An Overview of Draft SP 800-157 Derived PIV Credentials and Draft NISTIR 7981 Mobile, PIV, and Authentication

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Draft SP 800-157 – Derived PIV Credential for Mobile Devices

Scope:

– The Derived PIV Credential is an additional PIV Credential to satisfy HSPD-12’s ‘Common Identification’ mandate
Draft SP 800-157:
Addressing a **Gap** for Remote Authentication with Mobile

<table>
<thead>
<tr>
<th>PIV Assurance Level Required by Application/Resource</th>
<th>PACS</th>
<th>LACS Local Workstation Environment</th>
<th>LACS Remote/Network System Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>LITTLE or NO confidence</td>
<td>VIS, CHUID</td>
<td>CHUID*</td>
<td></td>
</tr>
<tr>
<td>SOME confidence</td>
<td>PKI-CAK, SYM-CAK</td>
<td>PKI-CAK</td>
<td>PKI-CAK, PKI-Derived</td>
</tr>
<tr>
<td>HIGH confidence</td>
<td>BIO</td>
<td>BIO</td>
<td>PKI-Derived</td>
</tr>
<tr>
<td>VERY HIGH confidence</td>
<td>BIO-A, OCC-AUTH, PKI-AUTH</td>
<td>BIO-A, OCC-AUTH, PKI-AUTH</td>
<td>PKI-AUTH, PKI-Derived</td>
</tr>
</tbody>
</table>

**Yellow** font indicates the environments for the **PIV Card** Credentials and their authentication mechanisms.

**Red** indicates the environments where the new Derived PIV credential’s “**PKI Derived**” authentication mechanism for Mobile Devices applies.
Motivation:

- PIV Cards have been geared towards traditional computing platforms (laptop, desktop)
- For newer computing devices (mobile devices), the use of the PIV Card for e-authentication is challenging and requires bulky add-on readers

Goal: To provide alternative approaches to PIV-enabled e-authentication with mobile device - without PIV Card and add-on readers.
Goal (continued):

• While leveraging the PIV Infrastructure for:
  – Interoperability: Take advantage of the same PKI infrastructure
  – Cost-savings: Leverage the trust and identity-proofing performed for 5 million issued PIV cards via SP 800-63 concept of credential derivation
Mobile devices and their capabilities vary by:

- Mobile device manufacturers, platforms, ports, Mobile Network Operators and have capabilities that are often different in focus (e.g., tablet vs smart phone).

- One technical approach is not sufficient to cover the various mobile devices deployed by USG.

- Draft SP 800-157 is flexible and offers a spectrum of approaches to electronic authentication on mobile devices.
Draft SP 800-157 – Derived PIV Credential for Mobile Devices

Integrated Security Tokens for Mobile Devices:
- Mobile Device Software tokens (current)
- MicroSD tokens (current)
- USB security tokens (near term)
- UICC tokens (near term)
- Embedded Hardware (near term)

Benefits:
- Derived PIV Credential - leverages identity proofing and vetting processes of PIV cardholder
- It’s integrated -> better user experience

Considerations:
- Provisioning and management of mobile device specific credential
- Limited mobile OS and application support (MicroSD, USB, UICC)
Draft SP 800-157 – Derived PIV Credential for Mobile Devices

SP 800-157 defines a Derived PIV Credentials for the Security Tokens:

- Define the Derived PIV Credential (a PKI-based credential)
- Both LoA-3 (software) and LoA-4 (hardware) Derived PIV Credential are possible
- Key size and algorithm options are the same as for the PIV Authentication private key
- Defines Derived PIV Credential Lifecycles: Derivation, Issuance, Maintenance (re-key/re-issuance) and Termination

Draft SP 800-157 also includes:

- How to include an optional Digital Signature Key and the Encryption Key in the Derived PIV Credential’s security token (Appendix A)
Draft SP 800-157 – Derived PIV Credential for Mobile Devices – Lifecycle Processes

Derivation & Initial issuance:
- Derivation of Derived PIV Credential is based on proof of possession of the PIV card
- Issuance of a LoA-4 credential is in person, while issuance of an LoA-3 allows for remote issuance

Maintenance (rekey and re-issuance):
- Remote rekey to a LoA-3 Derived PIV Credential token
- Remote rekey to a LoA-4 Derived PIV Credential token when rekeying to the same token
- Issuance of a Derived PIV Credential to a new (replacement) token can be done remotely for LoA-3 credential and in-person for an LoA-4 credential
- Derived PIV Credential is unaffected by loss, theft or damage to the Subscriber’s PIV Card.

Termination:
- The subscriber is no longer eligible for a PIV Card or is no longer in need of a Derived PIV Credentials
- If token can be collected, then zeroize the private key or destroying the token. Otherwise, revoke the PIV Derived Authentication certificate.
## Derived PIV Credential for Mobile Devices

### Appendix C -- Derived PIV Credentials in Relation to OMB Memoranda

<table>
<thead>
<tr>
<th>Credential Type</th>
<th>Token Type</th>
<th>PIV Assurance Level</th>
<th>Comparable OMB E-Auth Level</th>
<th>Target Guidance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIV Derived Authentication certificate</td>
<td>MicroSD Token</td>
<td>Very High</td>
<td>4</td>
<td>M-06-16/M-07-16 for Separate Tokens</td>
</tr>
<tr>
<td></td>
<td>USB Security Token</td>
<td>Very High</td>
<td>4</td>
<td>Future Alternate OMB Guidance for Integrated Tokens</td>
</tr>
<tr>
<td></td>
<td>Software Token</td>
<td>High</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Embedded Hardware Token</td>
<td>Very High</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UICC Token</td>
<td>Very High</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PIV Card’s PIV Authentication certificate</td>
<td>PIV Card (via attached reader or NFC)</td>
<td>Very High</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

With integrated tokens, authentication factors are not provided by a separate token.

“Future guidance will be made available by OMB to provide an alternative to the remote authentication policy in M-06-16 and M-07-16.”
Draft NIST IR 7981
Mobile, PIV, and Authentication
A Companion Document to Draft SP 800-157

- Analyzes different approaches to PIV-enable mobile devices
  - Includes the use of PIV Cards with mobile devices in addition to Derived PIV Credentials
- Points out benefits and considerations (pros/cons) for each approach
  - Example: UICC approach requires cooperation with MNO
- Approximates when these approach might become available
  - Categorized approaches in ‘current’ and ‘near term’ solutions
- Includes Recommendations
  - Hardware rooted solutions provide better security
  - Software solution are available now – NIST IR 7981 recommends complementing these by hardware-backed mechanism to protect the private key of the Derived PIV Credential when not in use (the hybrid solution)
  – In the longer-term, NIST IR recommends adoption of hardware-supported security mechanisms in mobile devices, such as the Roots of Trust (SP 800-164) to support stronger assurance of identity
What’s Next?

• Resolve public comments and produce final SP 800-157 and final NIST IR 7981

• Draft SP 800-166 Derived PIV Credential Test Requirements for
  - Derived PIV Credential Data Model and Interface and
  - Portability: Removable security tokens ((USB, microSD, UICC) should be portable from one device to another.

• Test Tool based on SP 800-166

• Setup Laboratory Accreditation program for vendor product testing

• SP 800-79-2 Guidelines for the Accreditation of PIV Card Issuers and Derived PIV Credential Issuers (under development)
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Thank you!

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- FICAM Logical Access Working Group (LAWG)
- Federal Chief Information Officer (CIO) Council
- Office of Management and Budget (OMB)

Commenters:
Questions?

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