Cyber Security & Instrumentation and Controls

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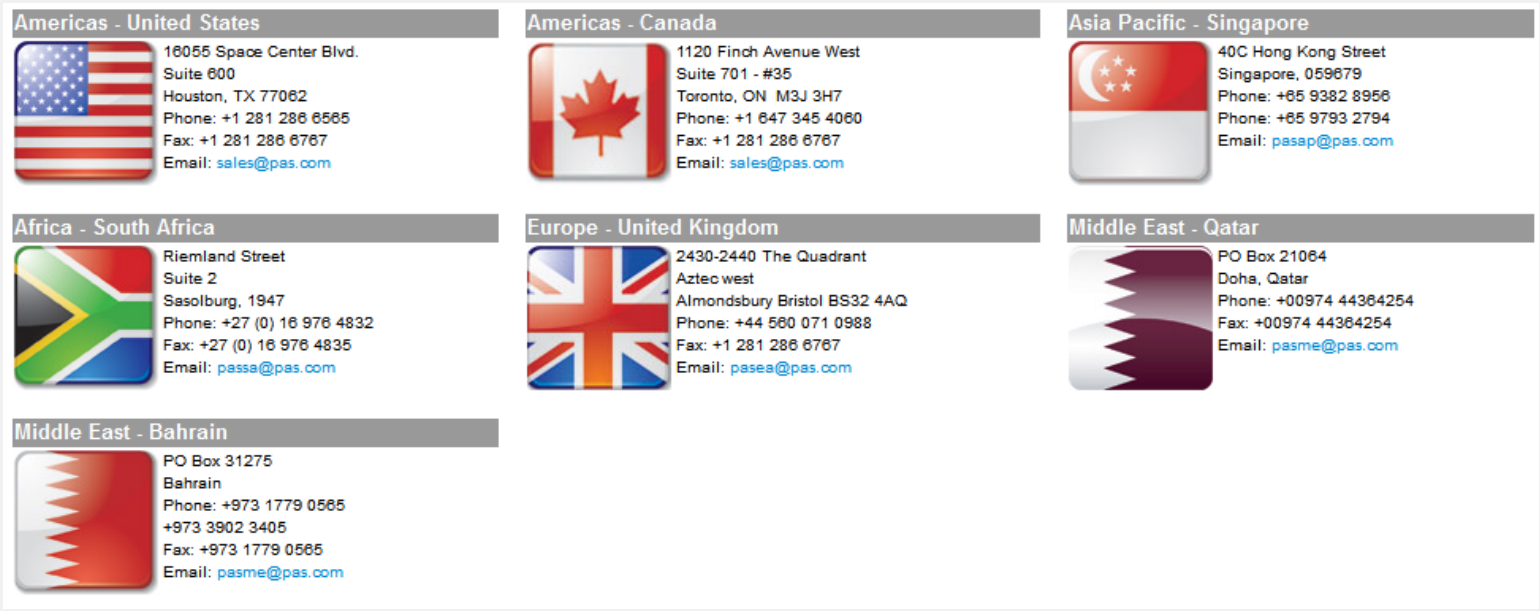
Introductions

- PAS, Inc.
  - Founded in 1993 as Plant Automation Services
  - Global Provider of software solutions
    - Large install base, across multiple industries
  - Operations Effectiveness
  - Automation Asset Management
  - Regional Offices:



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Definitions

- Configuration
- Cyber Security
- Cyber Automation Assets
- Cyber Attacks:
  - Espionage, Warfare, Crime, Vandalism, “Hactivism”, Sabotage, etc.
- Management of Change
- NERC CIP
- **Saboteurs**

  “...derives from the Netherlands in the 15th century when workers would throw their sabots (wooden shoes) into the wooden gears of the textile looms to break the cogs, fearing the automated machines would render the human workers obsolete.” - *wikipedia*

Software Solution

- PAS Objectives for I&C Cyber Security
  - Ensure system reliability through increased cyber-security solutions specifically designed for control system environments
  - Increase efficiencies by providing software solutions to automate repetitive compliance tasks
  - Provide change tracking history for audits
  - Provide a Management of Change solution that includes, “ex post facto” MOC combined with data validation

The Challenge of Compliance & Security

- Understanding current compliance/regulations is difficult
  - Multiple sources of information, multiple ways to be in violation, ever changing list of compliance items
- Cyber-Security Deployment and Maintenance is challenging
  - IT Networks/Automation Networks Various layers/levels of assets
    - Multiple vendors, versions, locations
    - Many systems are “quasi-connected”
    - User Access to systems are difficult to manage
    - Non-standard approach to systems management
- In addition specific requirements are resource intensive
  - Extremely time consuming
  - Prone to error through data omission
  - Manual data collection must be repeated
  - Effort to reach compliance measured in months

Recent Violation

- April 2012 - $115K fine for NERC CIP violations
  - One cited violation, failure to document / implement anti-virus software

The North American Electric Reliability Corporation (NERC) hereby provides this Notice of Penalty[1] regarding Unidentified Registered Entity (URE), NERC Registry ID# NCRXXXXX, in accordance with the Federal Energy Regulatory Commission's (Commission or FERC) rules, regulations and orders, as well as NERC Rules of Procedure including Appendix 4C (NERC Compliance Monitoring and Enforcement Program (CMEP)).[2]

URE submitted to Reliability*First* Corporation (Reliability*First*) self reports of possible violations of nine CIP Standards listed as follows: CIP-007-1 R3, CIP-007-3 R4.1, CIP-007-3 R6, CIP-004-2 R4.2, CIP-002-3 R3, CIP-006-3 R1, CIP-007-3 R1, CIP-007-3 R2, and CIP-007-3 R6.

CIP-007-3 R4.1 provides in pertinent part:

R4. Malicious Software Prevention — The Responsible Entity shall use anti-virus software and other malicious software ("malware") prevention tools, where technically feasible, to detect, prevent, deter, and mitigate the introduction, exposure, and propagation of malware on all Cyber Assets within the Electronic Security Perimeter(s).

R4.1. The Responsible Entity shall document and implement anti-virus and malware prevention tools. In the case where anti-virus software and malware prevention tools are not installed, the Responsible Entity shall document compensating measure(s) applied to mitigate risk exposure.

http://www.nerc.com/filez/enforcement/Public_FinalFiled_NOP_NOC-971.pdf

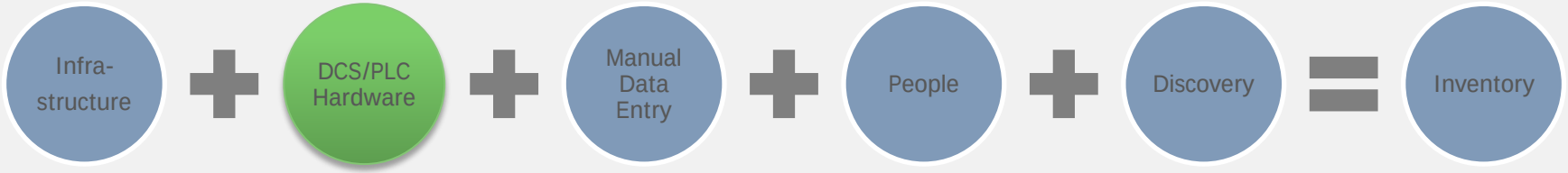
CIP Inventory

- What is an Asset Inventory?

CIP Inventory

- Ports
- Services
- Patches
- Applications
- Events
- Other Stuff (OS,etc.)

CIP Inventory



- Application Work Stations
- Operator Work Stations
- Engineering Work Stations
- I/O Cards/FBMs
- Controllers

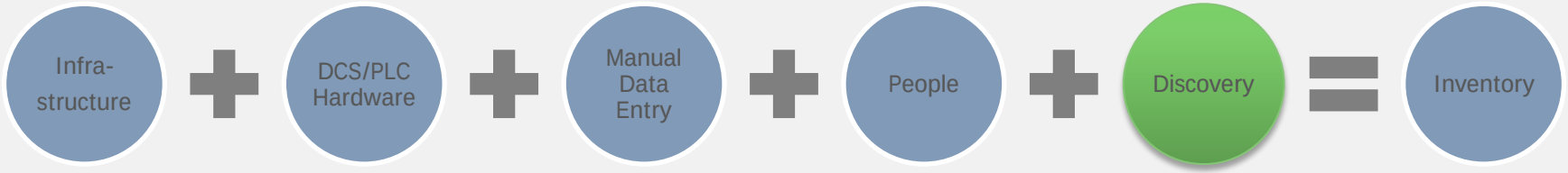
CIP Inventory

- Plant Criticality
- Black Start
- Must Run
- Megawatts
- Routable Protocol
- Modem Connection
- Cyber Critical Asset
- Reference ID
- ESP Segment ID
- External Accessibility ID
- PSP Boundary ID
- Appropriate Use Banner

CIP Inventory

- Users
- Access
- Passwords
- Training
- More…

CIP Inventory



- Approved Devices
- Unapproved Devices

CIP Inventory

The sum of the parts = 1 inventory item

Challenges / Solutions

- **Asset Inventory**
  - Complete asset inventory, in a standard hierarchy, updated on a regularly scheduled basis
- **Change Control & Configuration Management**
  - Tracking all modifications to Critical Cyber Assets, (hardware or software), automatically when possible, & MOC
- **Ports, Services, & Programs**
  - Tracking ports and services to ensure settings remain compliant. Anything not approved as part of COE will be identified and reported
- **Patch Inventory and Management**
  - The ability to visualize where patches are required, when patches have been deployed, which assets are not current on patches and require TSE's

Benefits

- Resourcing for asset inventories can be greatly reduced
- Automated inventories provide reports quickly
- More frequent assessments
- Defects are found more easily
- Broader Awareness Increases Intrusion Detection
- Violations are reduced
- Accuracy is increased

Project Case –Power Generator, multiple site implementation

- Required Resources: Reduced by a factor of four
- Inventory Task Duration: Reduced by a factor of six
- Automatic generation of compliance reports and dashboards

Thank You

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