UCAIug Network Redundancy Interoperability Demonstration at CIGRÉ 2012

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The UCA International Users Group is sponsoring an IEC 61850 interoperability demonstration at the 2012 CIGRÉ exhibition in Paris, France on 27-31 August, Booth #275 with 14 companies showing:

- Interoperability of devices implementing IEC 62439-3 local area network redundancy standard for the Parallel Redundancy Protocol (PRP) and/or High-availability Seamless Redundancy (HSR) protocols (PRP/HSR Demo).
- Interoperability of other features and capabilities of IEC 61850 with other participants' products (IEC 61850 Generic Demo).

To achieve high network availability for the most critical substation automation functions, such as tripping via GOOSE (Generic Object Oriented Substation Event) messages and IEC 61850 Process Bus, IEC 61850 relies on the IEC 62439-3 standard which is applicable to all switched Ethernet networks.

The IEC 62439-3 standard provides zero recovery time in case of failure thus fulfilling the most demanding real-time requirements of substation automation. Using IEC 62439-3 all end nodes have two Ethernet ports each sending the same data over two independent links. Because the data is always available to the receiver via at least one of the two ports, no topology reconfiguration is required to recover from communication failure on any one port/link. Each end node has only one IP address and one MAC address shared by the two ports, which makes the configuration identical to that of a non-duplicated node. The Link Redundancy Entity (LRE) in each node is responsible of duplicating the frames at the source and discarding of duplicate frames at the destination.

PRP/HSR Demo Participants

ABB — Power and productivity for a better world™

ALSTOM

GE Energy

HIRSCHMANN — A BELDEN BRAND

OMICRON

RUGGEDCOM — A Siemens Business

Schneider Electric

SEL — SCHWEITZER ENGINEERING LABORATORIES

SIEMENS

TOSHIBA — Leading Innovation

zhaw — School of Engineering — InES Institute of Embedded Systems

ZIV

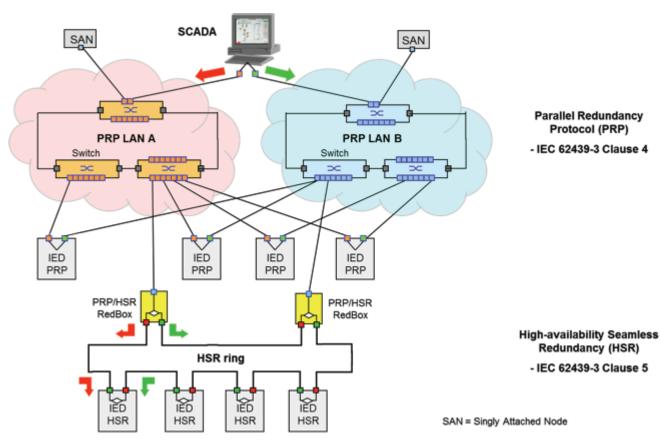### IEC 61850 Generic Demo Participants

grid smart

DNV KEMA

DIAMOND

Fig 1. Conceptual Architecture of PRP/HSR Interoperability Demonstration

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IEC 62439-3 consists of two protocols, which can be coupled together:

1. The Parallel Redundancy Protocol (PRP) relies on the parallel operation of two local area networks. PRP allows a mix of both redundant and non-redundant nodes (SAN) on the same network. The LRE can be implemented in software.

2. The High Availability Seamless Redundancy Protocol (HSR) applies the principle of parallel operation to a ring of bridging nodes interconnected by full-duplex links. Each end node has two ports with the same IP address but separate MAC addresses and implements the equivalent of a 2 port Ethernet switch to bridge between them. Since all nodes implement the bridging function the LRE is typically implemented in hardware.

These new high availability redundancy protocols are a true breakthrough in substation communication and are expected to be implemented in all future IEDs.

The PRP/HSR Interoperability demo includes hardware and software solutions compliant to the latest International Standard IEC 62439-3:2012. The application protocol for end nodes (protection relays, substation controllers, software applications, etc.) used during the Interoperability Demonstration will be IEC 61850. A high data traffic in form of an audio/video stream will demonstrate the recovery abilities of the network. The communication network will comprise two independent 1 Gigabit/s PRP LANs with an HSR 100Mbit/s ring connected to the PRP LANs via redundant PRP/HSR RedBoxes (Redundancy Boxes).
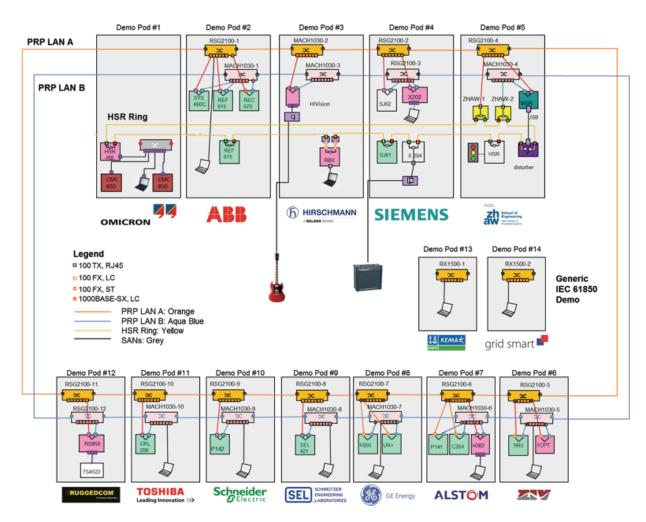
Booth Participants

GridClone   Megger

SISCO   SoCe

TÜV SÜD   UTINNOVATION

Gold

Booth Participant

FLEXIBILIS

Silver

Fig 2. Network Topology of PRP/HSR Interoperability Demonstration and Generic IEC 61850 Demonstration at UCAIug CIGRÉ 2012 Booth

August 27-31, 2012 — Stand #275   Visit our website at www.ucaiug.org