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SICAM A8000 with HSR, PRP

Ethernet Redundancy Protocols for Highest Availability

www.siemens.com/sicam-a8000

General

Secure and fast communication within the substation automation environment is essential to guaranteeing a secure and reliable electrical energy system in today's challenging complex electrical networks.

To fulfill the requirements of critical and time sensitive applications, the new Ethernet redundancy systems "High Availability Seamless Redundancy" (HSR) and "Parallel Redundancy Protocol" (PRP) have been designed according to the latest IEC 62439-3 Standard.

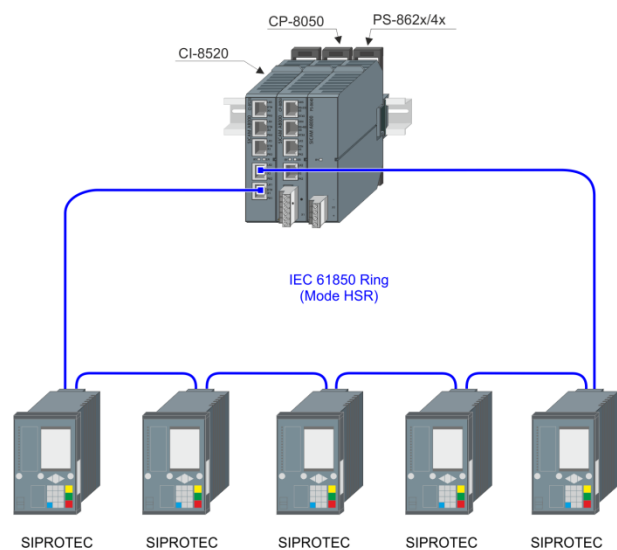
PRP and HSR Seamless Redundancy solutions are available in the full Siemens portfolio of SICAM A8000, SIPROTEC 5, SIPROTEC 4, SIPROTEC Compact and Reyrolle 7SR2x.

High Availability Seamless Redundancy (HSR)

HSR is a redundancy protocol for the loss-free, redundant transmission of data over Ethernet networks in ring topologies and provides redundancy without switchover time.

Each device in the network is connected via 2 Ethernet interfaces. The messages are transmitted on both interfaces and transmitted simultaneously in both directions in the ring. Thus 2 identical messages arrive at the target within a time frame (in a error-free state). The first is passed to the application and the second is discarded.

The ring is monitored by cyclic HSR management telegrams (cycle time 2 seconds). An open ring is signaled by a warning.



Configuration information

- HSR can only be used with the CI-8520 Ethernet Interface Module
- The choice of the 2 interfaces for one HSR ring each CI-8520 module, is arbitrary
- HSR mode must be activated for the used CI-8520 Ethernet interfaces
- In a HSR ring, a maximum of 512 unique source MAC addresses are allowed

Reliable and efficient

Parallel Redundancy Protocol (PRP)

PRP is a redundancy protocol which supports seamless redundancy (=no reconfiguration times in case of a network failure).

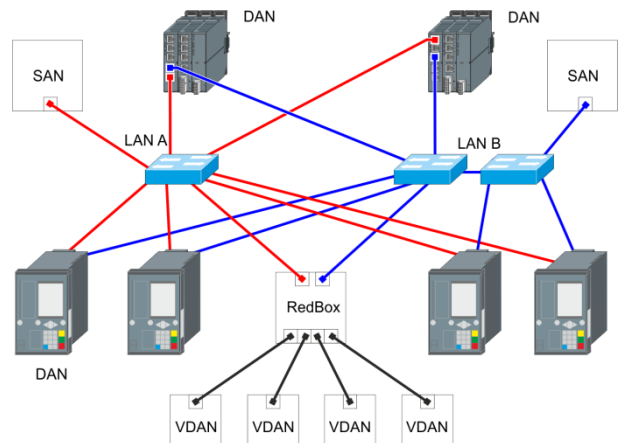
The Layer 2 redundancy procedure has been developed for automation networks that require high availability for continuous operation.

In a PRP structure all data are transmitted at the same time via 2 independent networks (LAN A and LAN B). Topology, performance and latency can be different in both networks, but latency may only differ within a certain range. As shown in the following picture, both networks must not be connected to each other.

The advantage of PRP over other protocols is that in the event of a communication interruption in a network, switching is seamless. This avoids data losses.

Configuration information

- Dual Attached Nodes (DAN)
Devices which are connected with both networks.
There is a separate interface for each network connection
- Single Attached Nodes (SAN)
Devices which are connected with just one network
- Virtual Double Attached Nodes (VDAN)
VDANs are devices with just one interface, but which are connected with both networks via a redundancy box (RedBox)
- PRP can only be used with the CI-8520 Ethernet Interface Module



Benefits

- Maximum network reliability, seamless reconfiguration
- Easy to configure
- Minimize wiring using effective ring structures
- Cost effective structures,
- Easy expandable by integrating additional HSR rings
- Interoperability ensured, standardized in IEC 62439
- Full compatibility with IEC 61850 Edition 1 and 2 as well as any other Ethernet protocol



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For all products using security features of OpenSSL, the following shall apply:

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (www.openssl.org), cryptographic software written by Eric Young (eay@cryptsoft.com) and software developed by Bodo Moeller.