

Do Your Substation Devices Speak IEC 61850? They Should, It's Time.

Edvard



Do Your Substation Devices Speak IEC 61850? They Should, It's Time. (photo by Siemens A.Ş. - Siemens Türkiye)

Overview of IEC 61850

Since being published in 2004, the [IEC 61850 communication standard](#) has gained more and more relevance in the field of substation automation.

It provides an effective response to the needs of the open, deregulated energy market, which requires both reliable networks and extremely flexible technology – ***flexible enough to adapt to the substation challenges of the next twenty years.***

IEC 61850 has not only taken over the drive of the communication technology of the office networking sector, but it has also adopted the best possible protocols and configurations for ***high functionality*** and ***reliable data transmission.***

Industrial Ethernet, which has been hardened for substation purposes and provides a speed of ***100 Mbit/s***, offers bandwidth enough to ensure reliable information exchange between ***IEDs (Intelligent Electronic Devices)***, as well as reliable communication from an IED to a substation controller.

The definition of an effective process bus offers a standardized way to connect conventional as well as intelligent ***CTs*** and ***VTs*** to relays digitally.

More than just a protocol, IEC 61850 also provides benefits in the areas of ***engineering and maintenance***,

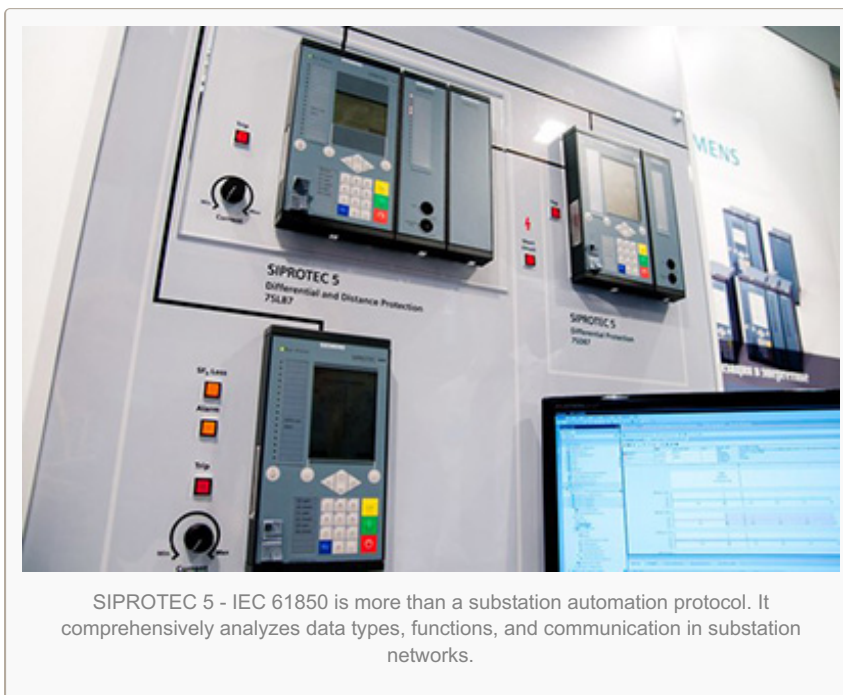
especially with respect to combining devices from different vendors.

Key features of IEC 61850

As in an actual project, the standard includes parts describing the requirements needed in [substation communication](#), as well as parts describing the specification itself.

The specification is structured as follows:

- An **object-oriented** and application-specific data model focused on [substation](#) automation.
- This model includes object types representing nearly all existing equipment and functions in a substation – **circuit breakers, protection functions, current and voltage transformers, waveform recordings**, and many more.
- Communication services providing multiple methods for information exchange. These services cover reporting and logging of events, control of switches and functions, polling of data model information.
- Peer-to-peer communication for fast data exchange between the feeder level devices (*protection devices and bay controller*) is supported with **GOOSE** (*Generic Object Oriented Substation Event*).
- Support of sampled value exchange.
- File transfer for disturbance recordings.
- Communication services to connect primary equipment such as [instrument transducers](#) to relays.
- Decoupling of data model and communication services from specific communication technologies.
- This technology independence guarantees long-term stability for the data model and opens up the possibility to switch over to successor communication technologies. Today, the standard uses **Industrial Ethernet** with the following significant features:
 - 100 Mbit/s bandwidth
 - Non-blocking switching technology
 - Priority tagging for important messages
 - Time synchronization
- A common formal description code, which allows a standardized representation of a system's data model and its links to communication services.
- This code, called **SCL** (*Substation Configuration Description Language*), covers all communication aspects according to IEC 61850. Based on **XML**, this code is an ideal electronic interchange format for configuration data.
- A standardized conformance test that ensures interoperability between devices. **Devices must pass multiple test cases**: positive tests for correctly responding to stimulation telegrams, plus several negative tests for ignoring incorrect information
- IEC 61850 offers a complete set of specifications covering all communication issues inside a substation
- Support of both editions of IEC 61850 and all technical issues.



Reference: Siemens Energy Sector – Power Engineering Guide Edition 7.0

Source:

<http://electrical-engineering-portal.com/do-your-substation-devices-speak-iec-61850-they-should-its-time>