Redefining Security

Use Case: Critical Infrastructure

Quantum-Safe end-to-end encryption for mission-critical real-time communication networks

Integrated QRNG and QKD-ready

Customer: Hitachi Energy Ltd.

Industries: Utility, Oil & Gas, Air Traffic Management, Rail & Road

Country: Worldwide

HITACHI
Inspire the Next

Business need

Protect mission-critical networks against cyber attacks, while ensuring robust and reliable communications

Solution

Encryption card for mission-critical infrastructure with Quantis QRNG chip, with optional QKD

Results

First encryption solution for mission-critical infrastructure with quantum technology

Business need

Hitachi Energy is a pioneering technology leader in the utility, industry and infrastructure sectors with innovative solutions and services across the value chain. Together with customers and partners, they are advancing the world's energy system to become more sustainable, flexible and secure whilst balancing social, environmental and economic value.

Hitachi Energy's heritage stems from their long and rich heritage of innovation – from their roots in ABB – and forerunners, Asea and BBC.

Hitachi Energy addresses the evolution of Mission-Critical Systems (MCS) networks from TDM-based to packet-based services with their state-of-the-art full hybrid multi-service platforms XMC20 and FOX615. The full hybrid concept allows for the co-existence of native TDM and packet-based access services within the same node, providing a perfect future-proof solution for MCS applications.

Additionally, Hitachi Energy believes that nothing is more important in MCS networks than guaranteeing the highest availability of each connection and the highest security for transferred data against attacks from outside. With mission-critical data, downtime and manipulation can mean risk to life and limb. Therefore, to build its SECU1 (XMC20) and SENC1 (FOX615) encryption cards, Hitachi Energy needed highly secure end-to-end authentication and encryption of control data with high-quality key generation based on truly random numbers.

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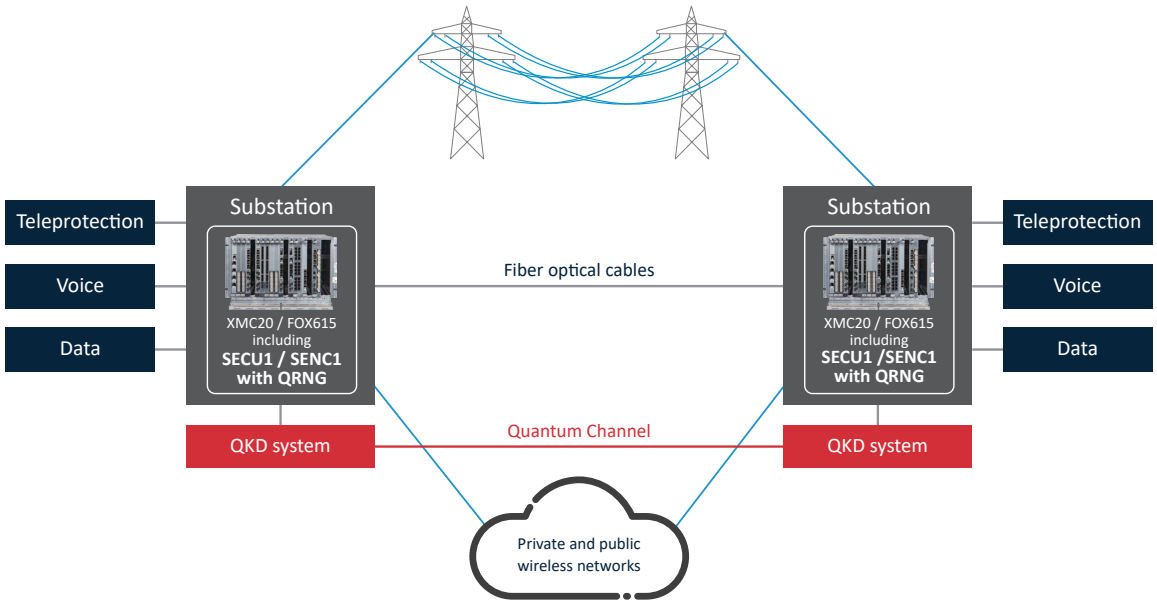
Solution

The SECU1 and SENC1 encryption cards secure data transfer in critical infrastructures. They are used in mission-critical applications for controlling and monitoring energy networks, oil and gas pipelines, railways and local authority networks (police, air traffic control, military defense).

Hitachi Energy chose ID Quantique for its crypto expertise to co-develop the SECU1 and SENC1 encryption cards. Additionally, to enhance and future-proof the encryption cards' security, Hitachi Energy selected ID Quantique's hardware-based Quantis QRNG chip IDQ6MC1 to generate highly secure keys that are truly random. This method provides top security for mission-critical networks today and in the long-term future. The basis for the trustworthy and protected distribution of keys is provided by a centralized and decentralized generation of keys. There is no single-point-of-failure and all nodes can securely communicate with one another. This permanent-encryption method prevents the creation of so-called network islands.

SECU1 and SENC1 encrypt the complete network traffic end-to-end natively on layer 2.5 in MPLS-TP transport networks. The cards are characterized by parallel high-security end-to-end encryption in mission-critical networks and ensuring very high data availability while providing precise timing. Encryption and authentication are carried out through the most secure encryption process available at the moment which is also recommended by the BSI (German Federal Office for Information Security).

Furthermore, the encryption solution supports Quantum Key Distribution (QKD). The optional QKD system ensures true long-term protection, allowing organizations to be agile and ready for the quantum computing era.



Results

Hitachi Energy offers the industry's first solution for highly secure end-to-end encryption of communications networks belonging to operators of critical infrastructure.

Hitachi Energy's hybrid XMC20 and FOX615 multi-service access and transport platforms offer with their respective encryption card SECU1 and SENC1 – co-developed with IDQ – the only way of making communications networks exceptionally secure in the long-term without risking availability.

The cards encrypt all network traffic used to monitor and control networks belonging to energy utilities, railway companies, gas and oil pipelines, local authorities and for air-traffic control and defense purposes transparently and natively on Layer 2. It allows customers to build dynamic modern MPLS-based critical infrastructure networks while ensuring public safety.

The solution is tailored to these sectors' needs and can be integrated into an existing network without making any changes in the infrastructure.

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