IEC 61850

IEC 61850 is a standard for the design of electrical substation automation systems, which defines fast communication of events (GOOSE) or data set samples (Sampled Values) through Ethernet frames. Standard naming and object modeling are based on a Substation Configuration Language (SCL), describing data exchange at device and substation levels.

OUR SOLUTION

OPAL-RT supports the following parts of the IEC 61850 standard:

- **IEC 61850-8-1 GOOSE:** High speed (< 4 milliseconds) peer-to-peer exchange of status and control commands between logical nodes of the substation protection, control, monitoring and logging systems. The GOOSE configuration can be easily imported from Configured IED Description (CID) files of the various equipment under test. Messages support native complex data objects and attributes with digital and analog values.

- **IEC 61850-9-2 Sampled Values:** Fast transmission and reception of voltages, currents and status information between transformers and transducers (CT, PT...), and primary power system equipment. Simulators can be used to emulate merging unit or to receive data from real merging unit. GPS time synchronization is performed using IEEE 1588, IRIG-B or 1PPS input signals. The protocol supports light edition (LE) sampled values and integrates a complete error injection mechanism to emulate cyber-security attacks on the network or erroneous transmission.

KEY FEATURES

- **Extraction from CID/ICD files containing multiple IEDs/logical nodes**
- **GOOSE test mode**
- **Error injection interface**

- **Connect up to 128 individual IEDs**
- **Synchronization through GPS, IEEE 1588, IRIG-B or 1PPS**
- **Full control on SV quality bits**

TECHNICAL SPECIFICATIONS

Standards	IEC 61850-8-1 GOOSE IEC 61850-9-2LE Sampled Values
Fundamental Frequencies	50/60 [Hz]
Number of SV streams	32 transmission or reception per license
Number of GOOSE messages	128 transmission or reception per license
SV Sampling Rate	80 Samples per cycle
Time Synchronization	GPS, IEEE 1588, 1PPS, IRIG-B

OPAL-RT SOFTWARE COMPATIBILITY

SOFTWARE	IEC 61850-8-1 GOOSE	IEC 61850-9-2 SAMPLED VALUES
RT-LAB	☑	☑
HYPERSIM	☑	☑

THIRD-PARTY HARDWARE[†]

NAME	REQUIRED	SKU	DESCRIPTION
Time Synchronisation kit, Oregano Syn1588 PCIe NIC[†]	☐	OP3811 or OP3812	Card required for accurate time synchronization (0.1 ppm oscillator)
Intel Quad-port Ethernet card[†]	☐	EXPI9404PTL	Dispatch Ethernet traffic over multiple ports to increase bandwidth

[†]Prior to ordering and/or installing, check with your local OPAL-RT representative to ensure PCI express and hardware compatibility.