PCItek Garbaldi and Phoenix Contact Security Solutions

Industrial Switching Platform with Key Distribution Center for Simplified Security Deployments for OT

Overview

With the convergence of IT and OT networks, the increase of cyber threats is a growing concern. Operators of Mission Critical Networks (OT environments) such as Power Utility, Nuclear, water utilities, Oil and Gas, must deploy security measures to protect intrusions from the IT Enterprise network. Security controls against these new and existing cyber threats need to be tightly integrated within the network and communications architecture of these connected systems. OT environments are characterized by harsh environmental conditions and are remote and inaccessible in some instances.

Secure protocols are increasingly being implemented out to the end devices in OT networks. These protocols, including IEC 61850 and DNP3 Authorization Management Protocol (DNP3 AMP), require encryption keys to be managed in all participating devices. Secure utility communications networks often lack a resilient key management architecture putting communication at risk if key management communications are interrupted.

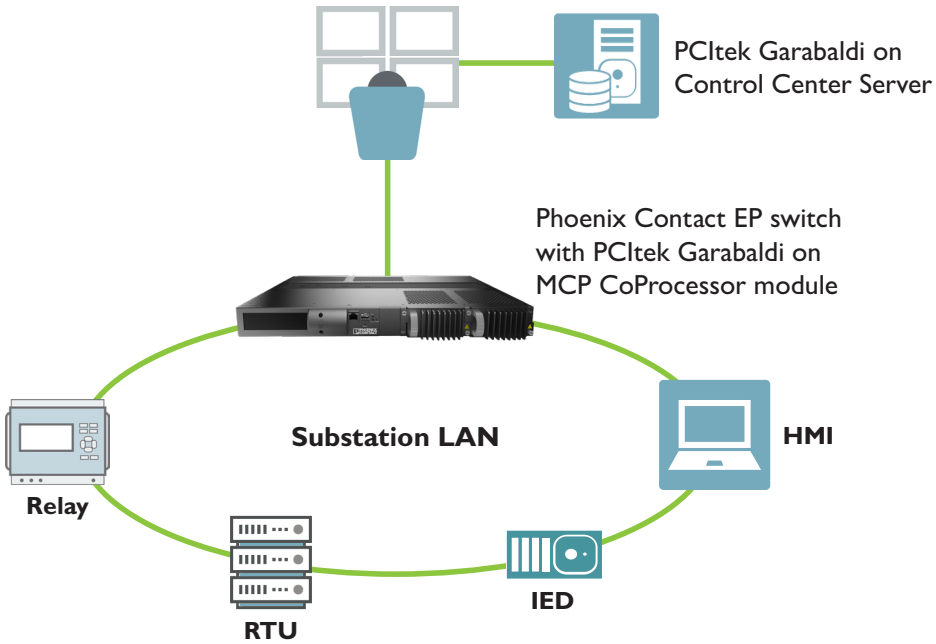
Phoenix Contact and PCItek have established a strategic technology partnership to help OT asset owners address cyber threats by integrating the Garabaldi Key Distribution Center (KDC) into Phoenix Contact's leading edge Raptor series L2/L3 multi service platform. This solution creates a single appliance to enable secure communications and to manage risk for their OT field devices.

Benefits	• **Simplified deployment of the Garabaldi KDC in ICS/OT environments.** • **Eliminate the need for dedicated hardware for Garabaldi deployments with Phoenix Contact Raptor switches.** • **Distributed key management architecture.**

Solution

The EP Series Raptor switch is an intelligent cybersecure hardware platform with 64 Gb/s full line speed with up to 4 x 10Gb/s + 24 1Gb/s ports running a feature rich embedded OS. The Raptor embedded OS is an all-encompassing operating system that supports L2/L3 switching and routing on a single platform. Its modular system of field replaceable modules, redundant hot-swappable power supplies, and ability to run third party software applications makes it a very flexible platform for today and the future. Combined with Garabaldi, Raptor will enable industrial and utility applications to have "best in breed" OT security solutions.

The EP switches enable reliable and safe operation in extreme ambient conditions. The managed switch portfolio meets the stringent requirements of IEC 61850-3 and IEEE 1613 standards and which were created to address reliability in critical infrastructure and power supply applications. The EP switches combine security, reliability, and flexibility in one device with built-in, comprehensive security functionalities on a hardened modular platform.



Garabaldi Capabilities

Garibaldi supports the Group Domain Of Interpretation (GDOI) protocol (specified by RFC 6407) used for key negotiation between IED and Group Controller/Key Server (GCKS). End-to-end cybersecurity is implemented according to the guidelines specified in the IEC 62351-9 standard.

The Garibaldi Management System is supplemented by an intuitive web application that allows configuration, diagnosing of the system, datastream usage, Substation Configuration Language (SCL) file import, certificate management and statistics tracking.

- Manages large numbers of 61850 multicast group's (Group Members / Devices / Apps) key.
- Configuration through use of IEC 61850 SCL files.
- Distributes symmetric keys via PULL, PUSH, and multicast-PUSH mechanisms.
- Operates in centralized or de-centralized environments.
- Generates individual keys per DataStream (increases security and availability).
- Follows cybersecurity recommended by IEC 62351-9.
- Manages system membership.
- Allows revocation.
- Manages access control for DNP3, SAv6 (IEEE 1815.1), and AMP (waiting on publication of standards).
- Easy to use browser-based user interface.

Garibaldi Multi-Domain Routing offers key and PKI management resiliency

KDCs can be deployed as a cooperative network of participating domains of key management which act as a mesh. This mesh of key domains can utilize other connected domains to route key requests to the source domain should the normal communication path be disrupted. Primary and secondary KDCs can be deployed within each domain in an active-active configuration.

One size does not fit all

Garibaldi KDCs can be deployed to meet the key management needs of most any size domain including, but not limited to: enterprise, control centers, substations, generation plants, distributed energy resource (DER) plants, and distribution networks.

Key and Public Key Infrastructure (PKI) Management

Garibaldi KDCs provide key management for IEC 61850 multicast services as well as future DNP3 support. Both of these key management protocols make use of X.509 PKI digital certificates to provide secure authenticated key distribution. Public Key Infrastructure (PKI) certificate management is provided through Simple Certificate Enrollment Protocol (SCEP) and Online Certificate Status Protocol (OCSP).

Easy Domain Member and KDC Configuration

Garibaldi KDCs make use of the multi-routing domain to allow domain members to be configured with the sole knowledge of the local domain KDCs. Requests for keys that must be resolved by other domains are resolved through the Garibaldi multi-domain routing capability. The same capability is provided to the members for SCEP and OCSP which minimize member configuration of endpoints for multiple certificate authorities.

Advantages of the Integrated Phoenix Contact and PCItek Garabaldi Solution include:

- More efficient security operations by integrating technologies.
- Simplify the monitoring of East-West network traffic for OT networks for improved visibility to monitor, detect and respond to threats.
- Reduces the need for dedicated hardware by leveraging edge computing deployments with a low-footprint appliance for passive network monitoring.
- Reduce risk while ensuring operations of critical infrastructure and business continuity.

Performance

Garibaldi has been tested, via simulation, to support over 15,000 datastreams.

Related Products

Chassis	Description	Designation	Item No.
	FL SWITCH EP7400 Series Chassis. IEC 61850-3 / IEEE 1613, Layer 2/3 Switch, -40°C to +85°C Operating Range. Supports up to 28 ports total.	FL SWITCH EP7428R-L3F1	1144353
	FL SWITCH EP7400 Series Chassis. IEC 61850-3 / IEEE 1613, Layer 2/3 Switch, -40°C to +85°C Operating Range, Supports up to 24-ports PoE, 28 ports total.	FL SWITCH EP7428R-L3F1P	1539668
Chassis	**Description**	**Designation**	**Item No.**
	FL SWITCH EP7500 Series Chassis Security enabled. IEC 61850-3 / IEEE 1613, Layer 2/3 Switch, -40°C to +85°C Operating Range. Supports up to 28 ports total.	FL SWITCH EP7528R-L3F1	1539667
MCP Computing Module	**Description**	**Designation**	**Item No.**
	MCP Computing Module , Ubuntu, 256GB storage	FL SWITCH EP7400-MCP-L-256GB	1539661
	MCP Computing Module , Ubuntu, 512GB storage	FL SWITCH EP7400-MCP-L-512GB	1539663
	MCP Computing Module , Ubuntu, 1TB storage	FL SWITCH EP7400-MCP-L-1TB	1539665
	MCP Computing Module , Ubuntu, 2TB storage	FL SWITCH EP7400-MCP-L-2TB	1539666

About PCItek

PCItek provides project consulting and complete product development and software integration. The development team has a broad depth of local and international experience - assisting utilities procure, implement and integrate operational and planning systems, discovery, training, documentation, modeling, and design.

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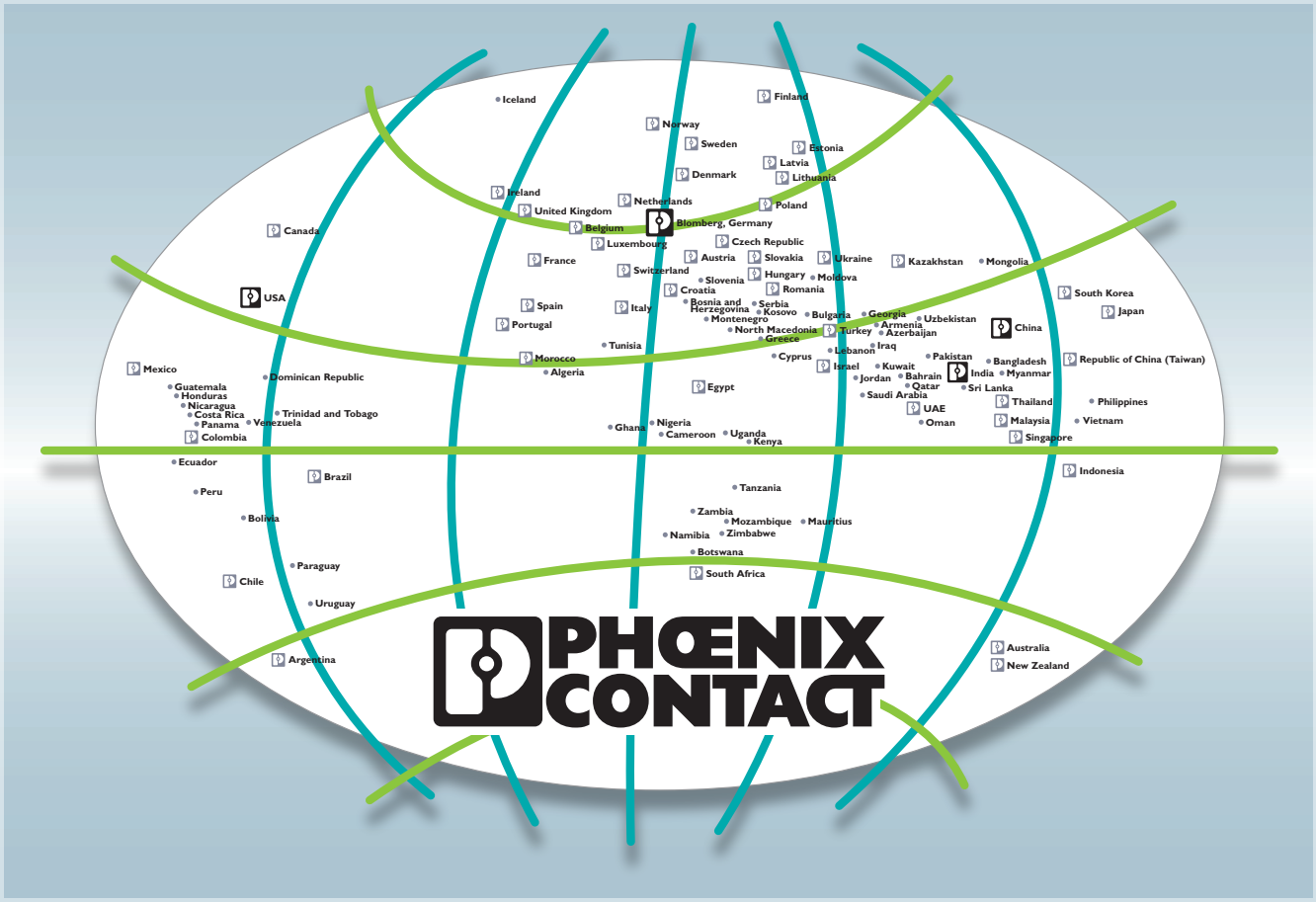

Open communication with customers and partners worldwide

Phoenix Contact is a global market leader based in Germany. We are known for producing future-oriented products and solutions for the electrification, networking, and automation of all sectors of the economy and infrastructure. With a global network reaching across more than 100 countries with over 22,000 employees, we maintain close relationships with our customers, something we believe is essential for our common success.

Our wide range of innovative products makes it easy for our customers to implement the latest technology in a variety of applications and industries. This especially applies to the target markets of energy, infrastructure, industry, and mobility.

You can find your local partner at

phoenixcontact.com