RENEW A THOUSAND SUBSTATIONS IN JUST TEN YEARS?

IEC 61850:
from XML to HMI in a Few Minutes

Grid operators face a difficult task: the secondary systems of more and more substations need to be replaced in ever-shorter intervals. If this isn't done, or it isn't done quickly enough, there is the threat of a blackout. But there is no need to be under time pressure. There is a well thought out standard and a new wizard to take on the job. What used to take days can ideally be completed by engineers in a few minutes.

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IT'S ALL DOWN TO THE STANDARD

The IEC 61850 group of standards describes not just a communication mechanism, but also an XML-based configuration language. Many clever applications are possible with this system configuration language (SCL): you can configure and model substations or any desired equipment with it. Based on a top-down approach, a system is first defined roughly and then specified in ever-more detail. The typical route starts with the system specification description (SSD), continues with a system configuration description (SCD) and ends with configured IED descriptions (CID). However, from the perspective of an HMI application, the SSD already contains so much information that complete equipment screens can be generated from it.

In principle, the SSD is a waste product of an initial configuration that describes basic requirements. The primary switching devices are placed in a logical electrical interrelationship; voltage levels, transformers, bus bars and protection functions are defined. In short, SSD is a functional description. Ingenious is that developers have decided that the standard should envisage X and Y coordinates, at least as an option, which are used to set out the position of the primary switching devices. These are ideal requirements for generating an HMI screen that reproduces the arrangement of the switching devices precisely.

MORE POWER: THE IEC 61850 SSD IMPORT WIZARD

A new zenon Editor expansion tool, the "IEC 61850 SSD Import Wizard", comes into play here. This wizard reads an SSD file and draws a single-line diagram into a zenon screen at the touch of a button. As mentioned, the functions of the primary devices are also described in the SSD file. Furthermore, the wizard knows which element it must draw at the respective point, such as a transformer, circuit breakers, disconnector switch, etc. The person configuring the project can use supplied elements and easily adapt these if required. It is also possible to create your own symbol library in this way.

As a result of this technology, plant operators and integrators have the option to define standards that the wizard takes on directly. The user determines the appearance, properties and color scheme at a central point and simply accepts them into all single-line diagrams.

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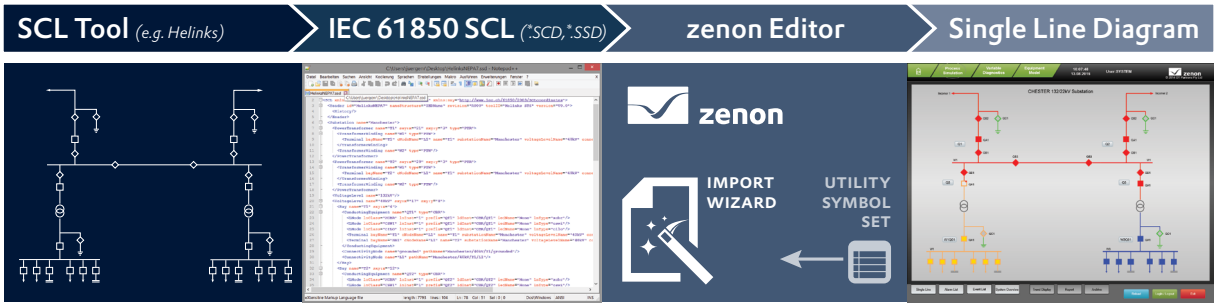


From an SSD file to a single-line diagram

RENEW SECONDARY DEVICES FLEXIBLY

The wizard primarily shows its strengths with the refurbishment of the secondary devices. The life cycles of the secondary devices are getting shorter and shorter. Protective devices used to last 40 years before they had to be replaced, now the lifecycles span 15 to 20 years. With on-site HMI systems, the reduction of the operation lifetime occurs even more quickly. We now measure a cycle of seven-and-a-half to ten years. Calculated across all substations of a large distribution grid operator, this results in quite a large number of refurbishment projects, i.e. projects for which the secondary systems are replaced while the primary systems remain operational. Here, operators must not fall behind with their quota of necessary renewals. Failure to do so could lead to a device failure and could possibly endanger the certainty of supply. The solution requires fast and error-free work with technology that reduces the load for integrators when configuring their project. And what could be better for this than a tool that is incorporated into the IEC 61850 configuration chain and implements the requirements from the description files without errors? It can be so easy…

When configuring a project, you simply select the SSD file, determine the symbol set of the grid operator, define the zenon screen and – go! The wizard automatically draws the single-line diagram. After that, you only need to link the variables to the symbols, make some adjustments here and there and the tailor-made HMI is finished. It does not matter how large, the screen is generated in just a few seconds. The necessary renewal projects can thus be processed in time – or even ahead of schedule. This is in turn reflected in the costs; not just on time but also cheaper.

GIVE TOP-DOWN A CHANCE

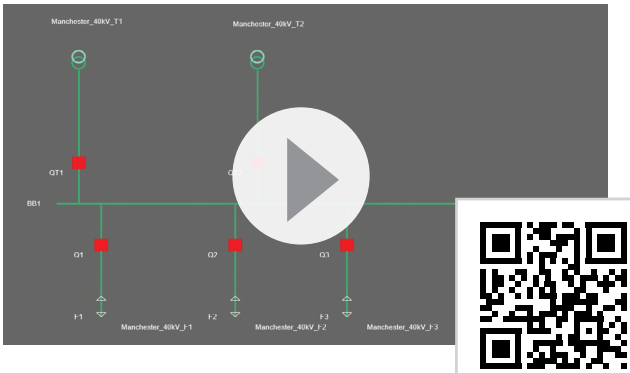
Experience shows that the top-down approach of IEC 61850 is not for everyone. Many engineers prefer to initially work from the perspective of the devices and signals. Only then do they configure their interaction and the forwarding of data to the control center of the grid operator.

However, a pre-defined SSD can be advantageous for a party putting something out to tender. Imagine a tender for a new or existing substation – and the possibilities for the people configuring the project if there is already an SSD file in the tender documentation for the respective substation. The experienced supplier can then simply start the SSD import wizard, and will have the single-line diagram generated automatically and can add it to the tender submission as a screenshot. The party issuing the tender can then immediately see how good their local HMI could look. And the supplier probably only needed five minutes to display their potential in an ideal light.

Renew a thousand substations in just ten years without a rush? It is possible. Just leave the laborious creation of single-line diagrams to a wizard. And you also gain the possibility to set standards, to shine in tender processes and to implement projects more quickly. Your key words: “top-down” and the “IEC 61850 SSD Import Wizard”.

Video: from XML to HMI in a few minutes

Scan & Play!



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