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SEAMLESS INFORMATION MODELS AND INFORMATION EXCHANGE BASED ON IEC 61850 (IEC 61400-25), IEC 61970, AND XML

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The paper provides an overview about the application of XML and web services in the international standards IEC 61850 (Communication networks and systems in substations), IEC 61400-25 (Communications for monitoring and control of wind power plants), and IEC 61970 (CIM, Common information Model). It presents the comprehensive set of semantical definitions (process and meta data) for substations, wind power plants, and the whole grid. The information exchange – based on a set of very common services, SOAP, and TCP/IP – and the use of XML for easier configuration of devices and systems are introduced. The integration of substation configuration information into the control-center configuration (CIM, Common information Model) and vice versa will be discussed.

Process automation solutions are widely accepted for power systems. They are mostly based on a huge number of proprietary specifications or (de facto) standards. Globally, utility deregulation is expanding and requiring to integrate, consolidate, disseminate, and interpret real-time information quickly and accurately within an utility – from power plants to the power consumer in the shop floor or domestic users. Future power systems face a growing demand of configuration information (meta data) that describe the process data. To meet today's and future requirements new standards have been defined: IEC 61850 (IEC 61400-25) and IEC 61970.

Systems that only produce, transmit, or distribute power need more and more – seamlessly supervised – automation systems that require little or no human intervention for the configuration and operation. Technologies bundled into the power system, therefore, have to include system configuration, protection and control equipment, as well as interfaces to supervisory control and data acquisition (SCADA) of control centres. Other applications that have already started to rely on these standards are: remote monitoring and fault diagnosis, power quality, automated dispatch and control, site optimisation of electrical/thermal outputs, asset management, as well as condition monitoring and diagnosis.

The future power systems will – thanks to a seamless information and communication system – be smart at the top and smart at the bottom, self-regulated by millions of communicating devices connected to form feedback loops, and permanently aware of the world around them. Utilities and vendors take advantage of the new seamless standards, and make the power systems safer and more efficient than before – all critical information is available (at any time and any where) and could be understood easily and unambiguously when making control decisions.