Critical Operations Protector (COP)

A GenX Product

HARDENED PROTECTION OF CRITICAL SMART GRID COMMUNICATIONS

The Itron Smart Energy Platform combines network infrastructure, software, and professional services to enable a range of smart grid applications. Maintaining grid integrity, particularly the issuance of critical grid commands, requires stringent security measures. Critical Operations Protector (COP) enhances the security of the Itron AMI application suites by isolating, rate limiting, and authorizing certain critical commands such as remote disconnects. COP generates secure digital permits required for executing these commands on Itron smart grid devices. Each permit contains a cryptographic signature so that devices, such as Itron-enabled meters, can verify the authenticity and integrity of the permit before executing the command. To prevent replay attacks, the system allows permits to be used only once and limits their validity to a fixed time window.

Critical Operations Protector includes a FIPS 140-2 Level 3-compliant hardware security module (HSM) for storing the keys to sign permits. For maximum security, utilities can deploy this HSM in a hardened location with physical and logical separation from the rest of their back-office systems. COP offers failover for high availability and disaster recovery.

COMMAND SCHEDULING AND RATE LIMITING

Remote disconnects and other commands with the potential to shed load should be paced to prevent sudden and severe imbalances on the distribution grid. COP addresses this requirement by rate limiting the sending of critical commands. With COP, administrators can define the maximum number of critical operations allowed over a sliding time window. For example, a utility may configure a maximum of 5000 remote disconnect commands

Enhanced security for critical commands:

» Issues permits needed to execute critical commands

» Rate limits the sending of critical commands

» Includes a tamper-resistant hardware security module

» Supports physical isolation and additional authentication requirements

» Simplifies compliance with portions of NERC-CIP

within any 24-hour period. Rate limits apply to critical commands initiated from within the Advanced Metering Manager (AMM) interface as well as those triggered via web services.

Upon detecting a rate-limit violation, COP immediately halts the issuance of new permits until at least two administrators unlock the HSM.

READY FOR NERC-CIP COMPLIANCE

The infrastructure supporting Advanced Metering can be classified as a critical asset under the North American Electric Reliability Corporation's Critical Infrastructure Protection (NERC-CIP) standard if it is capable of shedding a significant load. With its strong security mechanisms, COP helps utilities meet and exceed the NERC-CIP requirements while greatly simplifying compliance. By putting control of critical commands into a separate module, COP enables utilities to reduce the scope of a NERC-CIP compliance audit.

SERVICES FOR CRITICAL OPERATIONS PROTECTOR DEPLOYMENTS

Consistent with all of its offerings, Itron offers a complete set of services to take the project from conception to conclusion. Itron can fully manage development and test instances of COP in tandem with an existing instance of Itron AMI application suite. To meet NERC-CIP requirements, utilities must host and manage their production instances of COP.

SECURITY

Cryptographic Algorithms	RSA, DSA, ECDSA (NIST & Brainpool curves) DH, ECDH (NIST & Brainpool curves) AES, Triple-DES, DES MAC, CMAC, HMAC
Hash Algorithms	SHA-1, SHA-2 Family, RIPEMD
Random Number Generation	Physical (TRNG): AIS 20/311 class PTG.2 Deterministic (DRBG): NIST SP800-90A (Hash), AIS20/31 DRG.4
Cryptographic Interfaces	PKCS#11, Java Cryptography Extension (JCE), Microsoft Crypto API (CSP), Cryptography Next Generation (CNG), SQL Extensible Key Management (SQLEKM), Cryptographic eXtended services Interface (CXI)

SPECIFICATIONS

Interfaces	Ethernet: 2 x RJ45, 10/100/1000 Base-T USB: 2 x USB 2.0, 2 x USB 3.0 Video: 1 x DB15HD VGA connector Keyboard/pinpad: 2 x USB 2.0 (front)
Power	Input range: 100~240 VAC, 50~60 Hz AC Power requirement: Typical: 45W / 66VA Max: 50W / 70VA
Mechanical	Form Factor: 19" 1U Dimensions: 44.6 cm (17.56") W x 53.3 cm (20.98") D x 4.4 cm (1.73") H Weight: 10 kg (22.05 lbs)
Environmental	Operating temperature: +10° C to +50° C (+50° F to +122° F) Humidity: 10% to 95% relative humidity, non-condensing MTBF: 100,000 hours at +25° C (+77° F)
Approvals	RoHS II, WEEE Interference emission: EN 55022 Class B, EN 61000-3-2, EN 61000-3-3 Interference immunity: EN 55024 Equipment safety: UL, IEC 60950-1, CB certificate, CE, FCC Class B Climatic and mechanical conditions: ETSI EN 300 019 Storage Class 1.1, Transportation Class 2.1, Stationary Use Class 3.1

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CORPORATE HQ

2111 North Molter Road
Liberty Lake, WA 99019 USA

Phone: 1.800.635.5461
Fax: 1.509.891.3355