Overview of
FIPS 201 Revision 3

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Technology Administration, U.S. Department of Commerce
Overview

- Status Quo- The current Standard (R2)
- Where we’ll headed: Priority Change Requests
- PIV Authenticators and Federation
- In Closing
“There are wide variations in the quality and security of identification used to gain access to secure facilities where there is potential for terrorist attacks. In order to eliminate these variations, U.S. policy is to enhance security, increase Government efficiency, reduce identity fraud, and protect personal privacy by establishing a mandatory, Government-wide standard for secure and reliable forms of identification issued by the Federal Government to its employees and contractors (including contractor employees).”

Homeland Security Presidential Directive-12
August 27, 2004
Where We Are:

Status Quo: Revision 2 of FIPS 201

• **Addition of Derived PIV Credentials** – as an optional authenticator for platforms that do not support smartcards (currently restricted in SP 800-157 to mobile devices)
• **Virtual Contact Interface** – secure communication for wireless authentication
• **Biometrics:**
  – addition of **iris** as an option for enrollment/binding to enrollment record
  – Made **facial image template** mandatory as an on-card biometric – can be used at enrollment/re-issuance
  – Option for match on card fingerprint authentication

• Green text indicate that the R2 revision items play a role in R3
Where We Are:

Status Quo: FIPS 201 Revision 2

- Deprecated the **CHUID authentication mechanism** and indicated its removal from a future FIPS
- Made **PKI-CAK** cryptographic key mandatory for PIV Cards, intended use for 1 factor wireless authentication and as one of the replacement of the CHUID authentication mechanic

- Signature and encryption Key became mandatory

- Green items indicate that the R2 revision item plays a role in R3.
Change Requests
Where We Are Headed:
Change Requests for FIPS 201 Revision 3

• Addition of other Form Factors not just smartcards because...
  – Some platforms do not support smartcards

• Additional non-PKI Derived PIV Credentials (Authenticators) because...
  – We use alternatives, especially where smartcards are not supported

• Federation
  – shifting interagency interoperability requirements of HSPD-12 to federation
(continued) Change Requests for R3

- **Identity Proofing in General**
  - The FIPS 201/SP 800-63 alignment
    - Identity Source Documents
  - Remote supervised identity proofing
    - Supervised remotely – is local attendant needed?
PIV and PACS

– Removal of the CHUID authentication mechanism

– Alternatives for CHUID authentication mechanism
  • desired properties: fast, wireless (touch-and-go), one-factor
  • PKI-CAK, FICAM e-PACS server-based BIO-in-PACS (mixed review), Opacity

– Deprecating VIS (flash pass - guard comparing card photo)

– Addition of Mobile Device (maybe others) for PACS?
Miscellaneous Change Requests...

• Make NACI background investigation indicator on PIV Authentication Certificate optional & deprecate in future

• Considering additional PIV Card Security Features (SF)
  – Currently requires only one SF – strongly recommend three
  – Deprecate PIV card magnetic stripe and bar code
FIPS 201-3 Update:
Derived PIV Credential

Authenticators and Federation

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Derived PIV Credential (DPC)

Authenticators
Anticipated Changes in FIPS 201-3

- Broadly allow alternative authenticators to be derived from PIV credentials
  - Specify requirements in new Special Publication
  - AAL2 and AAL3
  - Rely on SP 800-63B as the basis for security requirements
  - Facilitate interoperability through federation, not authenticator standards
# Authenticator Assurance Levels

<table>
<thead>
<tr>
<th></th>
<th>AAL2</th>
<th>AAL3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Types</strong></td>
<td>Combinations providing multifactor authentication: OTP, Out-of-Band, Look-up Secrets, software crypto</td>
<td>Hardware cryptographic authenticators (multifactor authenticators or combinations)</td>
</tr>
<tr>
<td><strong>Examples</strong></td>
<td>Passwords with: • Push notifications, • OTP/SecureID • FIDO U2F Software-based Derived PIV</td>
<td>PIV cards* Hardware-based Derived PIV* FIDO with Token Binding + password</td>
</tr>
<tr>
<td><strong>MitM Resist.</strong></td>
<td><strong>Required</strong></td>
<td><strong>Required</strong></td>
</tr>
<tr>
<td><strong>Verifier</strong></td>
<td>Not Required</td>
<td><strong>Required</strong></td>
</tr>
<tr>
<td>Impersonation Resist.</td>
<td></td>
<td><strong>Required</strong></td>
</tr>
<tr>
<td><strong>Verifier</strong></td>
<td>Not Required</td>
<td><strong>Required</strong></td>
</tr>
<tr>
<td>Compromise Resist.</td>
<td></td>
<td><strong>Required</strong></td>
</tr>
<tr>
<td><strong>Auth. Intent</strong></td>
<td>Recommended</td>
<td><strong>Required</strong></td>
</tr>
</tbody>
</table>

FIPS 201-3 Update
Authenticator Interoperability

• **Objectives**
  – Support interagency reuse and acceptance
  – Facilitate technical interoperability with applications

• Many non-PKI authenticators are for use with a single CSP/Verifier
  – Limits need for authenticator-based interoperability

• **Shift interoperability focus to federation**
  – Provides abstraction layer to support multiple authenticators
  – Can simplify authenticator management

• WebAuthn/FIDO
  – FIDO/WebAuthn guidance could promote security, facilitate compatibility between gov’t servers and industry authenticators
Authenticator Challenges: The Link to PIV Cards

- PIV Card and DPC authenticator are tightly linked.
  - Authenticators need to be terminated if eligibility to hold a PIV Card ends/is terminated
  - Requires links to PIV Card issuer
    - Easier to maintain if issuer of DPC authenticator and PIV Card is the home agency (the same issuer) – IDMS maintains it.
    - Hard to maintain/communicate if DPC authenticator and PIV Card issuer are different
  
- NIST to restrict issuance of Derived PIV Credential (authenticators) to home agency to facilitates termination of authenticators
Federation
Anticipated Changes in FIPS 201-3

- Encourage federation to facilitate interoperability and flexibility
  - Specify requirements in new Special Publication
  - Rely on SP 800-63C as the basis for security requirements at FAL1-3.
  - Identify/develop profiles of common federation protocols
  - Develop guidelines for IdPs/CSPs
What is federation?

A process that allows the conveyance of identity and authentication information across a set of networked systems.

- NIST SP 800-63-3
Why federate?

- Abstraction layer for authenticators
- Attribute disclosure
- Timeliness of assertions/attributes
- Cross-boundary acceptance and use
- Relying Party maintains control of sessions
Abstraction layer across authenticators
Can cross boundaries
Can work internally

Diagram showing the interactions between a subscriber, an identity provider (IdP), and resource providers (RPs) within Agency A. The diagram illustrates primary authentication, redirects, and session management flows.
## Federation Assurance Level (FAL)

<table>
<thead>
<tr>
<th>Assertion type</th>
<th>FAL1</th>
<th>FAL2</th>
<th>FAL3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscriber attributes</td>
<td>Yes (if backchannel)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Examples</td>
<td>OIDC SAML artifact binding</td>
<td>OIDC with encrypted ID token SAML with encrypted assertion</td>
<td>OIDC or SAML plus secondary key-based authenticator (certificate, FIDO, etc)</td>
</tr>
</tbody>
</table>

- **FAL1 is good for most use cases**
  - Requires signatures, audience restriction, replay protection, etc.
  - Especially when subscriber attributes are sent in the backchannel, separate from the assertion

- **FAL3 requires token binding and/or client authenticated TLS**
Federation protocols

• OpenID Connect (OIDC)
  – Supports browser and mobile
  – iGov profile from OIDF

• Security Assertion Markup Language (SAML)
  – Profile available for browsers
  – eGov profile from Kantara
In Closing
• No major re-write of FIPS expected. Focus should be in amending/adding high level context/requirements in the major topic area (change requests)

• Major effort should concentrate on technical updates to NIST Special Publications for the major topic areas, while shepherding FIPS 201 through the revision fairly quickly.
  – SP development/edits will follow FIPS development
FIPS 201 Overall Process

• Top Down Approach
  – HSPD-12 -> FIPS 201 -> SPs

• FIPS specifies high level processes and requirements to satisfy HSPD-12
  – Supporting Special Publications (SP) detail the technical ‘how-to’
FIPS 201 Overall Process

Standards

- PIV Card Specification
  - SP 800-73-4
- Cryptographic Specification
  - SP 800-78-4
- Biometric Specification
  - SP 800-76-2
- Issuer Accreditation
  - SP 800-79-2
- Facility Access
  - SP 800-116
- PIV Reader Specs
  - SP 800-96
- Chain of Trust
  - SP 800-156
- PIV Digital Signature
  - Key PIN policy
  - NISTIR 7863
- Mobile Device: Derived PIV Credentials
  - SP 800-157

- PIV Card Interface/Functional Test Requirements
  - SP 800-85A-4
- PIV Card Data Model Test Requirements
  - SP 800-85B-2

- Mobile Device: PIV Credentials Test Requirements
  - SP 800-166

NIST Validation Program

HSPD 12

FIPS 201 (Secretary of Commerce)
<table>
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<tr>
<th>Project Milestone</th>
<th>Date</th>
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<tbody>
<tr>
<td>Government-only Business Requirements Meeting</td>
<td>March 2019</td>
</tr>
<tr>
<td>Draft updates to FIPS 201 materials</td>
<td>~November 2019</td>
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<tr>
<td>Workshop</td>
<td>~December 2019</td>
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<tr>
<td>2nd Draft package (if needed)</td>
<td>April 2020</td>
</tr>
<tr>
<td>2nd Draft Workshop (if needed)</td>
<td>May 2020</td>
</tr>
<tr>
<td>Final Package</td>
<td>August 2020</td>
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<tr>
<td>Associated Special Publication update/create complete</td>
<td>May 2021</td>
</tr>
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HSPD-12 Steering Committee

- OMB
- GSA
- DoD
- DHS
- DoJ

- Participants by invitation depending on the topic of discussion

Committee:

- Consists of representatives from federal department/agencies with a role specified in HSPD-12.
- Gives high level directions/goals on the revision within the scope of HSPD-12.
- On-going meeting as needed as direction adjust based on business requirement meeting / comments received.
- Review/Agree on Draft and Finals to be published
Questions?

Contact Information

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