National Cybersecurity Center of Excellence (NCCoE)
Energy Sector

Energy Provider Community of Interest

29 November 2016

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

NCCoE
NATIONAL CYBERSECURITY CENTER OF EXCELLENCE

Agenda

- NCCoE Energy Sector News
  - Upcoming NCCoE Planned Activities
- Current Projects
  - Identity and Access Management (IdAM) Project Update
  - Situational Awareness (SA) Project Update
- NCCoE Cybersecurity for Manufacturing Project Description
  - Overview
  - Capabilities Assessment for Securing Manufacturing Industrial Control Systems
- Supply Chain Use Case Development

NCCoE Out and About:

- Upcoming planned activities ;
  - Committee on National Security Systems (CNSS) Supply Chain Risk Management (SCRM) Working Group, December 12
  - Software and Supply Chain Assurance (SCCA) Winter Working Group Meeting, December 13-15, MITRE, McLean, VA

CURRENT PROJECTS: IDAM

Challenges we heard from industry:

- **Lack of authentication, authorization, and access control requirements for all OT**
- **Inability to manage and log authentication, authorization, and access control information for all OT using centralized or federated controls**
- **Inability to centrally monitor authorized and unauthorized use of all OT and user accounts**
- **Inability to provision, modify, or revoke access throughout the enterprise (including OT) in a timely manner**

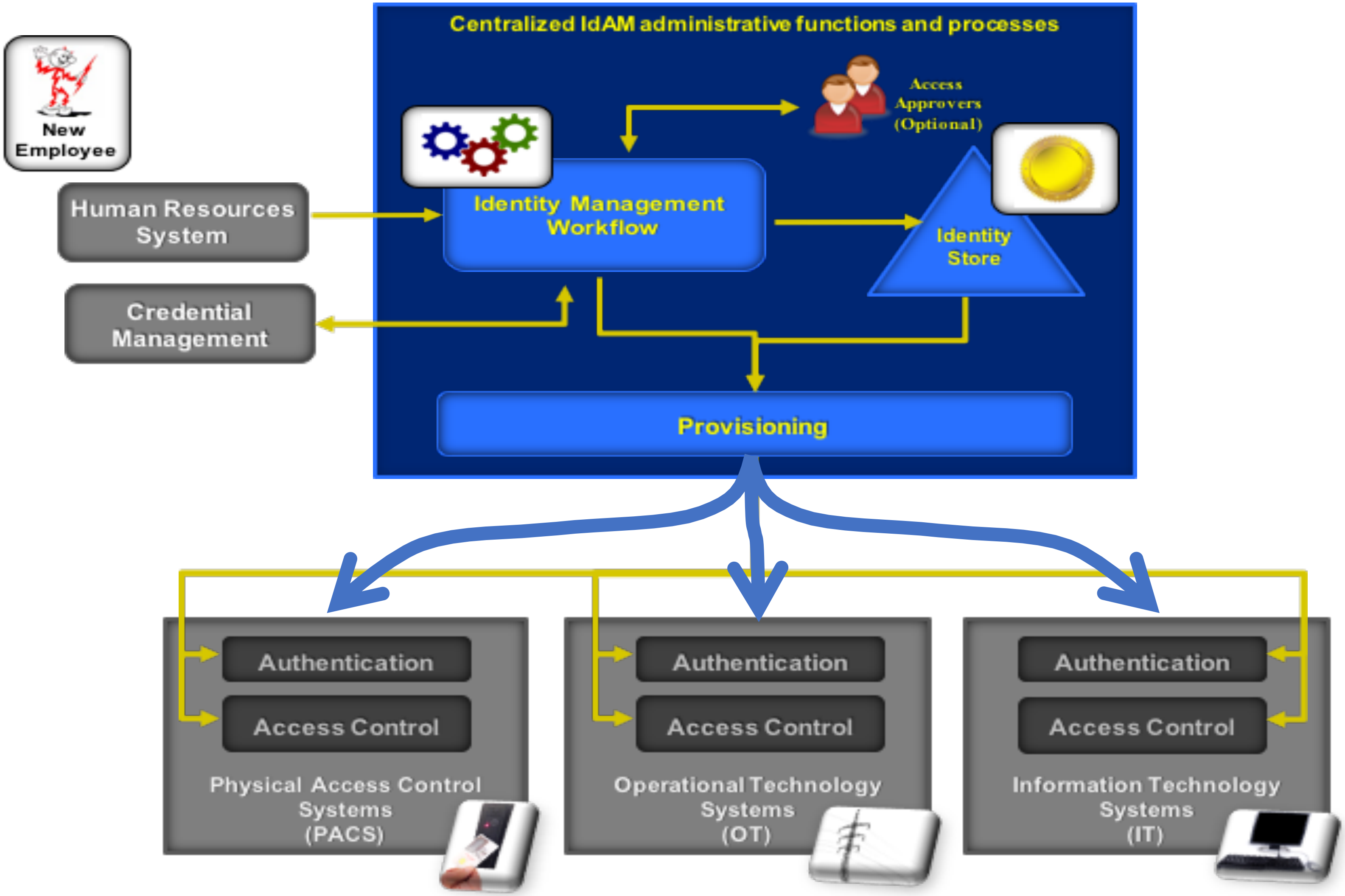
Solution NCCoE built:

- ✓ Authenticates individuals and systems
- ✓ Enforces authorization control policies
- ✓ Unifies IdAM services
- ✓ Protects generation, transmission and distribution
- ✓ Improves awareness and management of visitor accesses
- ✓ Simplifies the reporting process

Converged management of silos

Draft guide is online at https://nccoe.nist.gov/projects/use_cases/idam

CURRENT PROJECTS: IDAM SOLUTION


Centralized IdAM administrative functions and processes
New Employee
Human Resources System
Credential Management
Identity Management Workflow
Access Approvers (Optional)
Identity Store
Provisioning
Authentication
Access Control
Physical Access Control Systems (PACS)
Authentication
Access Control
Operational Technology Systems (OT)
Authentication
Access Control
Information Technology Systems (IT)

CPS Energy (San Antonio) and NCCoE are collaborating on a case study to document a worked example, lessons learned, and known benefits. Expect to complete by October.

CURRENT PROJECTS: SITUATIONAL AWARENESS

Industry Challenges:

- Improve OT availability
- Detect anomalous conditions and remediation
- Unify visibility across silos
- Investigate events leading to baseline deviations/ anomalies
- Share findings

Solution NCCoE is developing:

✓ Improves the ability to detect cyber-related security breaches or anomalous behavior

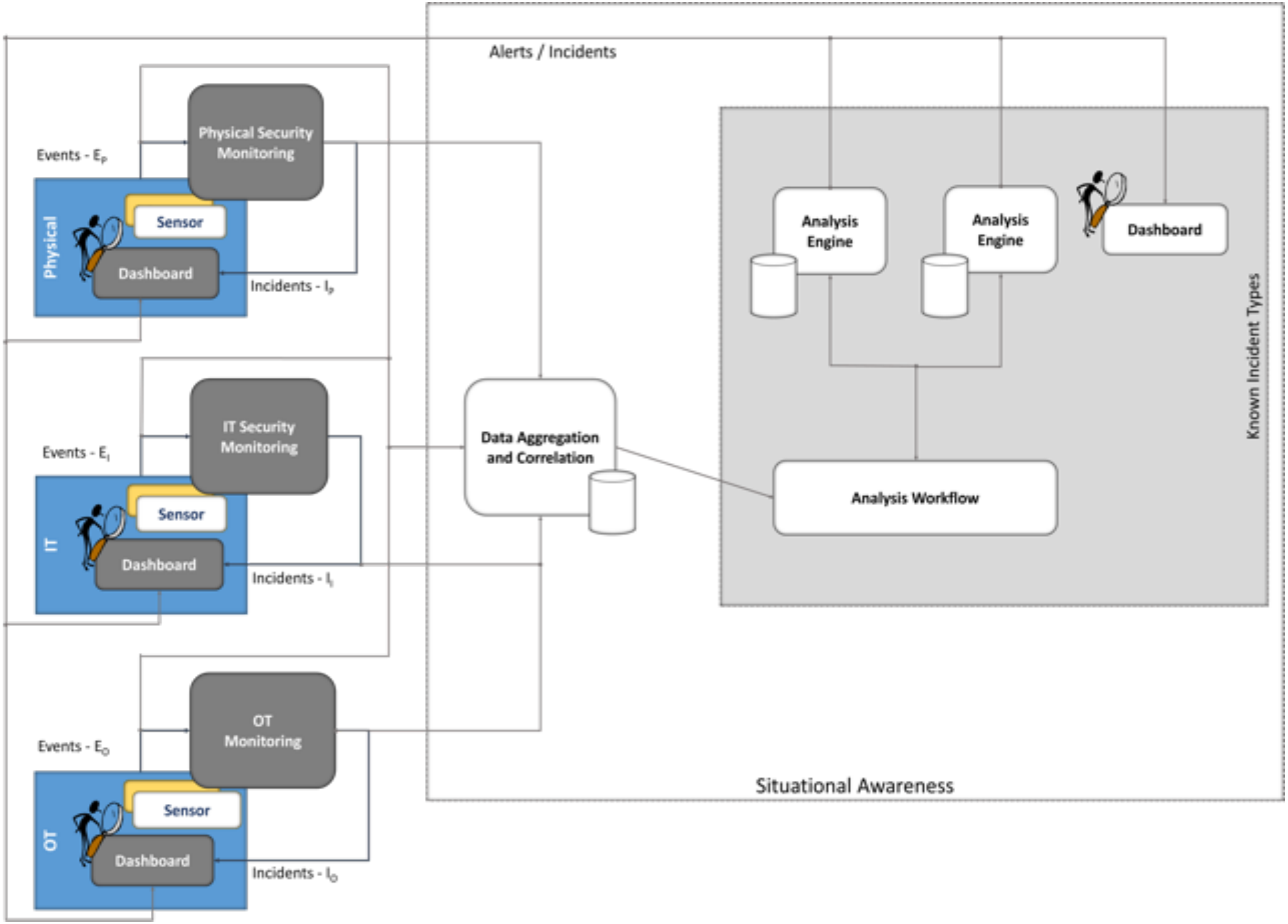
✓ Improves accountability and traceability

✓ Simplifies regulatory compliance by automating generation and collection of operational log data

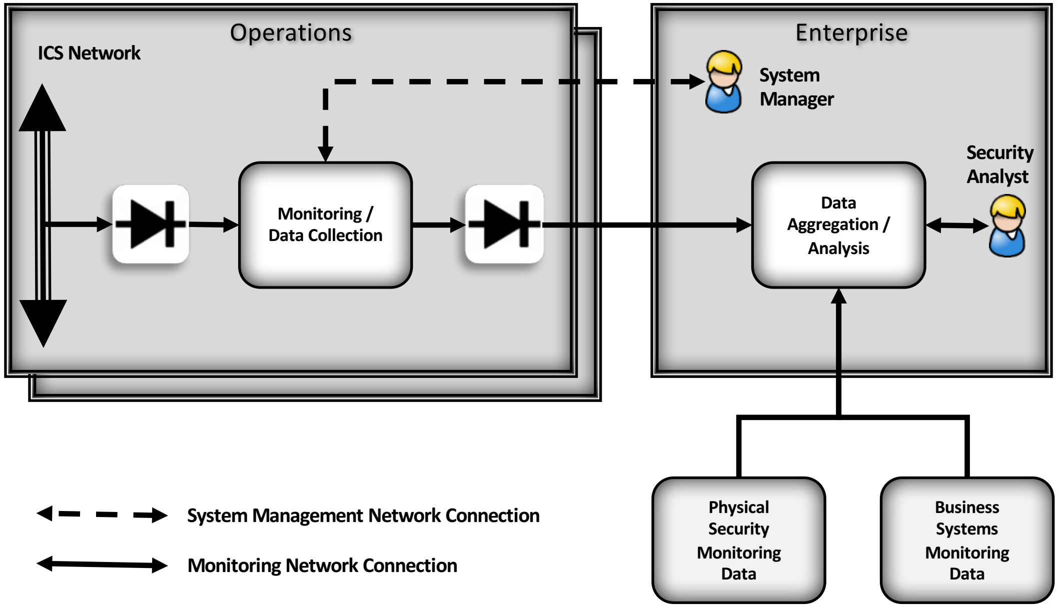
✓ Increases the probability that investigations of attacks or anomalous system behavior will reach successful outcomes

Use Case is online at https://nccoe.nist.gov/projects/use_cases/situational_awareness

CURRENT PROJECTS: SITUATIONAL AWARENESS SOLUTION



CURRENT PROJECTS: SITUATIONAL AWARENESS


Operations
ICS Network
Monitoring / Data Collection
Enterprise
System Manager
Security Analyst
Data Aggregation / Analysis
Physical Security Monitoring Data
Business Systems Monitoring Data
System Management Network Connection
Monitoring Network Connection

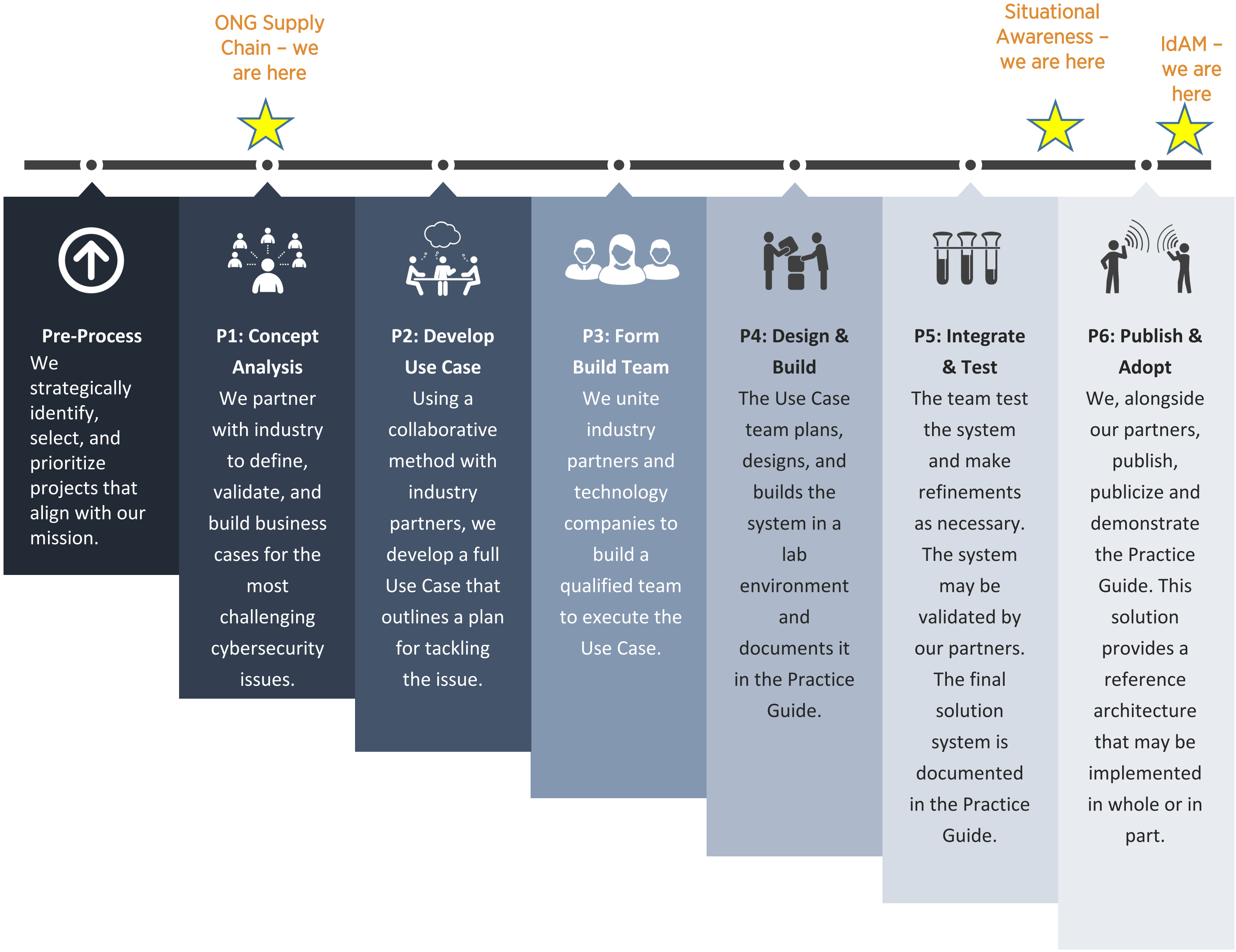
- Collect data from an Operations facility that includes Industrial Control Systems (ICS)
  - Ensure data can only flow OUT of the ICS Network into the monitoring and collection hardware / software
- Send data collected from Operations to an Enterprise data aggregation and analysis capability
  - Operations data is aggregated with business systems monitoring data and physical security monitoring data
  - Ensure data can only flow OUT of Operations into Enterprise
- Use the aggregated data to provide converged situational awareness across Operations and Business systems as well as physical security of buildings and other facilities
- Provide a limited-access remote management path from Enterprise to Operations to manage monitoring / data collection hardware and software

PROJECT MILESTONES

PROJECT NAME: IdAM	Upcoming Milestone Dates
Publish Special Publication	12/2016

PROJECT NAME: Situational Awareness	Upcoming Milestone Dates
Completed Build	11/2016
Release Draft Practice Guide for Public Comments	12/2016
Publish Special Publication	05/2017

PROJECT PHASES



ONG Supply Chain – we are here

Situational Awareness – we are here

IdAM – we are here

Pre-Process
We strategically identify, select, and prioritize projects that align with our mission.

P1: Concept Analysis
We partner with industry to define, validate, and build business cases for the most challenging cybersecurity issues.

P2: Develop Use Case
Using a collaborative method with industry partners, we develop a full Use Case that outlines a plan for tackling the issue.

P3: Form Build Team
We unite industry partners and technology companies to build a qualified team to execute the Use Case.

P4: Design & Build
The Use Case team plans, designs, and builds the system in a lab environment and documents it in the Practice Guide.

P5: Integrate & Test
The team test the system and make refinements as necessary. The system may be validated by our partners. The final solution system is documented in the Practice Guide.

P6: Publish & Adopt
We, alongside our partners, publish, publicize and demonstrate the Practice Guide. This solution provides a reference architecture that may be implemented in whole or in part.

Icon Credits (right to left): Talking by Juan Pablo Bravo; Test Tube by Olivier Guin; Collaboration by Krisada; Team by Wilson Joseph; Brainstorm by Jessica Lock; Network by Matthew Hawdon; Arrow by Jamison Wieser; all from the Noun Project.

Cybersecurity for Manufacturing

- Draft Project Description Published Monday, 11/07/2016
  - 30 Day Comment Period
  - Final Project Description: December, 2016 (contingent upon comments)

- Project Characteristics – Four Part Series
  - Joint effort with NIST Engineering Lab (Keith Stouffer) and NCCoE
  - Lab infrastructure already in place 1) Robotic arms, 2) Emulated chemical batch processing - HMI

- Security Capabilities
  1. Behavioral Anomaly Detection (first and focus of draft)
  2. ICS Application Whitelisting
  3. Malware Detection and Mitigation
  4. ICS Data Integrity

- Please Review and Comment ;
  https://nccoe.nist.gov/sites/default/files/library/project-descriptions/mf-ics-1-project-description-draft.pdf

Update: Development of ONG (Energy ICS) Supply Chain Use Case

- Coordinating with Jon Boyens, NIST lead on all things "Supply Chain"
  - NCCoE needs to narrow focus on technology based use case
  - Attending CNSS SCRM and SSCA Forum meetings week of 12/13 – 12/16

- NCCoE Challenges
  - "Supply Chain" is very broad topic
  - Majority of work needing to be done is policy and contract based
  - Tracking databases are not something NCCoE would consider developing
  - Security capabilities for supply chain verification and validation need to be explored – use case must have security technology component to qualify for NCCoE build

- Moving forward – continue exploring possibilities within stakeholder community

INDUSTRY INPUT

- Your thoughts?

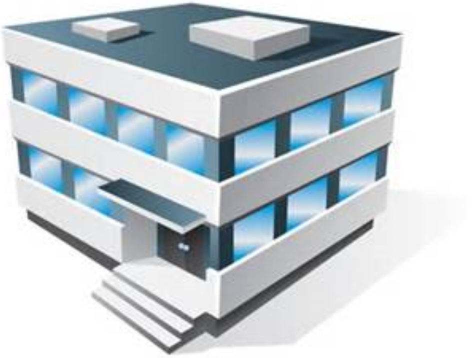
- Open Discussion

CONTACT US

301-975-0200

http://nccoe.nist.gov/forums/energy

energy_nccoe@nist.gov



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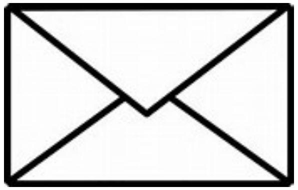
Rockville, MD 20850



100 Bureau Drive, Mail Stop 2002,
Gaithersburg, MD 20899

Thank You

ABOUT THE NCCOE

FOUNDERS

NIST
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U.S. Department of Commerce

Information Technology Laboratory

MARYLAND OF OPPORTUNITY.®

Department of Business & Economic Development

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GARDEZ BIEN
MARYLAND

WHO WE ARE AND WHAT WE DO

VISION

ADVANCE CYBERSECURITY

A secure cyber infrastructure that inspires technological innovation and fosters economic growth

MISSION

ACCELERATE ADOPTION OF SECURE TECHNOLOGIES

Collaborate with innovators to provide real-world, standards-based cybersecurity capabilities that address business needs

GOAL 1

PROVIDE PRACTICAL CYBERSECURITY

Help people secure their data and digital infrastructure by equipping them with practical ways to implement standards-based cybersecurity solutions that are modular, repeatable and scalable

GOAL 2

INCREASE RATE OF ADOPTION

Enable companies to rapidly deploy commercially available cybersecurity technologies by reducing technological, educational and economic barriers to adoption

GOAL 3

ACCELERATE INNOVATION

Empower innovators to creatively address businesses' most pressing cybersecurity challenges in a state-of-the-art, collaborative environment

The NCCoE seeks problems that are:

- Broadly applicable across much of a sector, or across sectors
- Addressable through one or more reference designs built in our labs
- Complex enough that our reference designs will need to be based on a combination of multiple commercially available technologies

Reference designs address:

- Sector-specific use cases that focus on a business-driven cybersecurity problem facing a particular sector (e.g., health care, energy, financial services)
- Technology-specific building blocks that cross sector boundaries (e.g., roots of trust in mobile devices, trusted cloud computing, software asset management, attribute based access control)

TENETS

Standards-based

Apply relevant local, national and international standards to each security implementation and account for each sector's individual needs; demonstrate reference designs for new standards

Modular

Develop reference designs with individual components that can be easily substituted with alternates that offer equivalent input-output specifications

Repeatable

Enable anyone to recreate the NCCoE builds and achieve the same results by providing a complete practice guide including a reference design, bill of materials, configuration files, relevant code, diagrams, tutorials and instructions

Commercially available

Work with the technology community to identify commercially available products that can be brought together in reference designs to address challenges identified by industry

Usable

Design usable blueprints that end users can easily and cost-effectively adopt and integrate into their businesses without disrupting day-to-day operations

Open and transparent

Use open and transparent processes to complete work, and seek and incorporate public comments on NCCoE documentation, artifacts and results