Derived PIV Credential – A Proof of Concept Implementation

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National Cybersecurity Center of Excellence (NCCoE)

- Established in 2012.
- Part of NIST Information Technology Lab.
- Work with business sectors to define cybersecurity challenges.
- Identify applicable cybersecurity standards, guidelines, and recommended practices.
- Partners with industry to develop cybersecurity solutions using commercial technology.

NCCoE 'Use Cases' and 'Building Blocks'

- A Use Case attempts to solve a business sector specific challenge.
  - e.g. Health Care, Energy, U.S. Government.

- A Building Block attempts to develop a very specific scoped solution applicable across multiple business sectors.
  - Investigate the Derived PIV Credential building block by identifying the requirements and necessary components to build a solution.
  - Identify partners and commercial IT products to support the proof of concept implementation

Problem to Solve

- Enable the use of a Personal Identity Verification (PIV) Credential on a device whose form factor does not support the use of smart cards for mobile devices.
- Leverage existing PKI infrastructure and PIV cards.

Example Use Case Scenario

- Provide logical access to remote resources hosted within an on-premises data center or in a public cloud.
- Sign and encrypt email on the device.

Usage Scenario #1

- Organization provisions PIV cards internally using a card management system (CMS) and internal PKI.
  - Capable of supporting the issuance, maintenance, use, and termination of derived PIV X.509-based credentials
- Deploying modern client devices.
  - No - smart card reader
  - Yes – embeded hardware or software token

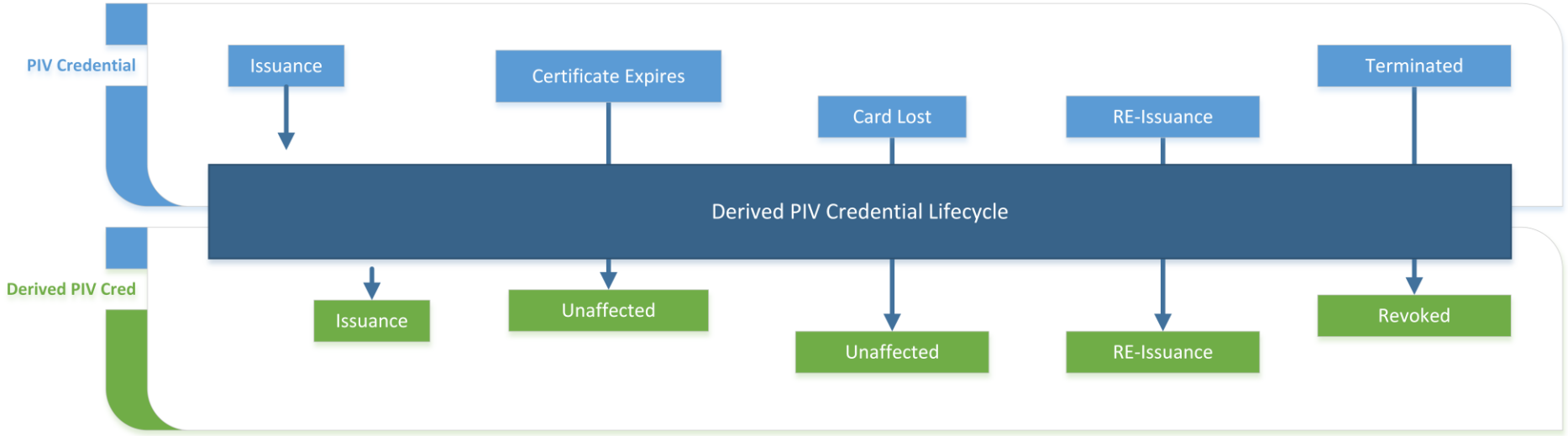
Usage Scenario #2

- Organization wants to leverage shared provider-provisioned PIV credentials.
  - Generate derived PIV Credential internally.
  - Local CMS and PKI will support issuance, maintenance, use and termination of DPC
- Deploying modern client devices.
  - No - smart card reader
  - Yes – embedded hardware or software token

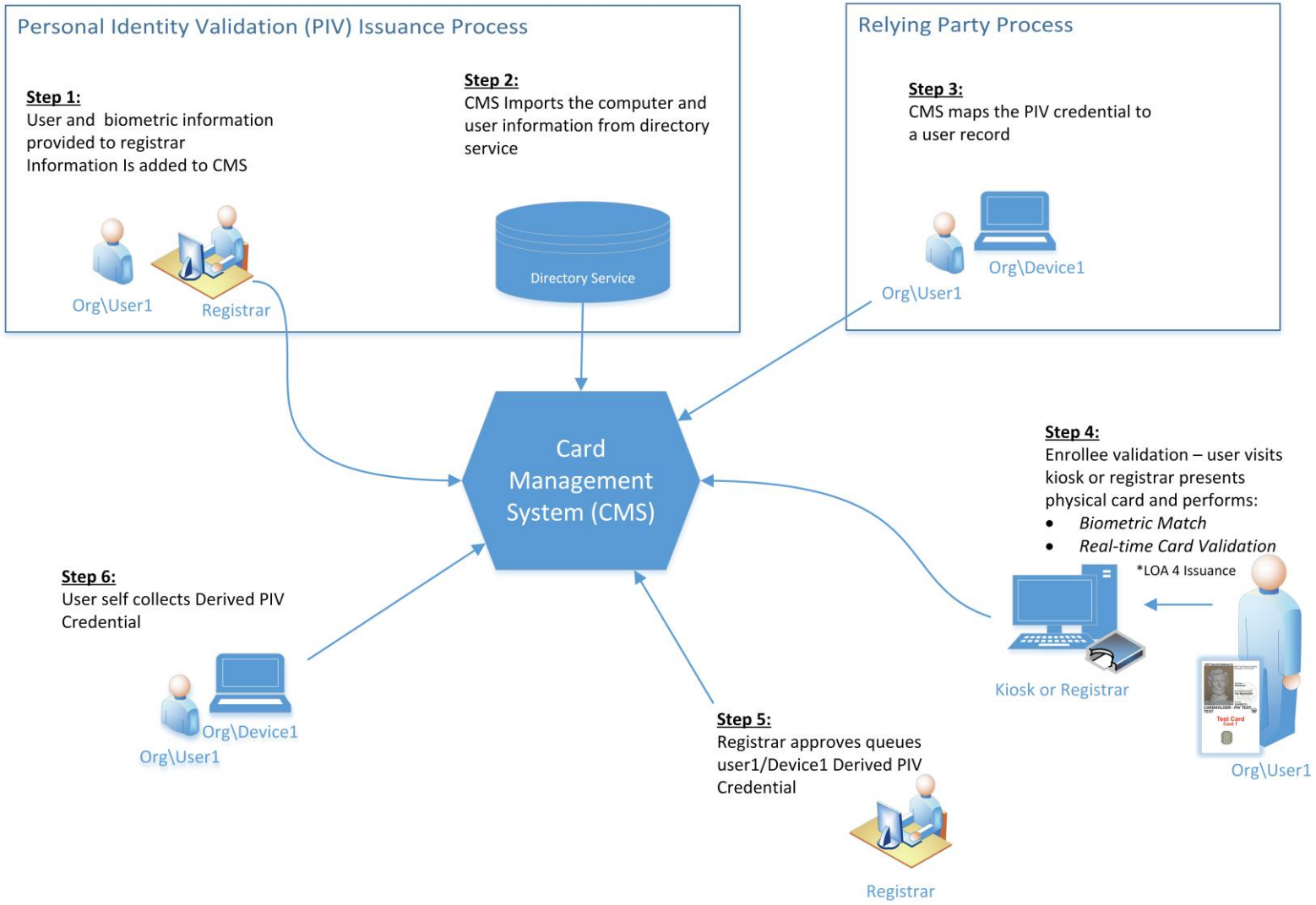
General Characteristics

- Private cryptographic key stored in hardware or software cryptographic module.
- Easily inserted into mobile device e.g. Micro SD, USB token, and embedded cryptographic module existing on the mobile device.
- The ability to issue credentials of SP 800-63 Level of Assurance 3 and Level of Assurance 4.
- Leverages identity proofing and vetting results of PIV credential.
- Enrollee's proof of possession of a valid PIV Card to receive a Derived PIV Credential.
- The derived credential certificate must be an x509 public key certificate meeting the requirements of the Federal PKI Common Policy Framework.

Derived PIV Lifecycle



Workflow


Personal Identity Validation (PIV) Issuance Process
Step 1:
User and biometric information provided to registrar
Information Is added to CMS
Org\User1
Registrar
Step 2:
CMS Imports the computer and user information from directory service
Directory Service
Relying Party Process
Step 3:
CMS maps the PIV credential to a user record
Org\User1
Org\Device1
Card Management System (CMS)
Step 4:
Enrollee validation – user visits kiosk or registrar presents physical card and performs:
Biometric Match
Real-time Card Validation
*LOA 4 Issuance
Kiosk or Registrar
Org\User1
Step 5:
Registrar approves queues user1/Device1 Derived PIV Credential
Registrar
Step 6:
User self collects Derived PIV Credential
Org\Device1
Org\User1

Implementation Challenges

- Technical and procedural requirements for the assertion of e-authentication LOA of the derived PIV credential.
- Enrollment and issuance processes to varying crypto container technologies.
- Credential Lifecycle management
  - i.e. PIN unlock process
  - PIV card event triggering
- Need process to inform internal CMS about changes to enrollee PIV card

Next Steps

- Release the building block description for public comments
- Identify industry partners
- Develop and implement the proof of concept implementation

References

- NIST DRAFT SP 800-157 Guidelines for Derived Personal Identity Verification (PIV) Credentials
- NIST SP 800-63-2 Electronic Authentication Guideline

Thank You!

- Questions?