IEC 61850: A Protocol with Powerful Potential

Introduction

As the international standard for power substation automation systems, IEC 61850 defines the communication between devices in the substation and related system requirements. It supports substation automation functions as well as their engineering. Unlike earlier protocols, the technical approach makes IEC 61850 flexible and future-proof.

Although there are over 50 protocols worldwide for substation automation, IEC 61850 is the only one that provides a standardized method of communications and integration whose goal is to support systems built from multi-vendors intelligent electronic devices (IEDs) networked together to perform protection, monitoring, automation, metering and control.

To achieve maximum benefit from this protocol, it is essential to understand what it has to offer, how it is different from previous standards and what it provides to end users.

Capabilities

Merging the communications capabilities of all IEDs in a substation or even across an entire power network can provide data gathering and setting capability as well as remote control. Multiple IEDs sharing data or control commands results in new distribution protection, control and automation functions. This has the potential to supersede and eliminate much of the dedicated control wiring in a substation, plus costly special purpose communication channels between the stations and power network.

This standardization enables the integration of the equipment and systems for controlling the electric power process into complete system solutions, which is necessary to support utilities' processes. It ensures interoperability of equipment and systems by providing compatibility between interfaces, protocols and data models. With IEC 61850's standardization of data acquisition and description methods, integration efforts are reduced.

This protocol also meets utilities' requirements for long-term system expandability. Not only does it enable utilities to combine products from a variety of manufacturers, but it also affords users long-term exchangeability of equipment to simplify parts stocking. All of these factors contribute to time and cost savings as well as reducing the complexity of managing facilities.

This standard not only provides a device-to-device peer network, but also it is also a station-to-station network. It helps translate important information from one substation to another, which is critical during power outages.

Differentiators
IEC 61580 is the only standard that meets the ever-increasing demand from utility companies worldwide for compatibility of an installed base of control equipment from multiple vendors.

Since the protocol is Ethernet based, it makes use of common and familiar tools and devices already present in utility business networks. This means it operates as a client to control the network and talk to all the servers or slaves on the network. Since those slaves are typically IEDs that control the transformers and switchgear in the substations, they collect a great deal of data that has to be read.

Unlike other protocols, which do not have file and historical type transfer files, IEC 61850 enables files to be brought up from the IEDs to a Supervisory Control and Data Acquisition (SCADA) system to provide information on system activity. More importantly, it enables offline trending. Unlike online trending where update rates might be as long as a second, offline capabilities provide data in milliseconds so that it can be saved and brought up for review and comprehensive analysis.

IEC 61580 relies on object oriented programming, rather than traditional programming to define the process data of servers. Since object orientation emphasizes data not procedure, it affords users ease of modification and flexibility in adapting to changing business needs. With code and data merged into one "object," all the information and functionality information resides in one place. A device sends information by multicasting and only devices that are subscribers receive this message.

End-user benefits
The standard provides users with the ability to predict how data will be moved and identified between clients and services from any manufacturer. With this predictability, integration is simplified.

With IEC 61850's client/server architecture, intelligence moves closer to the process and eliminates the bottlenecks and classic master/slave architecture. The client controls the data exchange making client/server communication very flexible in terms of the data to be transmitted.

The protocol speeds the time critical exchange of information to meet the safety requirements of several automated functions in a substation automation system.

The intended result is a seamless communication architecture for Utilities. Since IEC 61850 has high impact on the investment and operation of power systems, the Utilities and industrial plant electrical energy substation supply will actively consider the standard as well as the suppliers.

When implementing IEC 61280, it is imperative to work with suppliers who provide the high level of technical and application expertise that is critical to achieve optimal results. Supplier support ensures ease of configuration and commissioning, saves time, increases efficiency, provides faster return on investment and enables users to gain the advantages of the full power of IEC 61280's potential.

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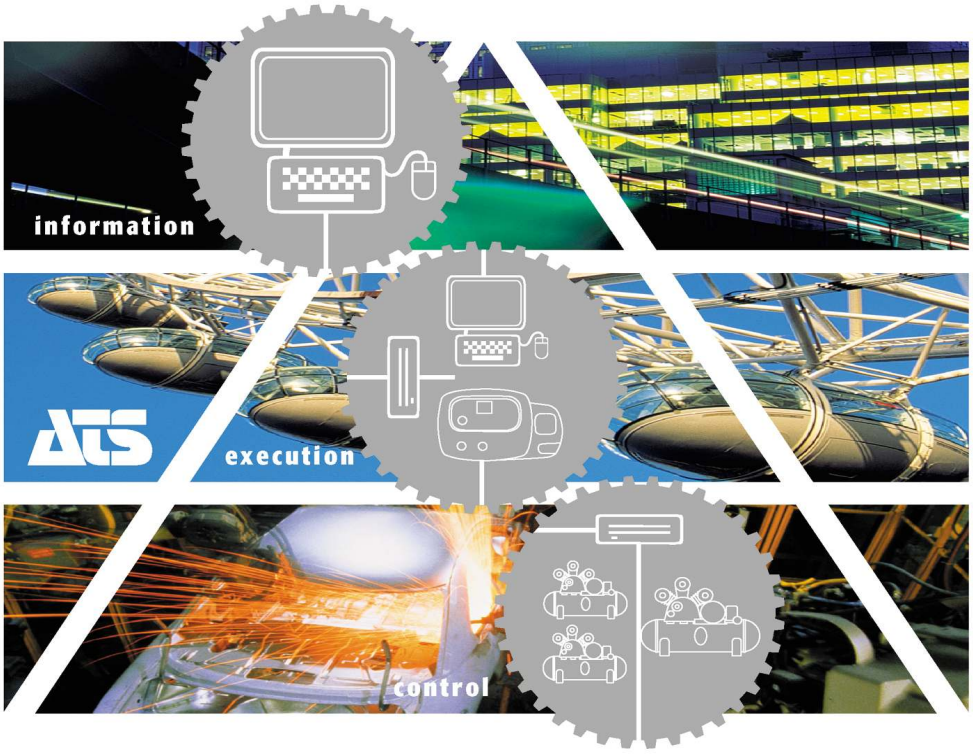

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