hspd12

Personal Identity Verification Interoperability

For

Non-Federal Issuers

Version 1.1

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Executive Summary

As the Personal Identity Verification (PIV) initiative progresses, it is garnering a great deal of interest from parties external to the Federal government. These non-federal organizations want to issue identity cards that are (a) technically interoperable with Federal government PIV systems, and (b) issued in a manner that allows Federal government relying parties to trust the cards. Furthermore, such interoperability and trust may be driven by operational imperatives of great interest to the Federal government (e.g. First Responder Authentication Card (FRAC)). However, the PIV card standard, Federal Information Processing Standards (FIPS) 201, is limited in scope to the Federal government and has several requirements that can be addressed only by the Federal government community. Therefore, some guidance is needed to assist non-federal issuers of identity cards in achieving interoperability with Federal government PIV systems. This document provides that guidance.

This document advocates a set of minimum requirements for non-federally issued identity cards that can be trusted by the Federal government, and details solutions to the four barriers to interoperability that currently preclude Federal government trust of non-federally issued identity cards. These four barriers are as follows:

1. **Common terminology for identity cards** – in order to ensure consistency, a lexicon for differentiating a Federal government PIV card from a non-federally issued identity card seeking PIV system interoperability must be developed;
2. **Technical requirements** – for non-federally issued identity cards to interact with federal infrastructure, basic technological requirements must be met;
3. **Identifier namespace** – effective use of identity cards requires an identifier that is unique across all identity cards. Lack of a unique identifier may result in incorrect access control decisions; and
4. **Trusted identity** – the fundamental purpose of an identity card is to establish the identity of the card holder. Therefore, an identity card must be issued in a manner that provides Federal government relying parties with a requisite level of trust.

Federal agency trust of non-federally issued identity cards is not mandated. Instead, a set of minimum requirements for enabling trust is provided. Using appropriate mechanisms (e.g., risk assessment), each federal agency decides for itself which, if any, non-federally issued identity cards to trust – and if so, for what purposes.

For additional information concerning this document, please contact icamsc@gsa.gov.

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1. INTRODUCTION

1.1 Background

Non-federal issuers (NFIs) of identity cards have expressed a desire to produce identity cards that can technically interoperate with Federal government Personal Identity Verification (PIV) systems and can be trusted by Federal government relying parties.

Several federally sponsored programs in this regard already exist and use NFIs. The programs include First Responder Authentication Credential (FRAC), Transportation Worker Identity Credential (TWIC), and Airport Credential Interoperability Solution (ACIS). Many other programs are in development with the same desired goal of being technically interoperable and trustworthy in the Federal government PIV environment.

1.2 Scope

This document is limited to describing NFI identity cards that can be interoperable with the Federal government PIV systems and can be trusted by Federal government relying parties.

1.3 Document Objectives

This document provides solutions for overcoming the barriers to federal reliance on non-federal identity cards. Four specific areas of concern have been identified:

1. **Common terminology for identity cards** – in order to ensure consistency, a lexicon for differentiating a Federal government PIV card from a non-federally issued identity card seeking PIV system interoperability must be developed;
2. **Technical requirements** – for non-federally issued identity cards to interact with federal infrastructure, basic technological requirements must be met;
3. **Identifier namespace** – effective use of identity cards requires an identifier that is unique across all identity cards. Lack of a unique identifier may result in incorrect access control decisions; and
4. **Trusted identity** – the fundamental purpose of an identity card is to establish the identity of the card holder. Therefore, an identity card must be issued in a manner that provides Federal government relying parties with a requisite level of trust.

For each of these, a minimum set of requirements has been described that will allow NFI identity cards to technically interoperate with Federal government PIV systems and be trusted by Federal government relying parties.

2. MINIMUM NFI CARD REQUIREMENTS

Federal government reliance (trust) on NFI identity cards requires the card to technically comply with PIV specifications so as to technically interoperate with Federal government PIV systems, and to have specific trust elements. The Federal Bridge Certification Authority (FBCA) certifies NFIs for use by Federal relying parties. The FBCA Certificate Policy (CP) contains the detailed requirements that those NFIs must meet.

The following sub-sections summarize those requirements.

2.1 Common Terminology for Identity Cards

In order to ensure consistency, a lexicon for differentiating a Federal government PIV card from a non-federally issued identity card seeking PIV system interoperability must be developed. A major issue in the identity card space is the lack of standard terminology to unambiguously distinguish between characteristics (e.g., trust characteristics) of federally issued and NFI identity cards. The result can be confusion, uncertainty, or misunderstanding regarding the capabilities and trustworthiness an identity card encompasses – particularly an NFI identity card. Attaining clarification after the fact can be costly in many ways (e.g., investing and implementing with an incorrect understanding likely requires rework or abandonment). PIV standards clearly define the federally issued PIV Card. However, the definition of different NFI identity cards, especially regarding their relationship to PIV remains problematic. This document resolves the terminology problem by proposing a more complete set of identity card terms that unambiguously describes federal and NFI identity cards in terms of critical characteristics affecting the degree of federal relying party trust. The proposed terms are:

> 💡 *A PIV Interoperable Card builds upon a PIV Compatible Card. An NFI must procure a PIV Compatible Card and issue it in a trustworthy manner. NFI PIV Compatible Cards and NFI PIV Interoperable Cards are not PIV Cards because NFIs and their identity cards cannot directly meet certain Federal government PIV requirements.*

- **PIV Card** – an identity card that is fully conformant with federal PIV standards (i.e., Federal Information Processing Standard (FIPS) 201 and related documentation). Only cards issued by federal entities can be fully conformant. Federal standards ensure that PIV Cards are interoperable with and trusted by all Federal government relying parties.

- **PIV Interoperable Card** – an identity card that meets the PIV technical specifications to work with PIV infrastructure elements such as card readers, and is issued in a manner that allows Federal government relying parties to trust the card.

- **PIV Compatible Card** – an identity card that meets the PIV technical specifications so that PIV infrastructure elements such as card readers are capable of working with the card, but the card itself has not necessarily been issued in a manner that assures it is trustworthy by Federal government relying parties.

2.1.1 Assumptions

The following assumptions apply:

1. Each Federal government relying party determines the extent to which it will trust PIV Interoperable Cards within its areas of control;
2. Cardholder privileges in any particular situation are determined solely by the Federal government relying party (i.e., PIV Interoperable Cards do not guarantee access of any kind, nor do they prevent issuance of a PIV Card); and
3. Each Federal government relying party makes access decisions based on the ability to verify the validity of the PIV Interoperable Card and on local access policy for external organizations.

2.1.2 Requirements

The following requirements apply to NFIs:

1. NFI PIV Compatible Cards and NFI PIV Interoperable Cards will use a smart card platform that is technically compatible with National Institute of Standards and Technology (NIST) technical requirements outlined in Section 2.2 of this document;
2. Consistent with the policy directives in Office of Management and Budget (OMB) memorandum M-05-24, NFI PIV Compatible Cards and NFI PIV Interoperable Cards should contain distinctive markings indicating the identity of the issuing entity; and
3. NFI PIV Interoperable Cards are electronically personalized, as defined by FBCA CP Appendix A and supporting documents. This includes but is not limited to:
    a. NFI PIV Interoperable Cards will include an Authentication Digital Public Key Infrastructure (PKI) certificate that meets a minimum set of criteria identified in Section 2.4 of this document.
    b. NFI PIV Interoperable Cards will include biometric fingerprint information that conforms to NIST Special Publication (SP) 800-76.

2.2   Technical Requirements

For non-federally issued identity cards to interact with federal infrastructure, basic technological requirements must be met. NFI identity cards must conform to the NIST technical specifications for a PIV Card as defined in NIST SP 800-73 and meet the cryptographic requirements of FIPS 140 and NIST SP 800-78. In order to ensure this conformance, NFIs should refer to the General Services Administration (GSA) Approved Products List (APL) available at www.idmanagement.gov. See Appendix A for additional technical information.

2.2.1 *Required Electronic Features*

NFI PIV Interoperable Cards must be populated in accordance with NIST SP 800-73[1] and contain, at a minimum, the following:

- Biometric;
- Card Holder Unique Identifier (CHUID);
- Universally Unique Identifier (UUID);
- Authentication PKI Certificate[2] mapped to the PIV-I Hardware policy[3];
- Card Authentication Certificate mapped to the PIV-I Card Authentication policy;
- Facial Image Buffer;
- Security Object; and
- Card Capability Container.

2.2.2 *Required Physical Features*

The physical topography of NFI PIV Interoperable Cards must include, at a minimum, the following:

- Organizational Affiliation (if exists; otherwise the issuer of the card);
- Card holder facial image;
- Card holder Full Name; and
- Card Expiration Date.

NFI PIV Interoperable and Compatible Card visual distinction is required to ensure no suggestion of attempting to create a fraudulent PIV Card.

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[1] PIV Interoperable objects should conform to NIST SP 800-73, with the exception of the extensions/modifications identified in this NFI document.

[2] The Authentication PKI Certificate is functionally similar to the PIV Authentication Certificate, requiring card holder authentication (e.g., PIN) to the cryptographic module before activation of the private key.

[3] NFI certificate policies are defined in FBCA CP.

2.3   Identifier Namespace

Effective use of identity cards requires an identifier that is unique across all identity cards. Lack of a unique identifier may result in incorrect access control decisions. The PIV Card includes a Federal Agency Smart Credential - Number (FASC-N) to uniquely identify it, and thus avoid identifier namespace collisions. When managed and distributed within a closed system (the U.S. Government), uniqueness is ensured. However, the FASC-N structure does not support its use beyond the U.S. Government as it cannot be easily extended to allow sufficient identifier namespace to support a large NFI population. In addition, NFIs cannot consistently assign globally unique FASC-Ns. Consequently, there is a need to develop a Smart Card Numbering scheme comparable to the FASC-N that follows a set of guidelines that ensure uniqueness across the federal issuers and NFIs.

2.3.1   Use of the UUID by NFIs

NFIs shall include a valid RFC 4122 generated UUID in accordance with NIST SP 800-73 section 3.3 in the GUID field of the CHUID. In addition, NFIs must include the UUID in a subject-alt-name extension of the authentication certificate in accordance with PIV-I Profile to ensure UUID availability to relying parties in remote Logical Access Control System (LACS) environments.

2.3.2   Use of the FASC-N Field by NFIs

NFIs must generate and use a FASC-N conformant with NIST SP 800-73. If a Federal government relying party PACS is capable of processing NFI Interoperable Cards, only the UUID may be relied upon as a unique card identifier. Otherwise, the Federal government relying party should consider alternative risk-based solutions.

2.4 Trusted Identity

The fundamental purpose of an identity card is to establish the identity of the card holder. Therefore, an identity card must be issued in a manner that provides Federal government relying parties with a requisite level of trust. To trust any identity card, it must be possible to validate the card (i.e., not expired, not revoked) and authenticate the cardholder (i.e., the cardholder is who he or she says he or she is). The PIV Authentication Certificate is where "trust" in the PIV Card resides. However, the policy object identifier (OID) for the PIV Authentication Certificate is available only to Federal government organizations. Therefore, a comparable Identity PKI Authentication Certificate that can be trusted by Federal government relying parties is defined for use by NFIs.

In addition, trust in an identity card requires an understanding and acceptance of the process used to determine the accuracy of the claimed identity. For the Federal government PIV Card, FIPS 201 specifies identity proofing and background vetting processes. While NFIs are unable to mirror the background vetting process (e.g., the National Agency Check with Written Inquiries (NACI)) employed by the Federal government, they can and must perform identity proofing in a manner that promotes trust in the process. Accordingly, NFIs require a common identity proofing standard that is understood by and acceptable to the Federal government.

2.4.1 NFI Identity Authentication PKI Certificate

NFI PIV Interoperable Cards must include an Identity Authentication PKI Certificate issued by a Certification Authority (CA) that chains to the FBCA at the PIV-I Hardware policy via cross-certification. This will enable Federal government relying parties to verify the validity of the identity card via the Identity Authentication PKI Certificate by first verifying the issuing organization (i.e., CA cross-certified with FBCA), and then providing assurance that the certificate (and by extension, the card) has not been revoked or invalidated since issuance.

The Identity Authentication PKI Certificate in an NFI PIV Interoperable Card contains a policy OID other than the one mandated for Federal PIV Authentication use, which contributes to satisfying the electronic distinctiveness requirement for the NFI PIV Interoperable Card.

2.4.2 Ensuring Identity Validity

The Federal government's identity proofing and background vetting processes, as defined in FIPS 201, are two distinct activities.

2.4.2.1 Identity Proofing

During identity proofing, the applicant is required to appear in person and provide two forms of identity source documents in original form from the list of acceptable documents included in Form I-9, OMB No. 1115-0136, *Employment Eligibility Verification*. At least one of the documents must be a valid State or Federal government-issued picture identification (ID). This identity proofing process is commensurate with OMB Memorandum M-04-04, *E-Authentication Guidance for Federal Agencies*, Assurance Level 4, which in turn provides the common identity proofing standard for NFIs.

NIST SP 800-63 defines E-Authentication Assurance Level 4 identity proofing as:

- In-person appearance and verification of two independent ID documents or accounts, one of which must be a current primary government picture ID that contains the applicant's photograph and either their address of record or nationality (e.g. driver's license or passport), and a new recording of a biometric of the applicant at the time of application.
- The Registration Agent must inspect the primary Photo-ID and if apparently valid, compare picture to applicant, record ID number, address and date of birth (DoB). If available, a digital image of the Photo-ID shall be captured and stored.
- The Registration Agent must inspect secondary government ID or financial account, and if apparently valid, compare picture to applicant, record ID number, address and DoB, or verify financial account number supplied by applicant through record checks or through credit bureaus or similar databases, and confirm that: name, DoB, address, and other personal information in records are consistent with the application and sufficient to identify a unique individual.
- The Registration Agent records a current biometric (e.g. photograph, fingerprints) to ensure that applicant cannot repudiate application and issues cards in a manner that confirms address of record.

In addition to its role in ensuring the validity of an identity card, the PIV-I Hardware policy Identity Authentication PKI Certificate ensures that the NFI meets E-Authentication Assurance Level 4 identity proofing. As a result, Federal government relying parties can trust the asserted identity of the NFI PIV Interoperable Card holder.

2.4.2.2 Background Vetting Process

The Federal background vetting process (e.g. NACI) is performed in order to determine an individual's suitability/fitness to work for or on behalf of the Federal government and is not applicable to NFI identity cards.

For purposes of PIV interoperability, NFIs need to concern themselves only with satisfying the identity proofing requirements for E-Authentication Assurance Level 4. Where suitability/fitness is a concern for an agency, the agency may require further background checks for access (however, this is outside the scope of this document).

> *Federal government relying parties continue to be responsible for validating the Authentication PKI Certificate, authenticating cardholder identity, and managing individual cardholder roles and authorizations.*

APPENDIX A: TECHNICAL INFORMATION

This Appendix provides additional technical information in support of Section 2.2, Technical Requirements. The following table provides a comparison of the requirements for each card type.

		PIV Card	PIV Interoperable	PIV Compatible
Identity Verification	NIST SP 800-63, Assurance Level 4	●	●	
	NACI	●		
Trust	FIPS 201 Conformant	●		
	PIV OID on PIV Authentication Certificate (trust model)	●		
	FBCA PIV-I Hardware equivalent Authentication Certificate[4]	●	●	
	FBCA PIV-I Content Signing equivalent object signing certificate	●	●	
Card Edge	Card Stock on GSA APL[5]	●	●	●
	PIV Application Identifier (AID)	●	●	●
	Command edge and NIST SP 800-85 conformant[6]	●	●	●
	NIST SP 800-73 conformant GUID present in the CHUID	●	●	●
	RFC 4122 conformant UUID required in the GUID data element of the CHUID[7]		●	●
	RFC 4122 conformant UUID present in the Authentication Certificates[8]		●	●
	Visually distinguishable from PIV Card		●	●

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[4] Certificate equivalence for NFIs is established by the FBCA.

[5] Conformant form factor.

[6] Contact and contactless command edge conformant defined in NIST SP 800-73-2 part 2 requires support for specific ISO/IEC 7816 commands. Card edge and data model verified through NIST SP 800-85 test tool (further efforts are expected to address exceptions for NFIs). Card edge specifications verified through the NIST Personal Identity Verification Program (NPIVP).

[7] NIST SP 800-73 does not require the use of RFC 4122 in the generation of a valid GUID for PIV cards, but it is required for NFI PIV-I cards.

[8] The value of the UUID will be in the subjectAltName extension of the PIV Authentication Certificate and the Card Authentication Certificate.

The PIV Card provides multiple authentication mechanisms[9] including:

- **Authentication Certificate** – allows PKI-based authentication only accessible via the contact interface when the user Personal Identification Number (PIN) is provided;
- **Biometric[10]** – authentication of the cardholder's fingerprints using biometric templates on the card, including verification of the signature and signer;
- **Cardholder Unique Identifier (CHUID)** – contactless read of the CHUID object, including verification of the signature and signer; and
- **Card Authentication Key (CAK)** – provides flexible card authentication options that may be performed via the contactless interface.

Each authentication method must conform to certain PIV data model elements defined in the following NIST SPs:

- **NIST SP 800-73** – provides PIV Card technical interoperability specifications. PIV Compatible Cards and PIV Interoperable Cards must adhere to the NIST SP 800-73 data model and card edge requirements;
- **NIST SP 800-76** – provides PIV Card biometric technical guidance. PIV Interoperable Cards must capture and store biometrics on the card in accordance with NIST SP 800-76; and
- **NIST SP 800-78** – provides PIV Card technical guidance regarding digital credentials present on the PIV Card. This is where much of the trust in the identity credential will be established. PIV Interoperable Cards must ensure their digital credentials meet NIST SP 800-78 technical requirements and the requirements discussed in Section 2.3.

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[9] For more information on these methods, see FIPS 201, section 6.2.

[10] Biometric data is accessible only after providing the correct PIN and only via the contact interface.

As of the date of this document, NIST SP 800-73 defines the PIV CHUID as follows:

Data Element	Max Bytes	Description
Buffer Length	2	Optional TLV record. Exists when a TLV record in addition to the FASC-N exists in the CHUID for contact File System and contact-less smart cards.
FASC-N	25	Mandatory TLV Record. Federal Agency Smart Credential Number is defined in Section 6 of this document.
Organizational Identifier	4	Optional TLV Record. Recommended when the SP 800-87 code for the FASC-N OI field contains alpha characters.
DUNS	9	Optional TLV Record. Recommended when the FASC-N Agency Code = 9999. D&B DUNS number for non-federal FASC-N issuer.
GUID	16	Mandatory TLV Record. RFC 4122 generated UUID in accordance with NIST SP 800-73
Expiration Date	8	Mandatory TLV Record. Card expiration date, YYYYMMDD
Asymmetric Signature	2816	Mandatory TLV Record. Issuer defined algorithm, public key and signature.
LRC	1	Manditory TLV Record Longitudinal Redundancy Code.

As of the date of this document, PACS Implementation Guidance defines the PIV FASC-N as follows:

Field Name	Length (BCD Digits)	Field Description
Agency Code	4	Identifies the government agency issuing the credential.
System Code	4	Identifies the system the card is enrolled in and is unique for each site.
Credential Number	6	Encoded by the issuing agency. For a given system no duplicate numbers are active.
CS	1	CREDENTIAL SERIES (SERIES CODE) Field is available to reflect major system changes.
ICI	1	INDIVIDUAL CREDENTIAL ISSUE (CREDENTIAL CODE) Recommend coding as a "1" always.
PI	10	PERSON IDENTIFIER Numeric Code used by the identity source to uniquely identify the token carrier. (e.g. DoD EDI PN ID, TWIC credential number, NASA UUPIC).
OC	1	ORGANIZATIONAL CATEGORY 1 - Federal Government Agency 2 - State Government Agency 3 - Commercial Enterprise 4 - Foreign Government
OI	4	ORGANIZATIONAL IDENTIFIER OC=1 – NIST SP800-87 Agency Code OC=2 – State Code OC=3 – Company Code OC=4 – Numeric Country Code
POA	1	PERSON/ORGANIZATION ASSOCIATION CATEGORY 1 – Employee 2 – Civil 3 – Executive Staff 4 – Uniformed Service 5 – Contractor 6 – Organizational Affiliate 7 – Organizational Beneficiary
SS	1	Start Sentinel. Leading character which is read first when card is swiped.
FS	1	Field Separator.
ES	1	End Sentinel.
LRC	1	Longitudinal Redundancy Character.

APPENDIX B: GLOSSARY

Term	Definition
Access Control	The process of granting or denying requests to access physical facilities or areas, or logical systems (i.e., computer networks or software applications). See also "logical access control system" and "physical access control system."
Authentication	The process of establishing confidence in the identity of users or information systems.
Authorization	The process of giving individuals access to specific areas or systems based on their authentication.
Biometric	A measurable physical characteristic used to recognize the identity of an individual. Examples include fingerprints and facial images. A biometric system uses biometric data for authentication purposes.
Cardholder Unique Identifier (CHUID)	The PACS Implementation Guidance [PACS] defines the CHUID data object; this description is refined in NIST SP 800-73. The PIV Card shall include the CHUID as defined in NIST SP 800-73. The CHUID includes an element, the Federal Agency Smart Credential - Number (FASC-N), which uniquely identifies each card. CHUID elements specific to this standard are described below in Section 4.2.1. The format of the CHUID signature element is described in Section 4.2.2. The PIV CHUID shall be accessible from both the contact and contactless interfaces of the PIV Card without card activation. The PIV FASC-N shall not be modified post-issuance.
Constituent	Member of a group or organization.
FBI Fingerprint Check	Fingerprint check of the FBI fingerprint files. This check is an integral part of the NACI, and is the minimum requirement for provisional PIV Card issuance.
Federal Agency Smart Credential Number (FASC-N)	The FASC-N is the primary identification string to be used on all government issued credentials. The key to credibility, non-repudiation and reciprocity is the definition and acceptance of a credential token identification numbering schema for use across all Federal Agencies that is uniquely assigned to one and only one individual. For deployed systems, this is the FASC-N. For emerging systems, it is the GUID. Both are contained in the CHUID for consistent means of access by PACS solutions allowing for ease of migration. The responsibility for issuing this number to federal personnel is decentralized to the various federal agencies, with the ultimate responsibility for ensuring uniqueness residing with each agency's CIO, or other duly designated agency official. For the FASC-N, this is achieved through an assigned Agency Code and subordinate system code and credential number.
Identity Proofing	The process of providing sufficient information (e.g., driver's license, proof of current address, etc.) to a registration authority, or the process of verifying an individual's information that he or she is that individual and no other.

Term	Definition
Logical Access Control System (LACS)	Protection mechanisms that limit users' access to information and restrict access on the system to only what is appropriate for them. These systems may be built into an operating system or application, or may be an added system.
National Agency Check (NAC)	A standard process that involves searches of the Security/Suitability Investigations Index (SSI), Defense Clearance and Investigation Index (DCII), FBI Name Check, and FBI National Criminal History Fingerprint Check.
National Agency Check with Written Inquiries (NACI)	The basic and minimum investigation required for all new federal employees and contractors, which consists of searches of the OPM Security/Suitability Investigations Index (SII), the Defense Clearance and Investigations Index (DCII), the Federal Bureau of Investigation (FBI) Identification Division's name, fingerprint files, and other files or indices when necessary. This investigation also includes written inquiries and searches of records covering specific areas of an individual's background during the past five (5) years (inquiries sent to current and past employers, schools attended, references, and local law enforcement authorities). Coverage includes employment (five (5) years); education (five (5) years and highest degree verified); residence (three (3) years); references; law enforcement (five (5) years); and NACs.
Non-Federal Issuer	This is an issuer that wishes to issue identity credentials that are PIV Compatible or PIV Interoperable.
Physical Access Control System (PACS)	Protection mechanisms that limit users' access to physical facilities or areas to only what is appropriate for them. These systems typically involve a combination of hardware and software (e.g., a card reader) and may involve human control (e.g., a security guard).
PIV Card	A government-issued credit card-sized identification that contains a contact and contactless chip. The holder's facial image will be printed on the card, along with other identifying information and security features. The contact chip will store a PKI certificate, the Cardholder Unique Identifier (CHUID), and a fingerprint biometric, all of which can be used to authenticate the user for physical access to federally controlled facilities and logical access to federally-controlled information systems. A PIV Card is fully conformant with federal PIV standards (i.e., Federal Information Processing Standard (FIPS) 201 and related documentation). Only cards issued by federal entities can be fully conformant. Federal standards ensure the PIV Cards are interoperable with and trusted by all Federal government relying parties.
PIV Compatible Card	An identity card that meets the technical specifications so that PIV infrastructure elements such as card readers are capable of working with the cards, but the card itself has not necessarily been issued in a manner that assures it is trustworthy by federal relying parties.
PIV Interoperable Card	An identity card that meets the technical standards to work with PIV infrastructure elements such as card readers, and is issued in a manner that allows federal relying parties to trust the cards.

Term	Definition
Public Key Infrastructure (PKI)	A service that provides cryptographic keys needed to perform digital signature-based identity verification, and to protect communications and storage of sensitive data.
Registration Agent	A trusted entity that establishes and vouches for the identity of a Subscriber to a CSP. The Registration Agent may be an integral part of a CSP, or it may be independent of a CSP, but it has a relationship to the CSP(s).
Universally Unique Identifier (UUID)	The UUID is a unique identifier that can be placed in multiple data fields to uniquely identify the card. For example, the UUID is found in the GUID field of the CHUID, the subjectAltName extension of PIV-I Authentication and PIV-I Card Authentication certificates, and within signed objects on the card (in place of the FASC-N in PIV Cards). The UUID is defined in RFC 4122.

APPENDIX C: ACRONYMS

Acronym	Definition
ACIS	Airport Credential Interoperability Solution
AID	Application Identifier
APL	Approved Products List
CA	Certification Authority
CAK	Card Authentication Key
CP	Certificate Policy
CHUID	Cardholder Unique Identifier
DoB	Date of Birth
DUNS	Data Universal Numbering System
FASC-N	Federal Agency Smart Credential - Number
FBCA	Federal Bridge Certification Authority
FBI	Federal Bureau of Investigation
FICC	Federal Identity Credentialing Committee
FIPS	Federal Information Processing Standard
FPKIPA	Federal Public Key Infrastructure Policy Authority
FRAC	First Responder Authentication Credential
GSA	General Services Administration
GUID	Global Unique Identifier
HSPD-12	Homeland Security Presidential Directive 12
ID	Identification
IP	Internet Protocol
ISO/IEC	International Organization for Standardization / International Electrotechnical Organization
LACS	Logical Access Control System
MAC	Media Access Control
NAC	National Agency Check

Acronym	Definition
NACI	National Agency Check with Written Inquiries
NFI	Non-Federal Issuer
NIST	National Institute of Standards and Technology
NPIVP	NIST Personal Identity Verification Program
NSPD	National Security Presidential Directive
OID	Object Identifier
OMB	Office of Management and Budget
OPM	Office of Personnel Management
PACS	Physical Access Control System
PAIIG	Physical Access Interagency Interoperability Working Group
PIN	Personal Identification Number
PIV	Personal Identity Verification
PIV-I	PIV Interoperable
PKI	Public Key Infrastructure
RFC	Requests for Comment
SP	Special Publication
TLV	Tag Length Value
TWIC	Transportation Worker Identity Credential
U.S.	United States
UUID	Universally Unique Identifier
WG	Working Group

APPENDIX D: DOCUMENT REFERENCES

Executive Order 13388: Further Strengthening the Sharing of Terrorism Information to Protect America (October 25, 2005)
http://www.fas.org/irp/offdocs/eo/eo-13388.htm

FBCA CP: X.509 Certificate Policy for the Federal Bridge Certification Authority (FBCA)
http://www.idmanagement.gov/fpkipa/documents/FBCA_CP_RFC3647.pdf

FIPS 140: Security Requirements for Cryptographic Modules
http://csrc.nist.gov/publications/PubsFIPS.html

FIPS 201: Personal Identity Verification (PIV) of Federal Employees and Contractors
http://csrc.nist.gov/publications/PubsFIPS.html

HSPD-5 Management of Domestic Incidents: Establishes a single, comprehensive national incident management system (February 28, 2003)
http://www.whitehouse.gov/news/releases/2003/02/20030228-9.html

HSPD-6 Integration and Use of Screening Information: Consolidates the government's approach to terrorism screening and information collection and usage in screening processes. (September 16, 2003)
http://www.whitehouse.gov/news/releases/2003/09/20030916-5.html

HSPD-7 Critical Infrastructure Protection, Prioritization, and Protection: Federal departments and agencies are to identify, prioritize, and protect United States critical infrastructure and key resources (December 17, 2003).
http://www.whitehouse.gov/news/releases/2003/12/20031217-5.html

HSPD-8 National Preparedness: Defines "first responder" as those who are responsible for the protection and preservation of life, property, evidence, and the environment (December 17, 2003)
http://www.whitehouse.gov/news/releases/2003/12/20031217-6.html

HSPD-11 Comprehensive Terrorist-Related Screening Procedures: Research and development on technologies, including biometric identifier (also Executive Order 13356)
http://www.whitehouse.gov/news/releases/2004/08/20040827-7.html

HSPD-12 Policy for a Common Identification Standard for Federal Employees and Contractors: Sets a standard for secure and reliable forms of identification
http://www.whitehouse.gov/news/releases/2004/08/20040827-8.html

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