Utility Metering Update

PLUG 2019

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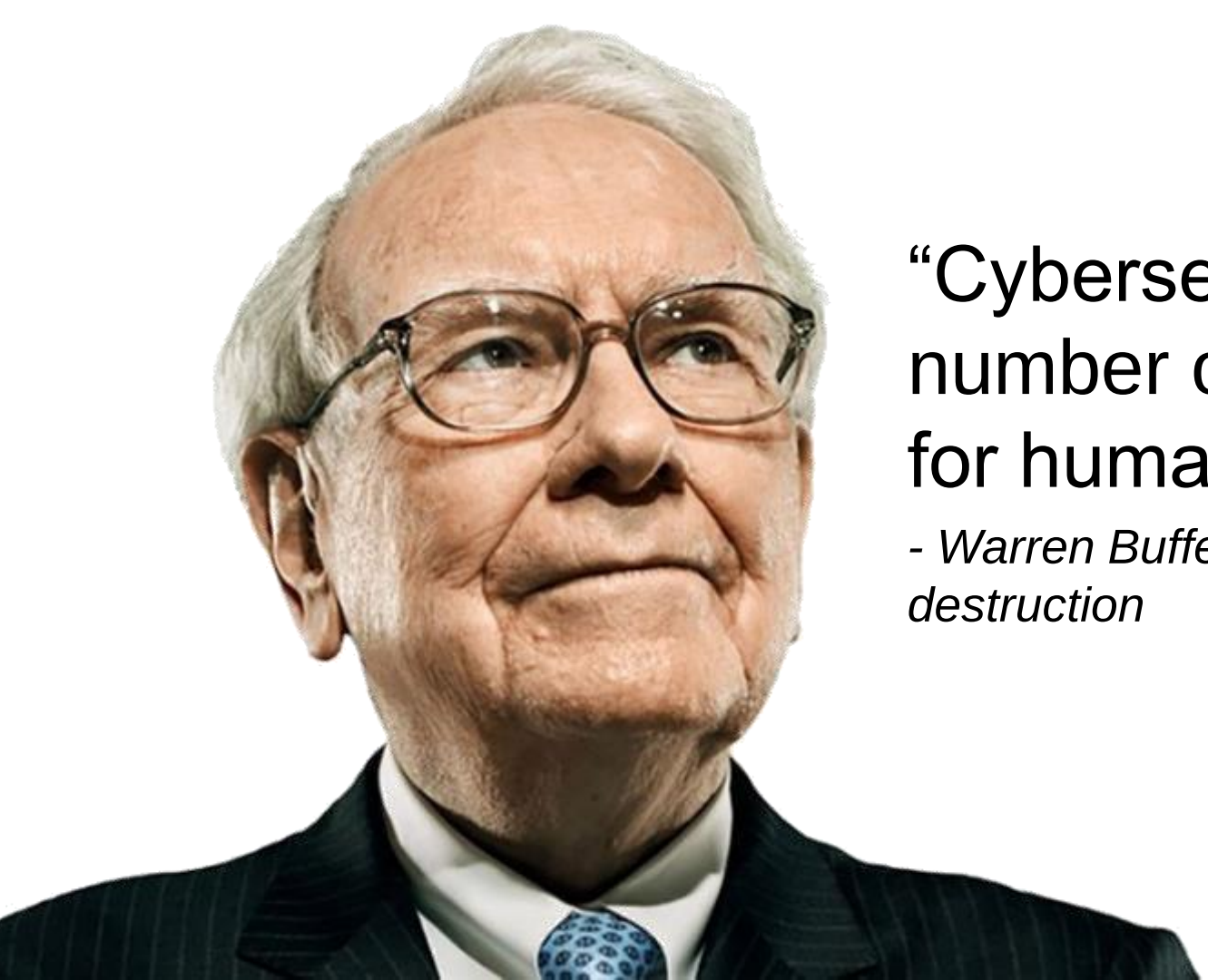
Schneider Electric’s Cybersecurity Journey



“Cybersecurity is the number one problem for humankind”

- Warren Buffet on weapons of mass destruction

Threat landscape is evolving

Stuxnet
Iran nuclear plant

45,000 machines infected **PLC** modified and destroyed

Shamoon
Saudi Aramco attack

30,000 Windows-based machines infected

Unknown malware
German steel mill

Uncontrolled **shutdown of a blast furnace** due to control component breakdowns

Sandworm, BlackEnergy
Ukraine

200,000 people left without electricity due to **grid blackout**

Triton
Saudi Arabia

Engineering workstation infected with the Triton malware causing the plant safety system to shutdown.

Crash Override

Tools with specific ICS attacks built in

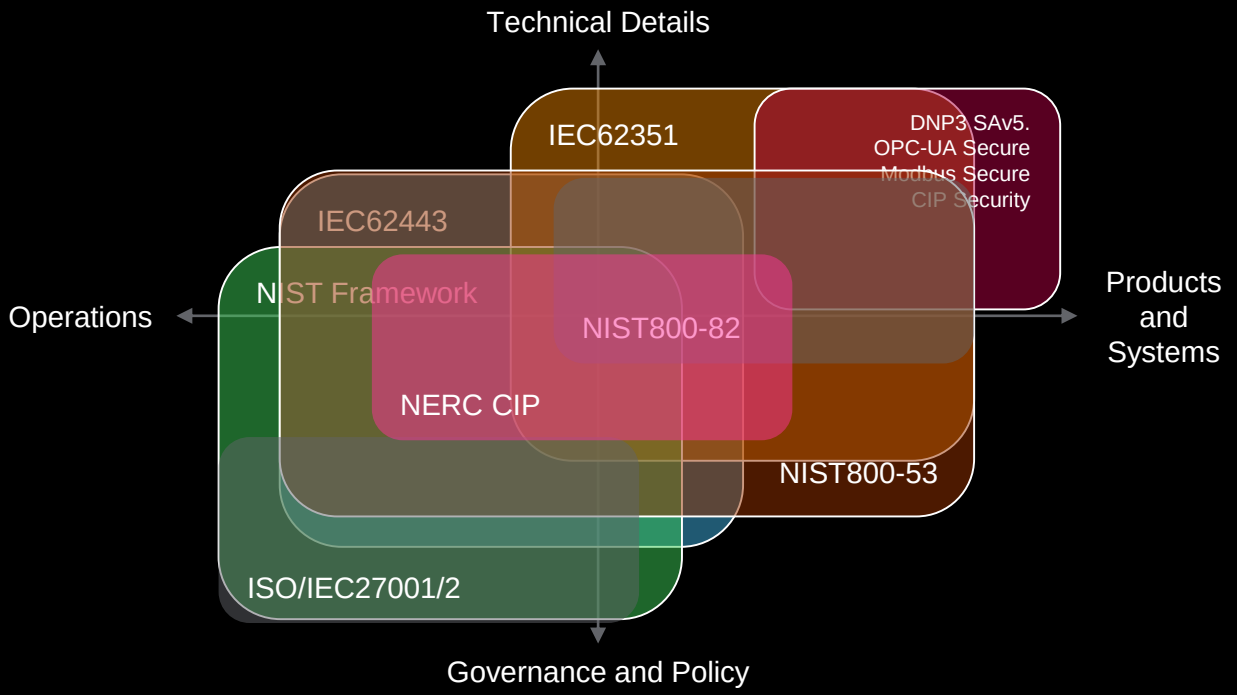
Ransomware

Geopolitical concerns

2010 2014 2015 2016 2017 **2019: What's Next?**

ICS specific tools emerging,
Willingness to attack ICS systems is increasing,
Supply chain is becoming a more common target,
Reputation and Trust are becoming increasingly important.

Regulations and Standards



IEC62443 is a key standard and followed by Schneider Electric.

Note the high degree of overlap with other standards and regulations
(e.g. NERC CIP)

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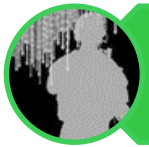
Cybersecurity lexicon and vocabulary

Security levels define the cybersecure functions embedded in our products, it increases the product robustness and makes it resistant to the Cyber threats.

Groups/Nation-states, governmental organization member…	 Protection against intentional violation using sophisticated means with extended resources, system specific skills and high motivation	SL 4
Cybercrime player, Terrorists, Hacktivists, Professional thieves, Cyber-criminals, competitors	 Protection against intentional violation using sophisticated means with moderate resources, system specific skills and moderate motivation	SL 3
Insider (Disgruntled employees or contractors…) or intruder (Thrill-seeking, hobbyist, malicious organization…)	 Protection against intentional violation using simple means with low resources, generic skills and low motivation	SL 2
Insider (Well-intentioned, careless employees or contractors)	 Protection against casual or coincidental violation	SL 1

IEC62443 - FR / SL – simplified/partial view

	FR 1 - IAC Identification and Authentication Control	FR 2 - UC Use Control	FR 3 - SI System Integrity	FR 4 - DC Data Confidentiality	FR 5 - RDF Restricted Data Flow	FR 6 - TRE Timely Response to Events	FR 7 - RA Resource Availability
SL4	- Multifactor authentication for human users over all networks	- Dual approval enforcement for sensitive operations - Protection of time source integrity	- Audit records on write-once media - Security self-tests during runtime	- Confidentiality of information traversing zone boundaries	- Logical and physical network isolation between critical and non-critical control systems		
SL3	- Centralized account management - Hardware security for machine credentials	- Centralized auditing	- Centralized management for malicious code protection - Communications secured with cryptography	- Purging of volatile shared memory resources	- Independence from non-system networks - Able to prevent any communication through the system boundary	- Programmatic access to audit logs	- Limit DoS effects to other systems or networks - Backup automation
SL2	- Authentication of human and machine users - Support of PKI certificates mgt	- Authorization enforcement for human and machine users - Configurable permissions for roles	- Protection of audit information	- Confidentiality of information at rest and in transit via untrusted networks - Purging of all private information when decommissioned	- Physical network segmentation - Deny by default, allow by exception	- Continuous monitoring of security mechanism performances	- DoS: Manage communication loads - System component inventory
SL1	- Authentication of human users - Account management	- Authorization enforcement for human users - Auditing (secure logging)	- Integrity of transmitted information - Integrity of Software, and information at rest	- Confidentiality of private information at rest and in transit	- Logical network segmentation - Zone boundary protection - Application partitioning	- Audit log consultation	- DoS protection - Backup & Recovery
FR							

ION Meter Cybersecurity

Advanced security for the most advanced meters in the world

Designed, built & tested according to Schneider Electric's Secure Development Lifecycle Process

- Assures resilient design & formal customer response in event of vulnerabilities
- Penetration and Achilles testing in coordination with Schneider Cybersec Labs

Technology Summary

- Digital signature on firmware upgrade files
- Secure protocol support (HTTPS today, work in progress today on SFTP and SSH)
- Features aligned with NERC/CIP needs:
  - Up to 50 user accounts with configurable access rights
  - Ability to enable/disable physical comm ports, and TCP ports
  - Ability to reassign TCP port numbers for most protocols
  - Audit logging for all login/configuration events, Syslog support
- Security with ION, FTP, HTTP(S), and display:
  - "Standard security" uses numeric password
  - "Advanced security" provides user accounts with configurable access rights and alphanumeric passwords
  - Protocol lockout feature (after too many invalid login attempts for a given user/protocol/port, a temporary lockout period is enforced
  - "Factory" access strictly controlled, disabled by default
- Hardware lock for utility metering applications

Utility Metering Update

Current Firmware:

ION8650:

- V004.021.000 AE-1922 Rev. 3/MAL-E465
  - FW Version V004.020.001 was corrected
  - Modified test provisions to support testing VAh, I^2h, and V^2h, on VARh LED on V004.020.000 firmware and later
  - Identified change made to battery connector to increase long-term reliability

ION7400:

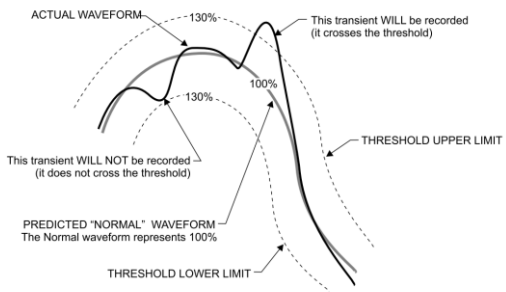
- V002.001.000 AE-2326 Rev. 01
  - New support for Firmware V002.001.000

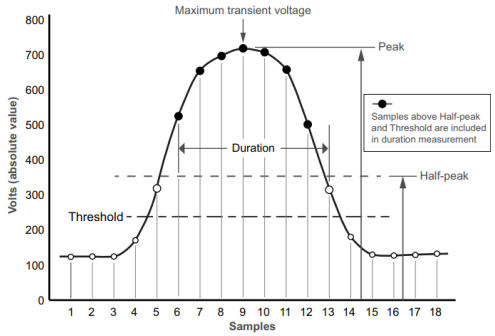
Firmware Updates:

ION8650:

V4.31.1 released globally May 2019

- V004.031.001 (MC submission coming soon)
- Added support for Outage Notification Feature
  - I/O Order Option “D”
  - JSON Outage Notification with Configurable Delay
- JSON Push over HTTP/s via Alert Module
- Support for HTTPS* & DNS
  - *Only for Alert JSON Push Messaging over Ethernet
- Increased Comm’s Robustness
  - DNP3.0 Update – Configurable timeout setting added
  - Increased and corrected memory allocations to better handle heavy comm’s loading
- New Transient Detection Mode
  - Select between Waveshape Alarm (traditional) or Absolute (Peak)





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Firmware Update

ION7400:

V002.001.000 – MC Approved Sept. 2019

- PTP support
- HTTPS Support
- Pre/Post event logging for data and waveform recorders
- Support for various compliance
  - EN50160:2010 via Webpage
  - IEEE519:2014
  - IEC61000-4-30 Ed.3 Class S
- Increased input count to 16 on Arithmetic Modules
- DNP Slave Export and Counter Modules are high-speed
- Arithmetic Module Count increase from 70 to 100

Certificate of Conformity

Number CoC-2274923-02
Project number 2274923
Page 1 of 3

Issued by : NMi Certin B.V.
Thijsseweg 11
2629 JA Delft
The Netherlands

Applicant : Schneider Electric dba Power Measurement Ltd.
2195 Keating Cross Road
Saanichton, BC V8M 2A5
Canada

Submitted : **A meter embedding IEC 61000-4-30 class A Power Quality functions**

Manufacturer : Schneider Electric
Type : PowerLogic ION7400

Characteristics : See page 2 and further

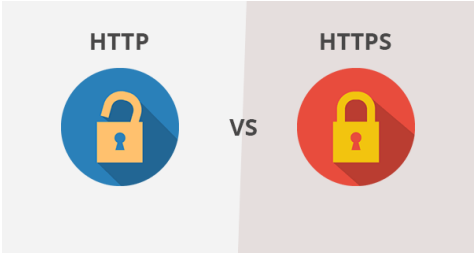
In accordance with : **IEC 61000-4-30 Ed. 3 (2015)**
"Electromagnetic Compatibility (EMC) – Part 4-30: Testing and measurement techniques – Power quality measurement methods"
IEC 62586-2 Ed. 2 (2017)
"Power quality measurement in power supply systems - Part 2: Functional tests and uncertainty requirements"

Measurement class : IEC 61000-4-30 class S

The undersigned declares that the described product is tested according to the above mentioned standard and meet their requirements, based on a non-recurrent examination. The appertaining test data is presented in type evaluation report number NMi-15200734-01 and NMi-2274923-01, granted by NMi Certin B.V.

NMi Certin B.V.
8 March 2019

C. Oosterman
Head Certification Board



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Measurement Canada Updates

10 Year MC Seal

- Jim Passmore has been leading the sampling effort
- Test results are expected to be completed by EoY 2019 and submitted to MC

Fundamental Metering

- Following closely to the MC movement via CEA-Metering Task Group
- Meter type approvals set to begin April 2020
- All meters sold must exclude Harmonic Content by 2024
- Will be launched as a completely new NOA for ION8650

Measurement Canada | Mesures Canada

An Agency of Industry Canada | Un organisme d'Industrie Canada

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