### SAFER, SMARTER, GREENER

## DNVGL



## **ENERGY**

# IEC 62439-3 PRP & HSR CONFORMANCE TESTING FOR ETHERNET SWITCHES AND IEDS

IEC 61850 introduced process bus-based substation communication that can be used for critical real time applications such as protection and circuit breaker tripping. These applications require 100% availability and seamless recovery of the local area network (LAN) even during a single fault! This can only be achieved using dedicated LAN redundancy technologies. The new PRP and HSR protocols (IEC 62439-3) fullfil these requirements.

HSR and PRP have specific requirements for IEDs and Ethernet switches. To support utilities in selecting the correct equipment DNV GL has set up a conformance testing program to verify that the equipment under test is in compliance with IEC 62439-3.

We recommend that utilities and system integrators only use equipment that has passed these PRP and/or HSR tests. From the vendor's point of view passing such tests gives a broader market visibility and proof of quality of their product.

#### Testing approach

DNV GL executes the tests accordingly to its internally developed test procedures and supported by highly specific software tools, all aligned to the need of the critical (protection) applications implemented by an IEC 61850 process bus. Tests can be executed on both Ethernet switches acting as Redundacy Boxes, or IEDs acting as end-devices.

- The verified aspects are:
- Documentation
- Frames transmission
- Frames reception: processing of good and corrupted frames, sliding window, SAN and DAN, unicast and multicast
- Management: via SNMP or other interfaces
- PTP over PRP/HSR paths: according to Annex A The default application data used during testing is GOOSE according to IEC 61850-7-2.

The phases of the test are:

- Preparation and configuration: DNV GL requests the devices to be configured in advance, unless the test is executed together with the manufacturer.
- Test execution:

A DNV GL test engineer executes the test procedure in our laboratories, or at the manufacturer's site.

Test report:

The deliverable is a report stating the measured test results of the PRP/HSR device and if the device passed/failed the applicable test procedures, and - in case of positive outcome an Attestation of Conformity.

#### ABOUT DNV GL

#### DNV GL

DNV GL is a global quality assurance and risk management company. Driven by our purpose of safeguarding life, property and the environment, we enable our customers to advance the safety and sustainability of their business. Operating in more than 100 countries, our professionals are dedicated to helping customers in the maritime, oil & gas, power and renewables and other industries to make the world safer, smarter and greener.

#### In the power and renewables industry

DNV GL delivers world-renowned testing and advisory services to the energy value chain including renewables and energy efficiency. Our expertise spans onshore and offshore wind power, solar, conventional generation, transmission and distribution, smart grids, and sustainable energy use, as well as energy markets and regulations. Our experts support customers around the globe in delivering a safe, reliable, efficient, and sustainable energy supply.