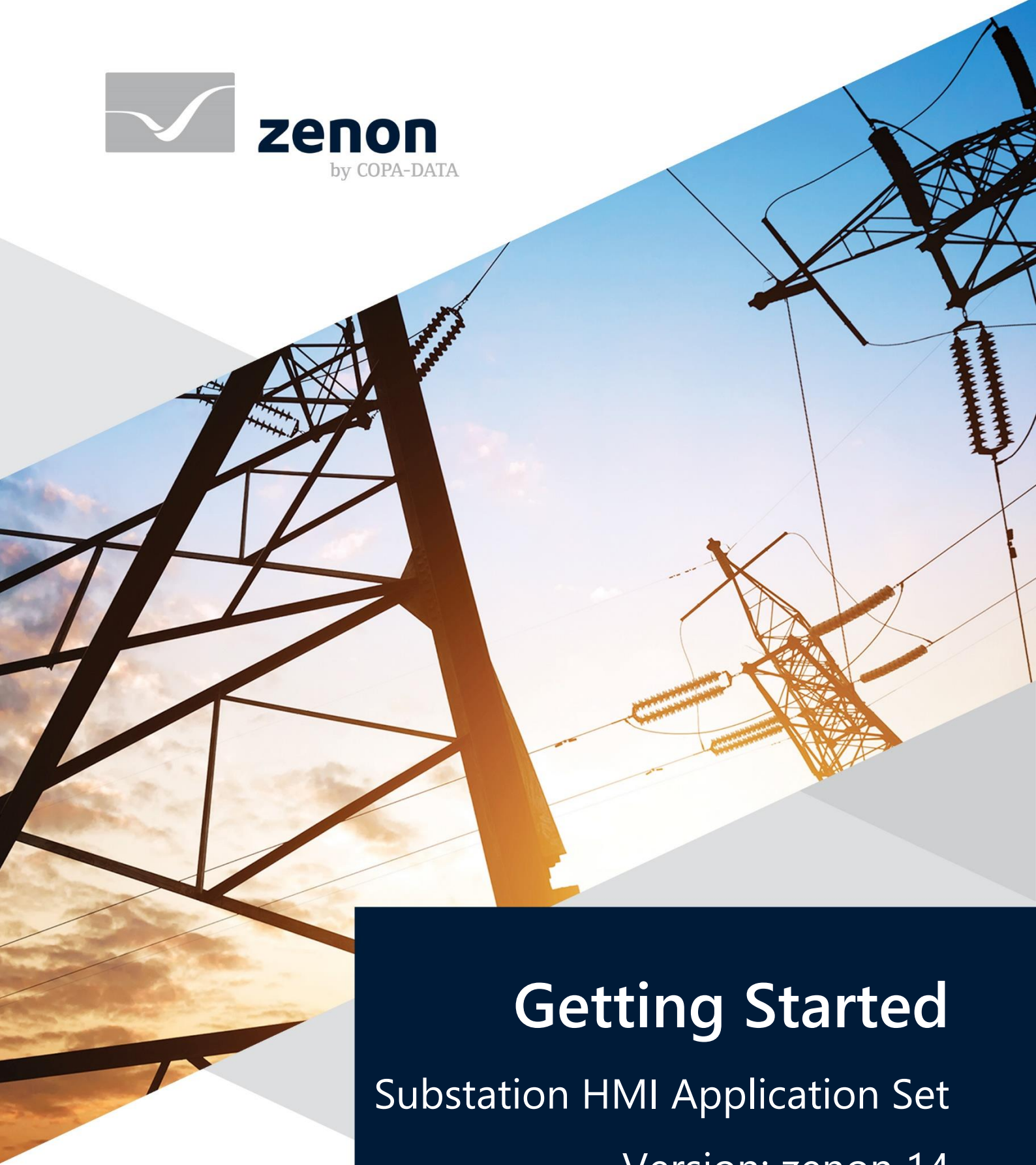
zenon
by COPA-DATA



Getting Started

Substation HMI Application Set

Version: zenon 14

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Getting Started:

Substation HMI Application Set

This document shall guide you through the essential steps to deploy and use the items contained within the Substation HMI Application Set in zenon. You will find step-by-step instructions to install, explore and engineer using this Application Set. Moreover, some background hints are given about the main concepts of the solution.

Contents

Download & Installation

Download and install the Application Set. Once the setup has finalized, the Substation HMI Application Demo project will be automatically set as the startup project. The demo project can be launched by starting the zenon Service Engine via the zenon startup tool.

Automatic Setup

The file you have received with the download of this application set represents an automatic installation package. By double clicking the file in your File-Explorer, you can start the automatic deployment.

This setup will prepare your zenon Editor Workspace with all the necessary resources. After the setup has finished, you are ready to start using the projects in the workspace.

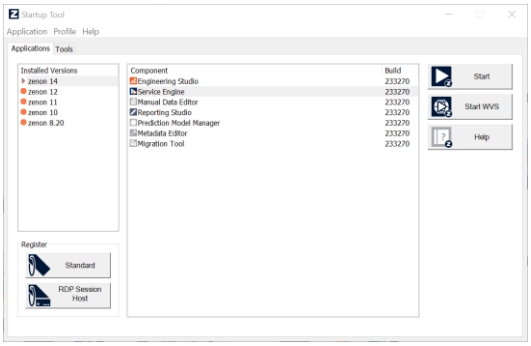


FIGURE: START ZENON RUNTIME FROM STARTUP TOOL

Prerequisites

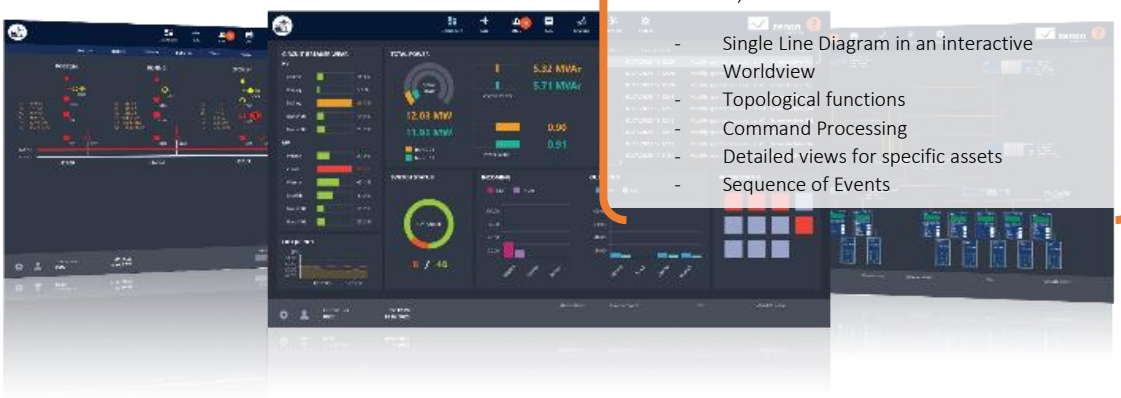
This Application Set requires you to use zenon Editor Version 14.

It is recommended to use a fully licensed zenon Editor or an evaluation license. Feel free to contact your local COPA-DATA Sales branch to provide an evaluation license for you.

Application Demo

The “Substation HMI Application Demo” project (SUBSTATION_HMI_DEMO) provides a preview of a typical substation HMI application. The “Dashboard” screen is opened after launching the Runtime. It provides an overview of a simulated substation application. The user can navigate through the project via the menu bar at the top of the screen.

A fully interactive “Single-Line diagram” (SLD) screen provides an example of Control, monitoring, topological coloring within a Worldview. Other screens contain examples of Trending, Event reporting and Analysis.



The **Application Demo** gives you a quick overview of the functionality which you can easily reach by the use of this Application Set. Process functions in the sample grid are simulated. Take a tour in this simulated runtime environment, and check out features such as:

- Single Line Diagram in an interactive Worldview
- Topological functions
- Command Processing
- Detailed views for specific assets
- Sequence of Events

Creating a custom application

Begin creating your own custom solutions by activating the “Substation HMI Template Project” in the zenon Editor. The Template project contains multiple preconfigured areas, which form the basis of a customizable application. A fully functional navigation bar, as well as screens for Alarming, Events and Trending are available.

Note: Removing or modifying predefined components (Frames, Functions, Color Palettes, Fonts etc.) of the project could cause certain features to not behave as expected.

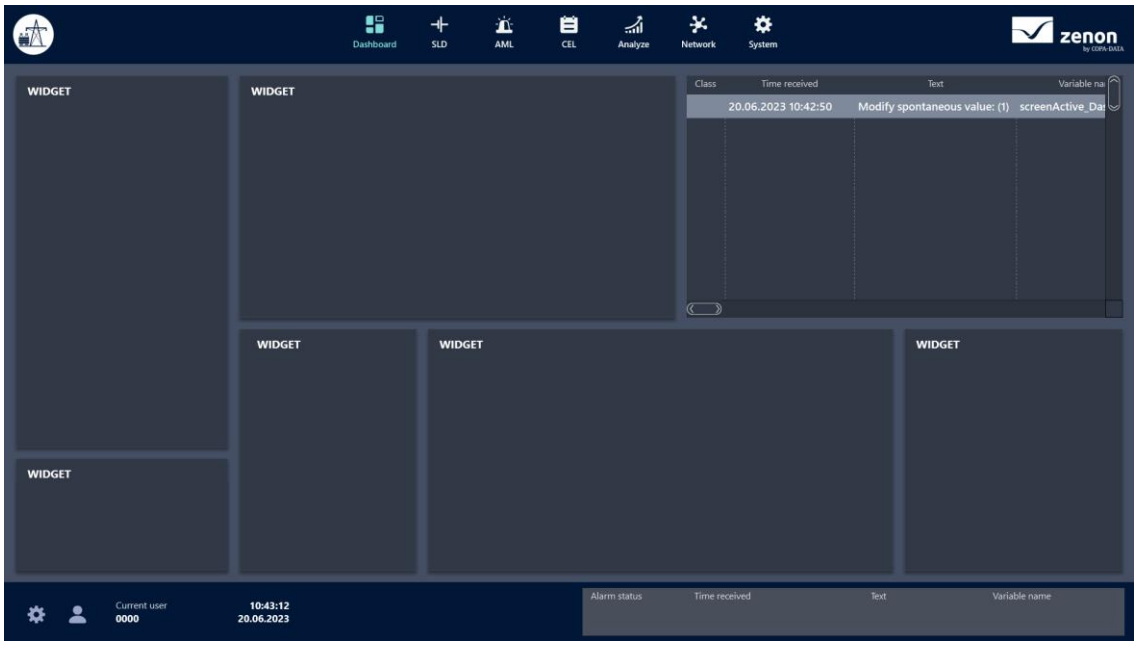


FIGURE: APPLICATION TEMPLATE – DASHBOARD SCREEN WITH PRE-ARRANGED SECTIONS

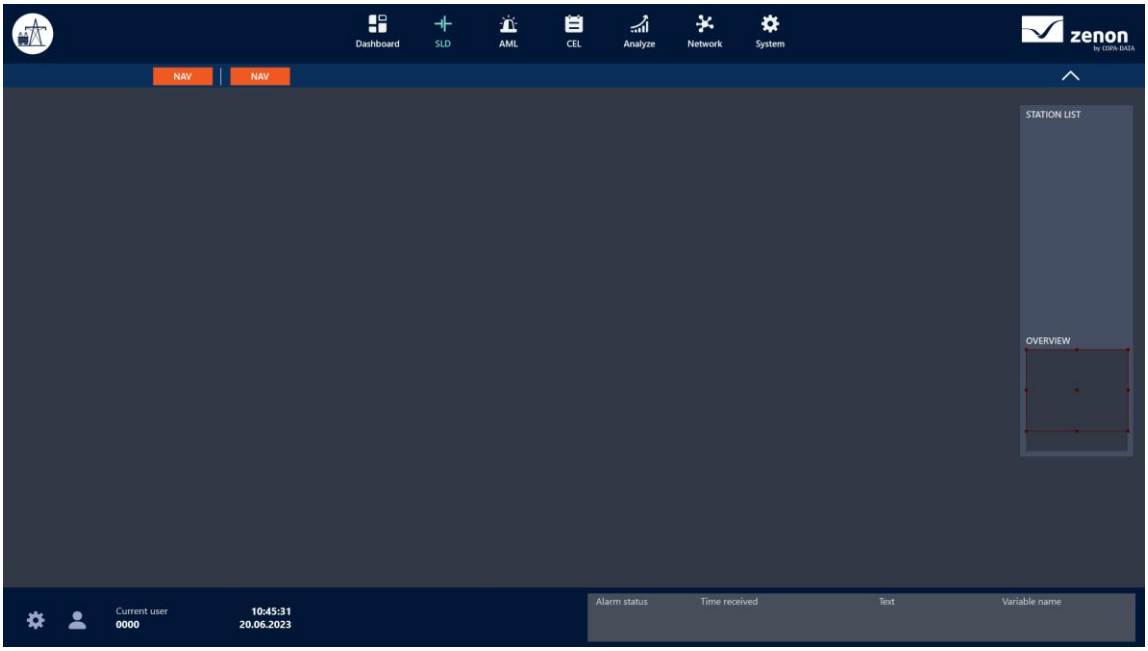


FIGURE: APPLICATION TEMPLATE – SINGLE LINE DIAGRAM SCREEN

Substation assets ‘out of the box’

Feeder, Switch, Bus Coupler …out of the box, with Smart Objects!

The template project includes some predefined Smart Object Templates. To begin working with the Smart Objects, select “Create new instance” in the “Smart Objects” module in the project tree. A list of available Smart Object Templates is displayed. To assist with selecting the correct Smart Object Template, a description is available in the dialog. Select a specific Smart Object Template, define a name, and click “Create”.

Creating an instance of a Smart Object Template, will create all associated functionality in the project automatically. (Variables, drivers, screens, functions etc.). The name defined in the Smart Object instance is used as a prefix for all created objects.

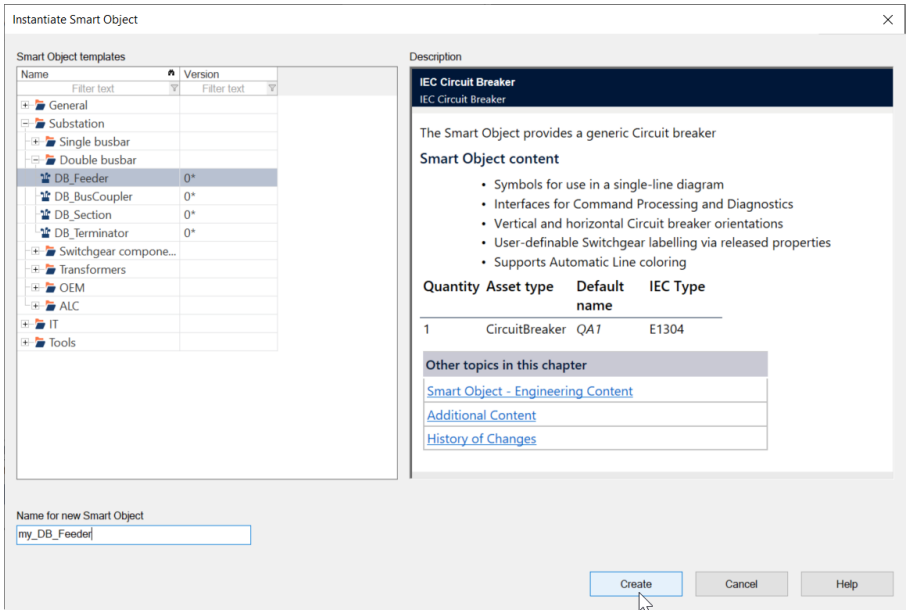


FIGURE: CREATE YOUR ASSET FROM A LIST OF SMART OBJECT TEMPLATES

Connecting to the right variables

Once instantiated, the predefined Smart Object variables can be mapped to specific project variables of your choice using the Variable mapping dialog which automatically opens.

Variable Mapping Dialog

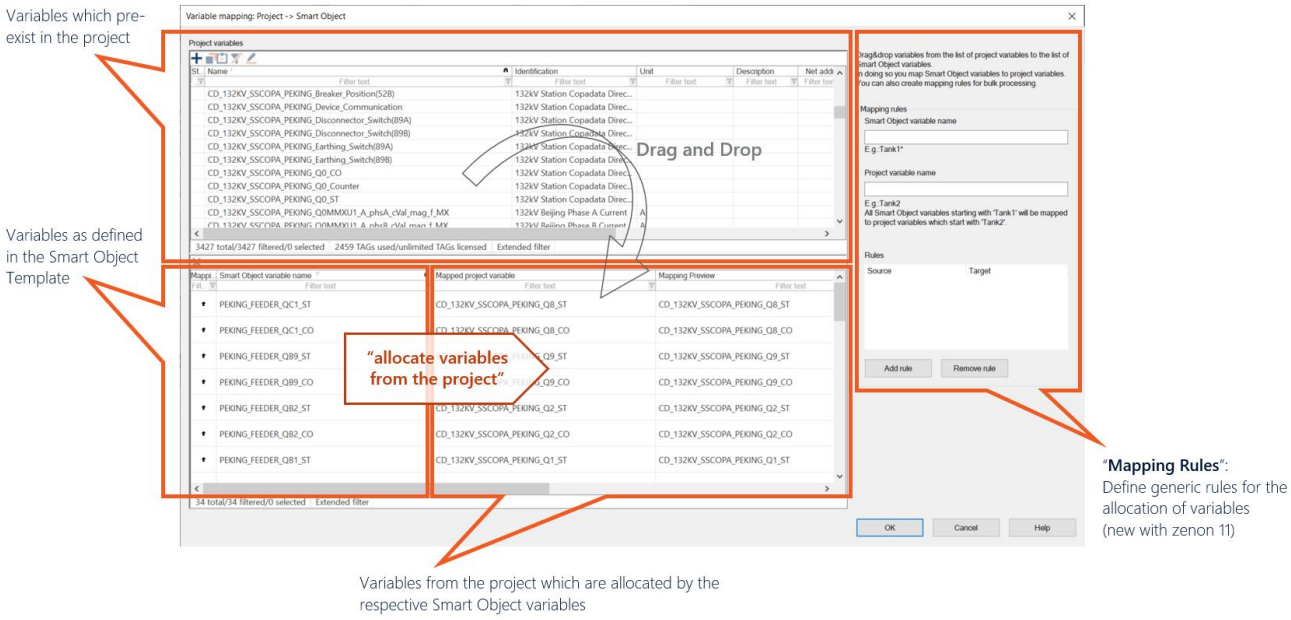


FIGURE: OPTIONAL VARIABLE MAPPING, TO CONNECT YOUR SMART OBJECT (ASSET) TO THE CORRECT DATA-SOURCES

The project contains two types of Smart Objects:

Generic Smart Objects:

Placeholder variables which are based on the “internal driver”. Such Smart Objects require the variables to be mapped to project variables using the dialog. This provides the user with the flexibility to create a driver in the zenon project and use the Smart Objects with any protocol and data-model. E.g.

- Single/Double busbar Feeder
- Single/Double busbar Section
- Double busbar Bus Coupler etc.

Device specific Smart Objects:

Variables are preconfigured to match the data-model of a specific device. The user is only required to configure the IP-address of the driver connection and the net-address of the variables. The device template contains the essential views and controls, based on the respective data models.

- SEL751A Protection Relay
  (For use with device: Schweitzer Engineering Laboratories SEL-751A Feeder Protection Relay)
- Sprecher E-P Protection Relay

Parameterizing the asset

Any practical feeder, switch or IED will have specific parameters, which need individual parameterization. These parameters have been defined during the design and engineering of the respective Smart Object Template. This way, even though the asset is created from one single (centrally defined) Smart Object Template, the “released” parameters can be individually set for each object instance.

In this Application Set, various settings of Smart Object instances can be adapted in the “Released property” section. Select the main node of the Smart Object instance from the list, then select “Released Properties” node to display a list of properties which can be modified. A list of all released properties can be found in the Smart Object description. A Smart Object Template engineer can specify which properties can be modified in a Smart Object instance.

Changing these properties directly influences the behavior of certain aspects of the Smart Object instance.

For example:

- Exchange the predefined Command processing group for a Circuit Breaker, with a custom group which has been defined in the project via the “Command Group” property.
- Adapt the naming convention of the switches displayed in the SLD symbol (Single Line diagram screen) via the “SLD” property.
- Exchange the diagnosis overview screen content with customized screens of your choice using the “Information selection” properties.

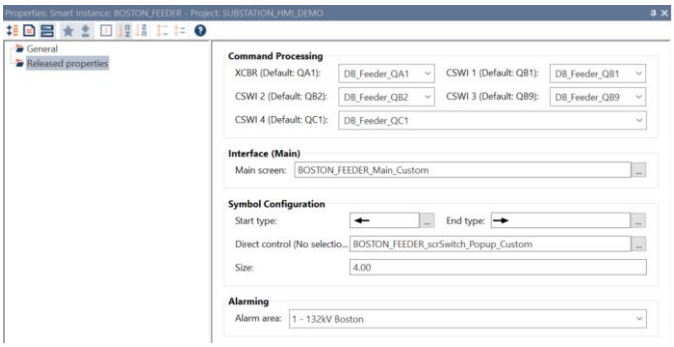


FIGURE: “RELEASED PROPERTIES” – THE PARAMETERIZATION INTERFACE FOR YOUR ASSET

Parameterization: Clear and safe

The instantiation of a Smart Object leads to the creation of various items (variables, screens, functions etc.) in the project. These items can be used in the project – as value source, for display etc. - but cannot be directly changed or deleted in the project. Changes are only permitted centrally via the original Smart Object Template.

To make specific parameters of an asset adaptable (individually per instance), these parameters are “released” by the template engineer. The values which are set via this interface will propagate into the respective detailed properties.

This ensures a consistent usage of templates and instances, while keeping a good overall structure and great flexibility.

Assembling a Single Line Diagram

Assets, such as a feeder bay can have different graphical representations. Most popular in case of a substation HMI project is the Single Line view of the asset. Therefore, each Smart Object provides a variety of graphical symbols which can be freely mapped to any screen. In this Application Set, symbols for use in a Single Line Diagram were prepared. Topological functions such as Automation Line Coloring or Topological Interlocking will work without any further effort, once the symbols are aligned correctly next to each other.

Feeder Bay Example:

Expand the Smart Object instance node and select the required symbol. If required, the Smart Objects contain multiple orientations of the same symbol for use with various application layouts. A symbol can be inserted into a screen via drag & drop.

A combination of various Smart Objects can be used to create a specific substation application. All Smart Objects have been designed to allow for simple alignment of lines and busbars when using the grid in the screen editor.

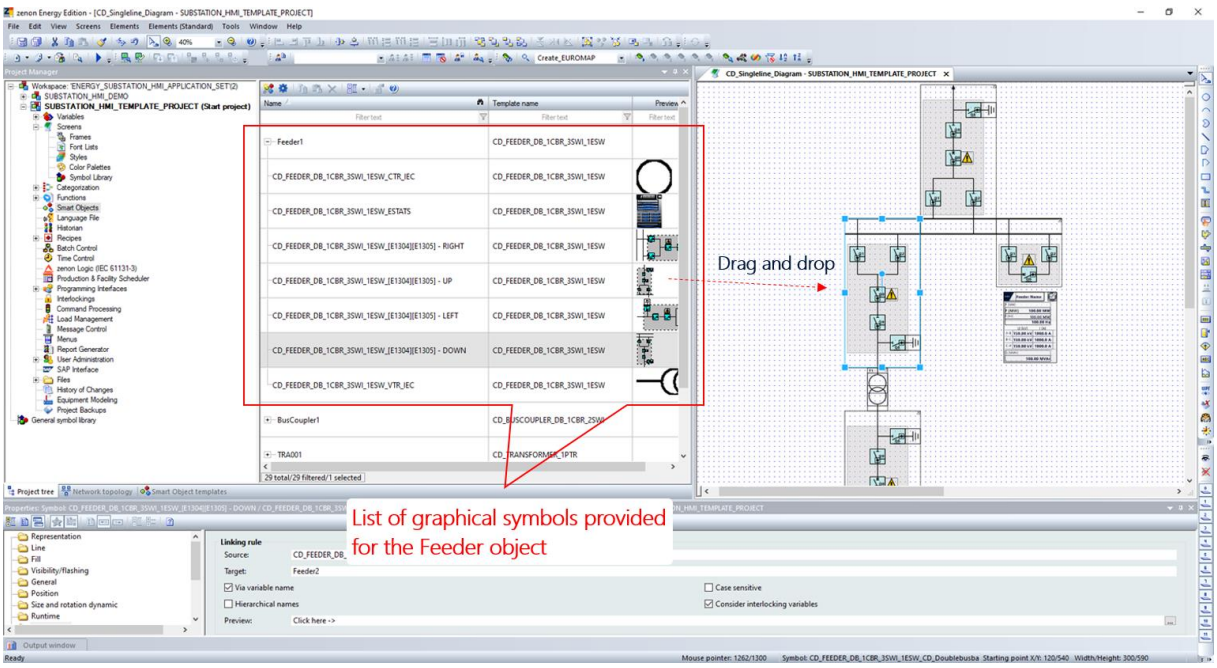


FIGURE: MAPPING GRAPHICAL SYMBOLS OF A SMART OBJECT TO A SCREEN

Where to go from here …

The creation of assets from Smart Object Templates can be repeated multiple times. In this way a Single Line Diagram can be created step-by-step. The Smart Objects contained in this Application Set support the usage of topological functions, as well as Command Processing. All of which can be used, while allowing the actual zenon project to remain “open” for regular engineering activities.

Smart Object instances remain connected to their original Smart Object Template. This allows project-wide updates of any object, to be easily performed in case there is a new version of the Smart Object Template available. Smart Object Templates can be shared between engineers.

Want to create your own templates?

The Smart Objects engineering technology in zenon allows you to create your own templates. Various features will support you to build up a powerful library of Smart Objects, thus increasing your engineering efficiency in Energy projects.

Contact your local COPA-DATA Support Office for more information