Substation Automation
Utilities
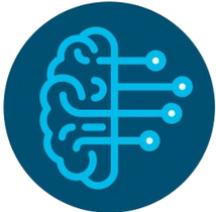
Robust industrial design

Comprehensive cybersecurity

IEEE 1588 Precision Time Synchronization

Remote diagnostics

Introduction

Substation automation goes beyond traditional supervisory control and data acquisition (SCADA) to provide added capabilities and information that can further improve operations and maintenance, increase system and staff efficiencies, and leverage and defer major capital investments.

An intelligent communications network is a foundation to building a smart grid. Utilities are investing in communications networks to improve their situational awareness of grid assets in order to control, automate, and integrate systems. Value is created when utilities "smooth out" peak load demand, forgo the use of costly spinning reserves, and alleviate the need for long-term capital investments in new generation plants and other capital investments such as reconducting for capacity improvement.

Cisco believes substation automation is one of the key first steps to achieving a smarter grid. The grid must be observable and measurable before it can be controlled and automated. Substation automation helps utilities add sophisticated protection and control functions while also providing greater visibility into the performance and health of grid infrastructure.

Benefits

The Cisco® Substation Automation solution helps utility operators face a variety of business and operational challenges by offering solutions that comply with industry standards such as IEC 61850 and IEEE 1613. Cisco offers substation automation products and services designed to provide a reliable and secure communications network to enable:

· Robust industrial design for substation compliance supporting mission-critical applications

· Comprehensive cybersecurity

· High availability and redundancy in substation LAN

· IEEE 1588 Precision Time Synchronization

· The move from legacy substation protocols to IEC 61850

· Remote diagnostics

Cisco Substation Automation

"SCANA is continually modernizing our systems and our grid for increased reliability and to better protect against cyber threats. We look to our technology partners, such as Cisco, for digital technology to help comply with those regulations, stay safe, and effectively enable operational technology."

Randy Senn
CIO
SCANA

Substation communications networks

Moving from legacy substation protocols to IEC 61850

In order to integrate substation protection, control, measurement, and monitoring applications into one common protocol, a new communication protocol has been developed and standardized: IEC 61850, Communication Networks and Systems in Substations. Intelligent electronic devices (IEDs) and associated applications communicate with each other and have different requirements on the underlying network.

Robust industrial design for substation compliance

Cisco's full range of Industrial Ethernet (IE) switches, including the 5000, 4000, and 2000U Series, have a rugged hardware design compliant with the IEEE 613 and IEC 61850-3 substation standards. These fanless, convection-cooled switches are built for extended durability. They help ensure error-free operation at a wide temperature range and in high electromagnetic interference (EMI) environments.

High availability and redundancy in LAN

High availability is a critical requirement for utility networks that transport mission-critical data. Cisco IE switches running in a ring topology or tree topology provide redundancy for higher network availability by implementing:

· Cisco Resilient Ethernet Protocol (REP) for rapid convergence
· Zero-convergence Parallel Redundancy Protocol (PRP), IEC 62439-3
· High-Availability Seamless Redundancy (HSR)
· IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) and per-VLAN Rapid Spanning Tree Plus (PVRST).

IEEE 1588 Precision Time Synchronization

Precision timing is required for IEDs recording faults and sequences of events and in any application that requires data to be accurately time-stamped within a substation. Precision Time Protocol (IEEE 1588 v2) is deployed on all IE switches to meet the time synchronization requirement for utility substations.

For more information

Contact your Cisco representative or learn more online at www.cisco.com/go/smartgrid.