are AMR (Automatic Meter Reading) FEP (Front End Processor) and NMS FEP. AMR FEP collects metering data from DCUs every 15 minutes by FEP protocol defined by KEPCO. NMS FEP collects network status data from DCUs every 15 or 30 minutes by SNMP protocol. Polling mechanism has a system overhead concentration problem on FEP, SMCP (Smart Meter Concentration Protocol) has been researched.

Failure level of AMI network has three stages and duplicated failures are

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removed by redundancy check module to provide the optimized failure list to the operator. An operator could manage the metering network more stably by using the NMS functions such as real time failure list, failure handling with remote control and communication tree and performance analysis with network topology diagram.

This paper introduces main functionalities, designed context, implemented service screen and operational result.