PKI Primer

• A system for the creation, storage and distribution of digital certificates which are used to verify that a particular public key belongs to a certain entity

• The PKI creates digital certificates which map public keys to entities, securely stores these certificates in a central repository and revokes them if needed

• Used for mutual authentication of DER resources
How Public Key Exchange Works

1. Requests Protected Resource
2. Presents Server Certificate
3. Verifies Server Certificate
4. Presents Client Certificate
5. Verifies Client Certificate
6. Accesses Protected Resource
PKI Trust Chain

Root (offline)

Sub-CA (online/offline)

Secure Element & Device Certificate
SunSpec PKI Motivation

• Enable DER industry to meet state and federal cybersecurity requirements

• California Rule 21
  • IEEE 2030.5-2018

• IEEE 1547-2018
  • IEEE 2030.5-2018
  • IEEE 1815
  • SunSpec Modbus
Current SunSpec PKI Environment

- SunSpec is providing a production PKI for IEEE 2030.5 communications
- IEEE 2030.5 specifies TLS 1.2 as the basis for secure communication
- California Rule 21 specifies IEEE 2030.5 as the default protocol for communicating with utilities
- The Common Smart Inverter Profile (CSIP) specifies the details of IEEE 2030.5 communications in California Rule 21
SunSpec PKI for IEEE 2030.5/CSIP Characteristics

- Only for DER at present
- Manufacturers central to trust chain
- Device expiration policy defined by standard
Features

• SunSpec production PKI provides the mechanism for communication security in the production environment

• SunSpec test PKI provides a parallel system that mirrors the production PKI functionality for testing purposes
SunSpec PKI Resources

SunSpec Public Key Infrastructure (PKI)

The SunSpec Certified Public Key Infrastructure (PKI) program is designed to increase stakeholder confidence in Distributed Energy Resource (DER) communication solutions, including those enabling interoperability of smart inverters, smart PV modules, EV charging, and energy storage.

Public Key Infrastructure is the preferred method of authentication for networked ecosystems due to its strength and scalability. In addition, advances in the hardware and semiconductor industries have allowed for strong authentication using Elliptic Curve Cryptography (ECC) and PKI to be implemented in small devices very economically.

Download Test PKI Application Note  Request Test PKI Certificate Package

SunSpec Test PKI Certificates

Application Note

Generate SunSpec Test PKI Certificate

- Key
- Company
- First Name
- Last Name
- Email
- Certificate Type
- Model OID
- Serial Number
- Count

Get Certificate Package
SunSpec Open Source Reference Test Platform

• Advanced inverter and storage
• SunSpec Modbus
• IEEE 2030.5*

* Available Q3 2019
SunSpec Certified Testing Laboratories

Open to all qualified testing institutions
Going To Market With SunSpec PKI

Join SunSpec

Access SunSpec Certification and PKI Production Development Kit

Get Test PKI Certificates

Test Product at SunSpec Authorized Test Laboratory

Get SunSpec Certified

Get Production PKI Certificates with Kyrio

Ship CA Rule 21 Compliant Products
Look for the SunSpec Certified™ Mark
Join the SunSpec Test PKI Network

- Free test PKI certificates available

- Enables access to SunSpec certification and interoperability testing

- Allows testing with any equipment or test framework using the SunSpec test PKI

- Go to https://sunspec.org/sunspec-public-key-infrastructure-pki-program/ to get the application note and request test certificates
Upcoming Public Cybersecurity Sessions

Register June for 12 2019 Webinar
https://sunspec.org/webinar-three-implement-strong-cybersecurity-pki-distributed-energy-resource-industry/
Opportunities to Learn & Contribute In Cybersecurity

Register Now for July 2 2019 Course
https://extension.ucsd.edu/courses-and-programs/secure-communication-networking-for-distributed-energy-resources

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