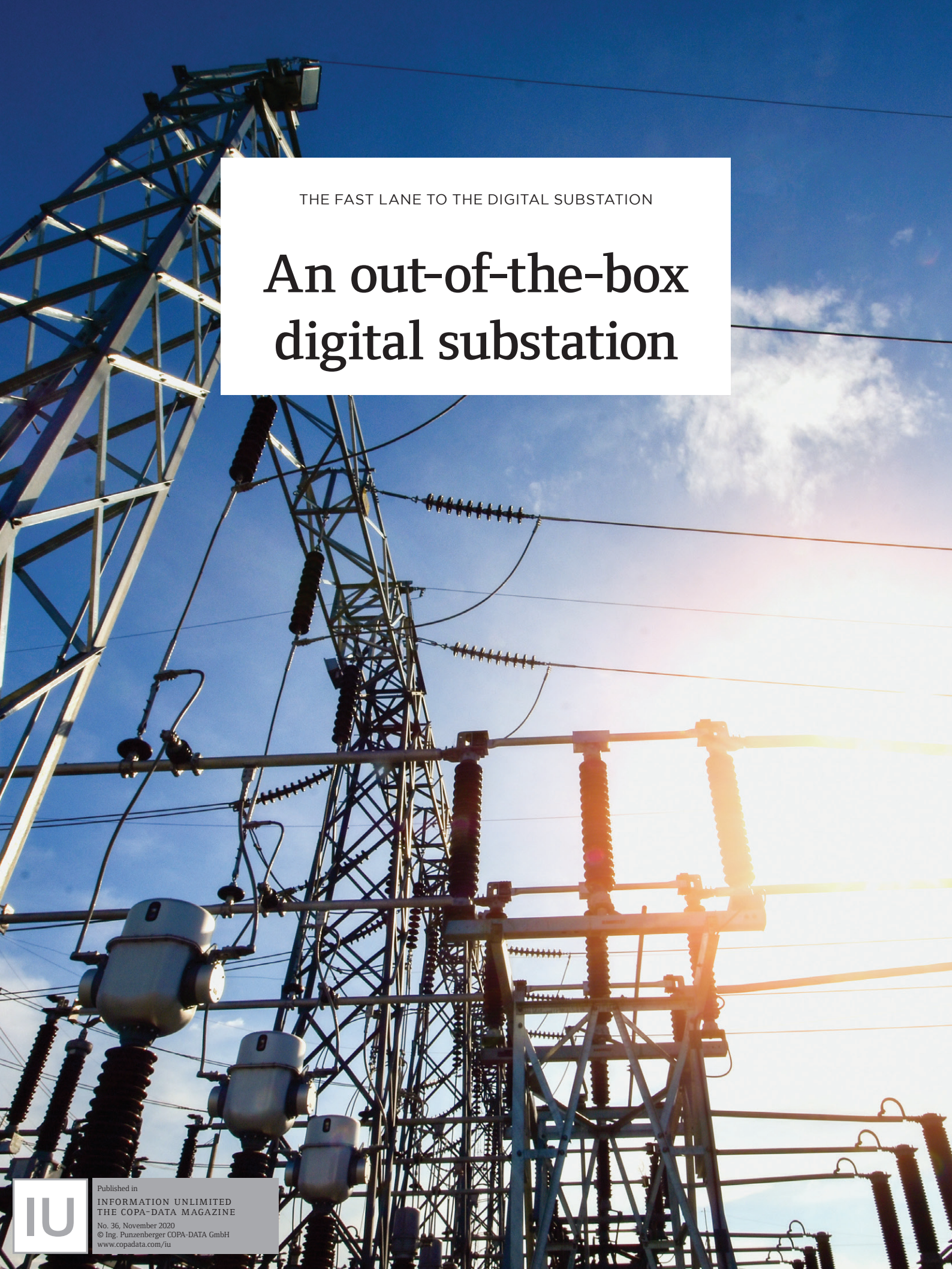


THE FAST LANE TO THE DIGITAL SUBSTATION

An out-of-the-box digital substation

Published in
INFORMATION UNLIMITED
THE COPA-DATA MAGAZINE
No. 36, November 2020

www.copadata.com/iu

zenon Application Sets simplify digitalization projects significantly in the energy and infrastructure industry. Even in early stages of planning for next-generation equipment, the implementation team can draw on extensive concept and solution resources. Best-practice modules provide a foundation and offer direction to help ensure successful implementation. Learn how to implement a digital substation efficiently and in line with established standards using zenon.

DIGITALIZATION ON THE AGENDA

The purpose of digital technology is to improve equipment efficiency, make operational management transparent and increase flexibility to meet varying requirements. A foundation has to be laid to enable the existing systems to interact intelligently with one another and for new elements, such as consumer loads or regenerative generators, to be considered in the decisions for optimum overall operation.

Energy suppliers' innovation teams are running at full speed. It is important to find the proper mix of technology to define the digitally driven infrastructure of tomorrow, while integrating legacy systems too. Using suitable methods, existing inventory must also be gradually refitted to bring it in line with the digital concept.

PLAYING AGAINST TIMEWASTERS AND COMPLEXITY MONSTERS

We are accustomed to the expectations surrounding state-of-the-art automation solutions to continuously increasing. Ambitious demands in the fields of digitalization and the Internet of Things require additional measures to be taken. Overall, the bar has been raised dramatically when it comes to the conceptual and implementation intelligence surrounding the use of new technology in combination with established standards. Typically, systems integrators have collected considerable process knowledge over the years to enable them to meet market requirements. The situation is similar for operators, who have successfully run their systems for decades. However, this wealth of experience is threatened by shifts in the field of technology, as well as by changes to organizational and market structures.

So, it's worth asking: how can we safeguard today's know-how for the long term – to ensure that results already obtained can be easily recreated, if necessary? What prevents us from simply adopting ready-made solution modules?

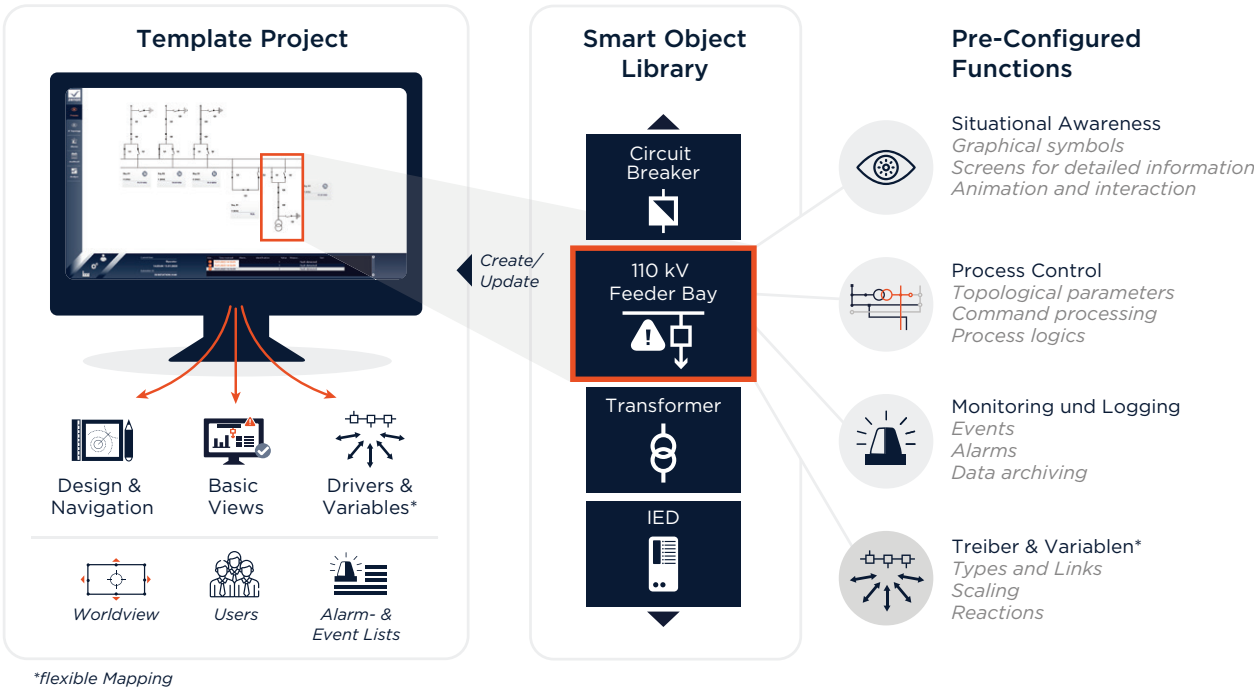
STANDARDIZATION AND REUSE IS THE ORDER OF THE DAY

Often during a new project, you find yourself in a situation where you're developing a great deal of functionality from scratch. After all, the project – if not entirely new – seems to have many unique requirements. New tools are developed and the project design is once again updated to the latest standards. This work takes a lot of time, which probably could have been better invested in more productive activity. The key to replacing what we might call "quasi-productive engineering" is developing standardized and reusable functional units.

So, the two main reasons for standardization in this context are simplifying work and and saving costs. The idea here is to cleverly split up the overall solution and pack it into small units. These units are then placed on a virtual shelf. In the end, a virtual library is created from many such virtual shelves. When you'd like to roll out a new project, you can take these units off the shelf and incorporate them in the project. The units already have preset functions, variables and images. As a result, engineers no longer have to worry about detailed functions. They are already fully integrated and tested.

Built with a consistent design, the units are clearly understandable for users, both in engineering (project engineer) and in the runtime application. Reuse and familiarity thus save time, which cuts costs.

Only by developing application-oriented modular units can such time savings be achieved in the long term. It is



In zenon's Substation HMI Application Set, users can conveniently insert cross-functional process elements in a project at the click of a mouse.

therefore necessary for an expert team to be involved in developing them; for example, a systems integrator. However, COPA-DATA, the provider of the solution platform, is increasingly emphasizing the benefits of a high-availability process engineering solutions library. For this reason, COPA-DATA has decided to create virtual libraries that will help systems integrators and end users to create projects faster and easier.

APPLICATION SETS: OUT-OF-THE-BOX FUNCTIONALITY IN LINE WITH ESTABLISHED STANDARDS

COPA-DATA calls these units "Smart Objects". In software development, an "object" is a unit that helps to subdivide a complex system into manageable parts, encapsulating the the object's internal details and offering a clearly structured interface to the outside world. This applies to Smart Objects: they integrate graphical, functional and communication elements. Essentially, a Smart Object is a mini zenon project that is designed for reuse. It contains functionalities from different modules and combines them. A Smart Object can be used multiple times in a project by instantiating it and inserting it seamlessly into the existing project. The cross-module approach provides engineers with a process-based view of the project. This avoids the need to think in terms of product modules.

One example: a line branch for a single-line diagram can be predefined as a template using the new Smart Object technology. This can be linked to the functions of all zenon modules that the branch needs to be fully functional in the process. Instantiation can be used to generate one or more branches of this type in the project. In the the project's main view, the single-line diagram, the branch is integrated with its specific arrangement of switches and connections. A zenon function leads to a detailed picture in which the switches refer to the command, which in turn links to a command picture. An alarm panel shows the most important alarms of the connected protective devices. The measured values coming from the relevant current and voltage transformers are also displayed. The Smart Object is a unit that functions independently. All data points are pre-existing and only need to be linked to the real-time variables in the project. All the engineer has to do is select the line branch from the library, place it in the corresponding overview screen, and link it to the variables – the complete branch is configured, down to the smallest detail.

We use the Application Set concept to describe a complete library of Smart Objects for a specific application type and the related basic project, which includes the navigation and standard images such as AML, CEL, along with the corresponding software license and solution documentation.

As a user, there is a clear benefit: you don't have to deal with designing a zenon project from scratch. Neither do you have to create a symbol library nor worry about templates or screen switching functions. Instead, you can hit the ground running with a correctly designed command. Plus, you can skip the design review because you know the colors and fonts match on all the images. The only things you need to configure are the links between the predefined variables for the Smart Object interface and the variables for the drivers that connect the project to the devices (IEDs).

SAME-SAME BUT DIFFERENT – THE STANDARDIZATION BIND

Using preconfigured modules only works as long as they sufficiently meet user requirements. But no customer or project is the same – and requirements vary. Smart Objects generally have to be designed to be adjustable within certain limits. For this purpose, Smart Objects have a mechanism known as "released properties" – parameters that the developer of the Smart Object can deliberately change for subsequent users. This ensures that the object's basic functionality remains preset and protected, but selected parameters of an instance in the project can be flexibly adapted.

SIMPLY USE RELIABLE COMPONENTS AND SCALE THEM AS YOU PLEASE

Smart Objects significantly expand the foundation in zenon for creating an effective template system. Standardized functional units encapsulate all module functions and settings that are required to map any process component. Clearly structured interfaces connect variables to the respective objects and enable users to arrange certain details for the process object.

Based on this approach, a complex process engineering element, such as a line branch in a substation, can be mapped with all of its data, internal logic and visualization as a Smart Object. When you are ready to use it in a project, simply pull it off the "shelf" to create a comprehensive, fully-functional HMI application in just a few steps.

In the Substation HMI Application Set, COPA-DATA will offer a flexible combination of Smart Objects, as well as a basic project with corresponding engineering documentation, as part of a comprehensive commercial package. This enables systems integrators and end users to draw on extensive solution resources to develop and expand substation projects.

The Application Sets are another way COPA-DATA is developing the zenon Software Platform to benefit the zenon user community; helping users to say goodbye to timewasters and address the new challenges in the industry.

JÜRGEN RESCH
Energy Industry Manager

Jürgen Resch has been passionate about power plants and captivated by cables since he was a child. If you want to put his expertise to the test and find out just how switched on he is, simply email:

energy@copadata.com

STEFAN HUFNAGL
Energy Industry Expert

Stefan Hufnagl has been part of the COPA-DATA team since 2013. With several years' experience in the fields of industrial control and drive technology, as well as robotics, he now focuses closely on trends in the energy and infrastructure industry. He uses his expertise mainly to support colleagues in sales-related departments.

stefan.hufnagl@copadata.com