Technology Innovation Project

Project Brief

TIP 406: SEL Ambassador Project - DOE CEDS Initiative*

Context

The Ambassador project recognizes the extreme cybersecurity and operational benefits Software Defined Networking (SDN) provides to critical infrastructure control system networks in the Energy sector. The Ambassador project builds on successfully completed and commercialized products researched and developed under the previous Department of Energy, Cybersecurity for Energy Delivery Systems program (DOE CEDS).

DOE CEDS program projects called the Watchdog Project and SDN Project and will use the research findings under the DOE CEDS Chess Master Project. Based on the first-hand principle investigator engineering experience of these three CEDS projects there is a need for a solution to manage the trust, data, and resources that are passed between software applications that operate in the SD-Infrastructure eco-system

Description

The Ambassador project will develop a software architecture that manages the trust, data, and resource allocations safely and securely between software applications from multiple suppliers that all operate on the same SD-Infrastructure. This software architecture will be demonstrated and tested in a controlled power system environment. The software to be developed will focus on maintaining the security of the data, change management, and user attribution at a minimum. Security requirements and priorities will be driven by the system owner participants. The software will also include the resource management required with event driven operations so different software applications don't interfere with other applications or contradict each other.

In total four new products are intended to be developed and released within existing, Commercial, Off-the-Shelf (COTS) applications that improve the cybersecurity for the Energy sector.

1. The Juniper software application enhancements will focus on circuit provisioning and telemetry monitoring.
2. The Dragos software application enhancements will focus on intrusion detection and incident response with the capability to integrate automated active defense.
3. The SEL software enhancements will focus on self-configuration of substation networks based on the IEC61850 substation configuration description file.
4. An event bus software program that will establish trust and information management between the applications is intended to be researched and developed collectively by the participants

Why It Matters

The Ambassador project leverages the successfully completed and commercialized products researched and developed under the previous DOE CEDS program projects called the Watchdog Project and the SDN Project and uses the research findings under the DOE CEDS Chess Master Project.

At the end of the project, there will be a commercial release of software that manages the safe, secure and reliable operation of a multi-application software eco-system all operating on the same SD-Infrastructure.

Goals and Objectives

The objective of the this project is to research, design, and test a solution to reliably manage the interoperability, trust, and resource and data management between software applications running in a software-defined system and proving it in demonstrations and commercialization from multiple vendors.

Deliverables

In addition to the reports specified in the "Federal Assistance Reporting Checklist", the project team will provide the following deliverables associated with each project task:

Task 1.0 - Project Management and Planning
– Project Management Plan
– Data Management Plan
– Any NEPA Required documentation

Task 2.0 Research and Development
– Topical report on lessons learned and end user interview use cases captured. This report will also include the open-source protocols and standards that will be followed to achieve interoperable communications and a roadmap to multivendor interoperability.
– Whitepaper on industry benefits and research findings
– Topical report on system functionality and specifications
– Topical report on commercial development and release of the three applications and resource and trust management software framework
– Whitepaper on the test plan and the correlating test results

Task 3.0 Commercialization Plan:
- Topical report on commercialization plan for all three software applications and trust management and resource management software framework.
- Final published technical documentations which may include datasheets and instruction manuals.

Task 4.0 Field Test Demonstration
- Test Plan: based on the use cases and end user requirements identified. This test plan will be used in the supplier's validation testing and in the end user network lab to confirm goals and objectives of the combined technology was achieved.

- Test Execution: execute the suppliers' and end users' validation system testing as outlined in the test plan and capture all test results that confirm or alter the expected industry benefits.
- Results Publication: a final whitepaper publishing the results of the demonstration and validation testing.

Final Project Briefing
- The project team will prepare and present a Final Project Briefing on the results and accomplishments of the entire project.

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Project Start Date: October 1, 2018

Project End Date: September 30, 2021

Related Projects

TIP 374: Phase 2: Integrate Self-Monitoring Features of Substation Protection and Control System equipment by enhancing GOOSE I/O Monitoring and Using the sampled values protocol IEC 61850 standard

TIP 315: Develop Self-Monitoring Substation Protection and Control System

Participating Organizations

Schweitzer Engineering Laboratory (SEL), Pullman, WA
Dragos, Hanover, MD
Juniper Networks, Sunnyvale, CA

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* Cybersecurity for Energy Delivery Systems (CEDS)

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