IEC 61850 Edition 2 Test Tools and QA Services

KEPCO and QualityLogic worked together to make commercial-quality IEC 61850 Edition 2 test tools available to the industry. The tools ensure interoperability of substation automation products that communicate using the IEC 61850 Edition 2 standard. QualityLogic is the first worldwide distributor of the KEPCO IEC 61850 test tools.

IEC 61850 Overview

The IEC 61850 has evolved into a global standard for substation automation. This standard aims to provide a utility company with a single standards-based protocol for complete substation automation. The standard seeks to provide higher level of interoperability between systems from different 61850 vendors.

IEC 61850 Edition 2 Client Conformance Verifier

The IEC 61850 Edition 2 Client Conformance Verifier is an easy-to-use testing tool that lets you execute tests specified by the UCA Conformance Test Procedures for Client System with IEC 61850-8-2 Interface specification.

It's easy to configure the testing tool for the specific device configurations that are required for your testing environment. You can configure the tool with the specific SCL configurations you are using, along with the network information. The Client Verifier is based on a visual diagram test scripting engine, so you can create or modify tests on the fly without writing a single line of code.

The Client Conformance Verifier gives you:

- Step-by-step guidance for each client test case
- Automated conformance assessment
- to speed testing
- Detailed message exchange information
- Assurance of successful 61850 Client Certification

Under the IEC 61850 Edition 2 standard, a substation consists of Intelligent Electronic Devices (IEDs), such as

relays and switches, that reside on the Process Bus, and command and control client devices to the IEDs, like Human Machine Interfaces, Remote Terminal Units and gateways, which reside on the Station Bus.

The KEPCO/QualityLogic 61850 Edition 2 Client Conformance Verifier addresses conformance testing of 61850 client devices that reside on the Station Bus. The UCA International Users Group developed Conformance Test Procedures for Client Systems and defined the plan for testing conformance of 61850 client devices. The 61850 Client Conformance Verifier automates the test cases defined by UCA.

Client Testing

The IEC 61850 Edition 2 Client Conformance Verifier includes a built-in analyzer that collects the relevant communication packets for a test session. The analyzer presents the captured packets in an easy-to-understand layer, ranging from low-level Link to high-level ACSI. The analyzer helps you analyze the network traffic that was communicated for the particular test session to diagnose any problems.
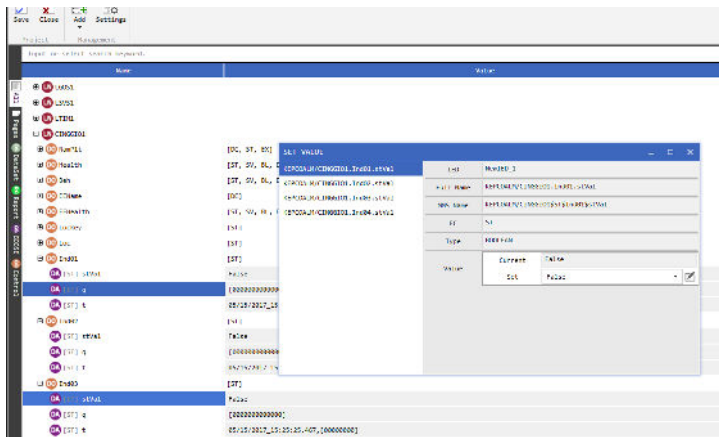

Figure 1

IEC 61850 Edition 2 Virtual Server

The Virtual Server facilitates Client development by:

- Eliminating the need for real IEDs for testing 61850 client devices
- Providing on-the-fly IED configuration
- and simulation for testing
- Complementing pairwise testing

The IEC 61850 Edition 2 Virtual Server lets you simulate IED devices through a user-friendly Windows application. With Virtual Server, you can fully configure the IED through use of the IED's own SCL (.icd or .cdi) file. Using the actual SCL file from the vendor ensures that the logic nodes and attributes defined by the actual IED are fully simulated by the Virtual Server.

Simulation

The Virtual Server can simulate different behaviors of the 61850 IED device, including changing the state of the circuit breaker in specified millisecond cycles. This feature lets you simulate overflow conditions by accumulating a collection of IED triggered reports, as well as test the 61850 Client's ability to receive buffered and unbuffered reports on the fly. You can select one or more data attributes to be simulated by using a simple select and click mouse operation.

Data View

The Virtual Server allows you to view the IED's data attributes conveniently through a tree view window. Each IED defines a list of logical devices and attributes using the naming schemes that are described in the IEC 61850 standard. The Data View feature of the Virtual Server presents the data through a graphical tree view. You can perform Read and Write operations on these attributes using the same Data View feature.

Switch Control

The Virtual Server lets you graphically control up to three circuit breaker components of the simulated IED. Both Direct and SBO (Select Before Operate) controls are supported by the Virtual Server's Switch Control feature. Depending on the type of control used, you can change its values to ON, OFF, BAD or INTERMEDIATE, as supported by IEC 61850. As you select different breaker settings, the IED attribute value will change on the fly.

IEC 61850 Test Tools Technical Support

This service is invaluable for developers who are working to implement IEC 61850, or implementers who are using the standard in a pilot, demonstration or deployment project. Tech Support provides quick answers to technical questions, saving time and costs in developing or deploying the technology.