



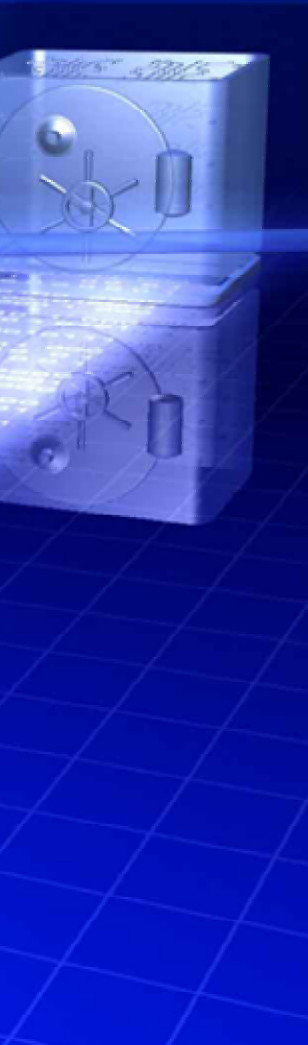
Biometric Interoperability

*National and International
Activities Update*

SAFLINK
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Why do we need standards?

- For any given technology, industry standards assure the availability in the marketplace of multiple sources for comparable products
- They foster wide spread utilization of the technology
- They reduce time-to-market
- They facilitate interchange and /or interoperability
- They reduce risk to integrators and end users
- They reduce vendor “lock-in” effect
- They are a sign of industry maturity



Standards Organizations

International




National



Informal

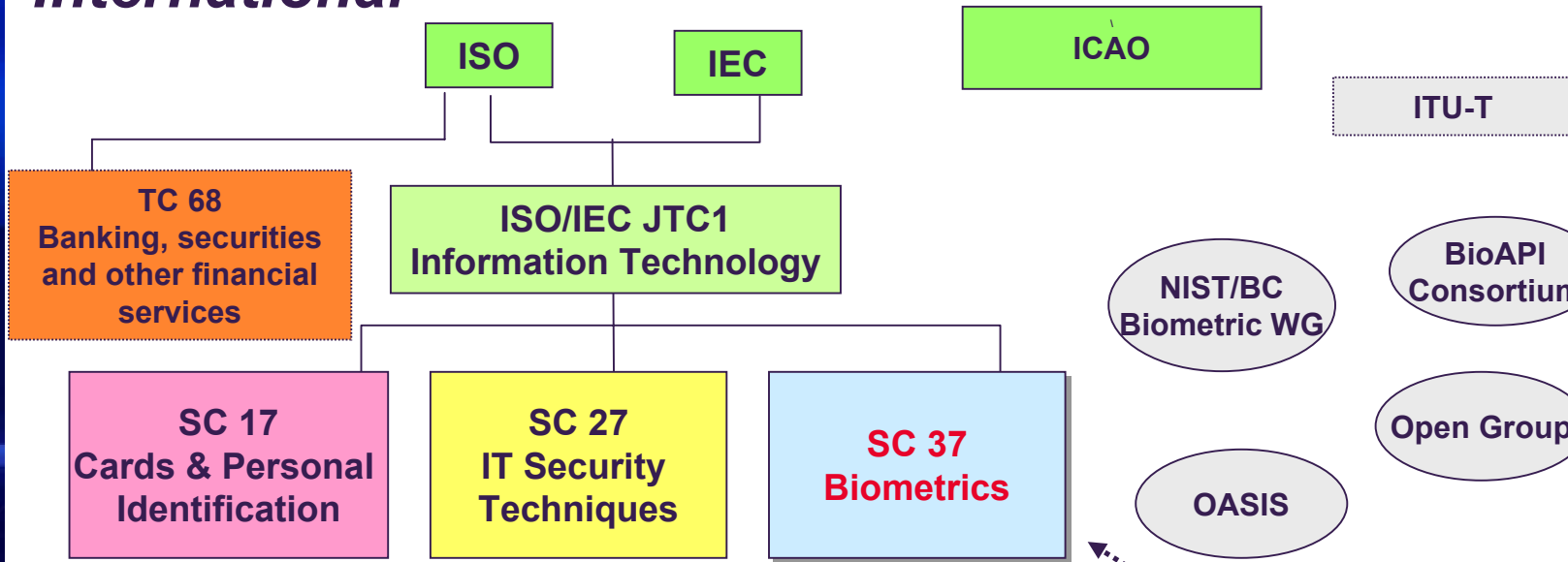


Standards Scene

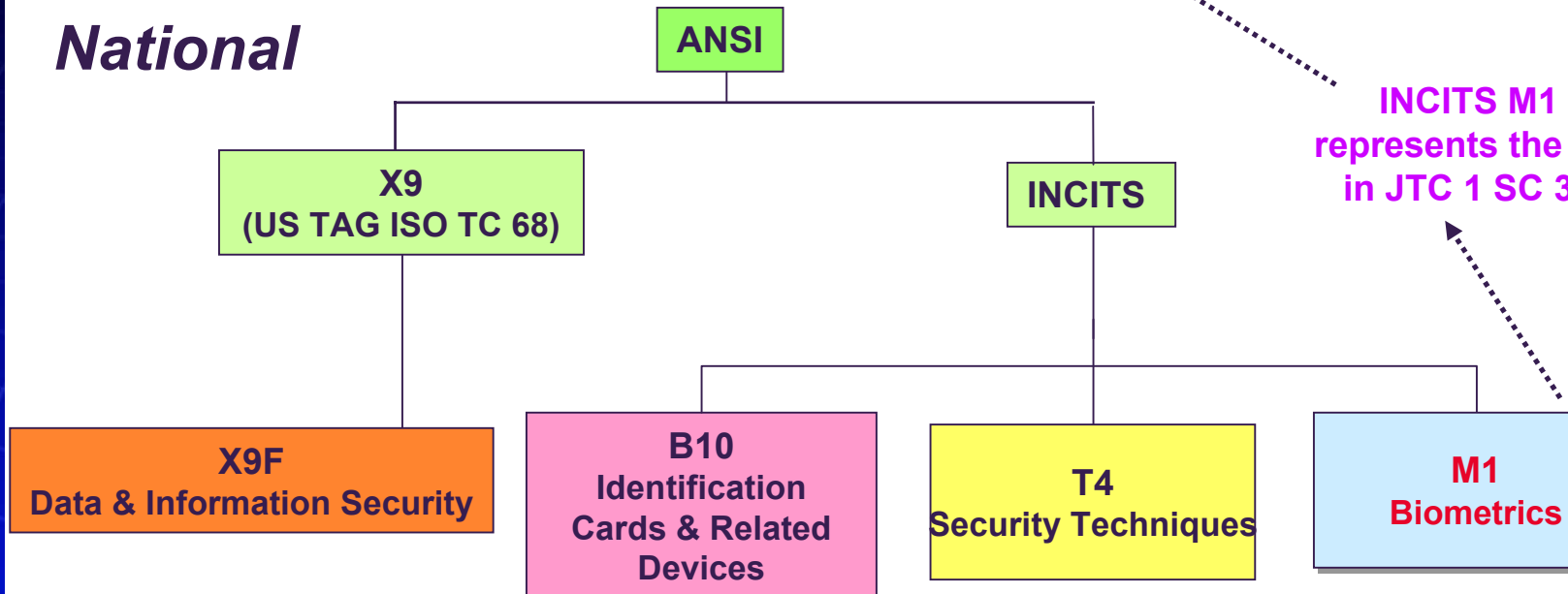
- 
- ISO – International Organization for Standardization
 - JTC1/SC17: Cards & Personal ID
 - **JTC1/SC37: Biometrics**
 - JTC1/SC27: IT Security
 - TC68: Financial Services
 - INCITS – International Committee on Information Technology Standards
 - B10: Cards & Personal ID
 - **M1: Biometrics**
 - T4: Security Techniques
 - Informal Bodies
 - **BioAPI Consortium**
 - JCF

Who is doing what?

International



National



INCITS Technical Committee M1

- INCITS is the major standards organization in the US responsible for the development of Information and Communication Technology (ICT) standards.
- M1 is the INCITS committee for biometrics, established November 2001.
- M1 represents the US in biometric international standards development through Subcommittee 37 of Joint Technical Committee 1 (JTC1).



INCITS M1 - Organization

Task Groups

M1.1 Harmonized Vocabulary

M1.2 Technical Interfaces

M1.3 Data Interchange Formats

M1.4 Biometric Profiles

M1.5 Performance Testing & Reporting

M1.6 Cross Jurisdictional & Societal

Ad Hoc Groups

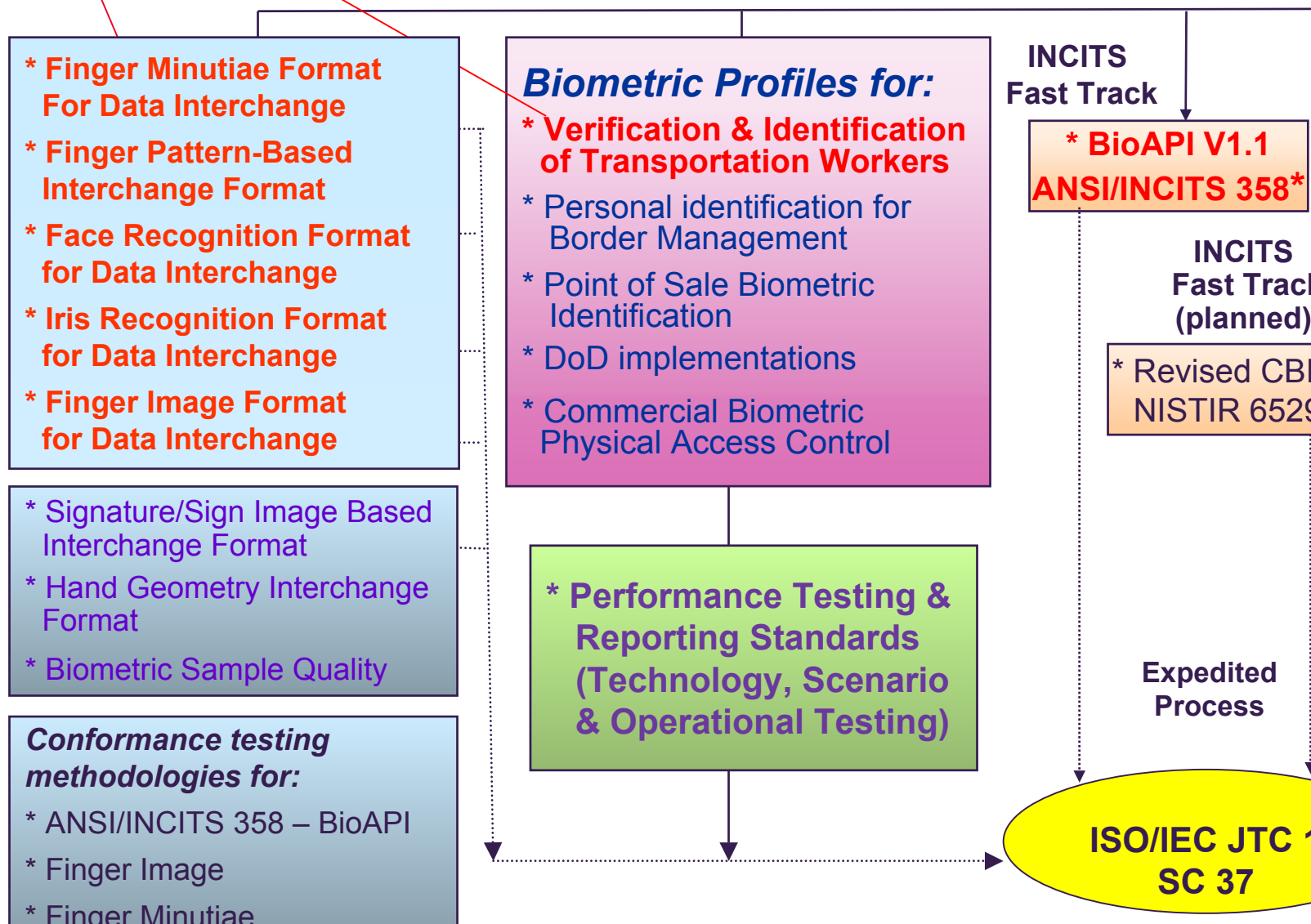
AHGBISGF

AHGEMS

AHGSQ

What's going on?

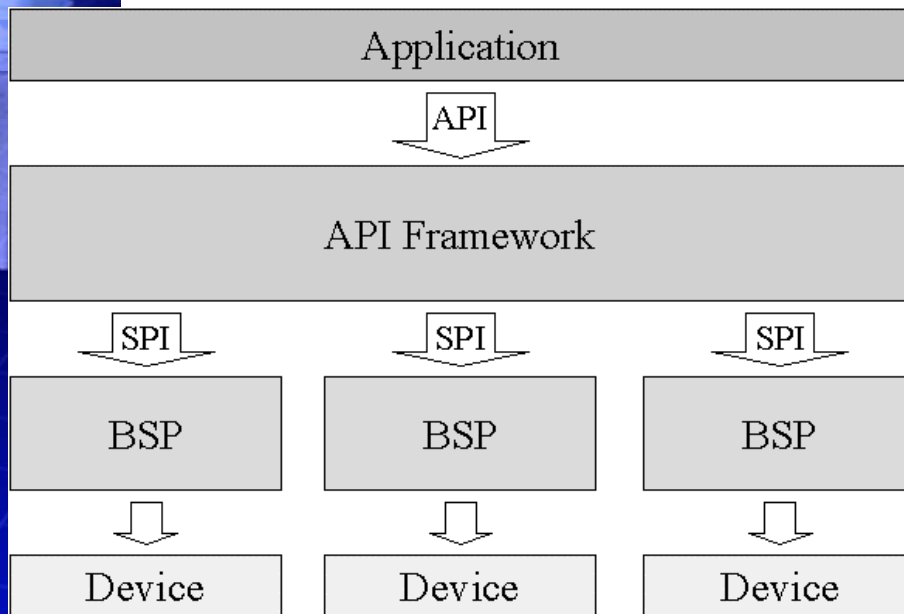
Approved!



BioAPI

ANSI/INCITS 358

The BioAPI Specification defines an open system standard application program interface (API) that allows software applications to communicate with a broad range of biometric technologies in a common way.



- ✓ Simple application interfaces,
- ✓ Standard access methods to biometric functions, algorithms, and devices,
- ✓ Robust biometric data management and storage,
- ✓ Standard methods of managing biometric data and technology types, and
- ✓ Support for biometric verification and identification in distributed computing environments.

BioAPI Functions

BASIC FUNCTIONS

• **BSP Management Functions**

- **ModuleLoad**
 - Load BSP & enable events
- **ModuleAttach**
 - Attach BSP to BioAPI framework

• **Enroll User**

- **Enroll**
 - Create template & store in user account DB

• **Verify asserted identity (1:1)**

- **Verify**
 - Live input matched against one stored template

• **Discover User's identity (1:N)**

- **Identify**
 - Live input matched against set of stored templates

PRIMITIVE FUNCTIONS

• **Capture**

- CapturedBIR is an “intermediate”
- Purpose recorded in BIR
- AuditData is “raw” BIR

• **CreateTemplate**

- Purpose must be “Enroll...”
- NewTemplate can be an adaptation of a StoredTemplate

• **Process**

- Purpose must be Verify or Identify
- Converts “intermediate” to “processed” BIR (if algorithm installed in BSP)

• **VerifyMatch**

- Perform 1:1 match

• **IdentifyMatch**

- Perform 1:N match against specific DB

• **Import**

- Imports non-real-time data for processing



CBEFF

Common Biometric Exchange
Formats Framework

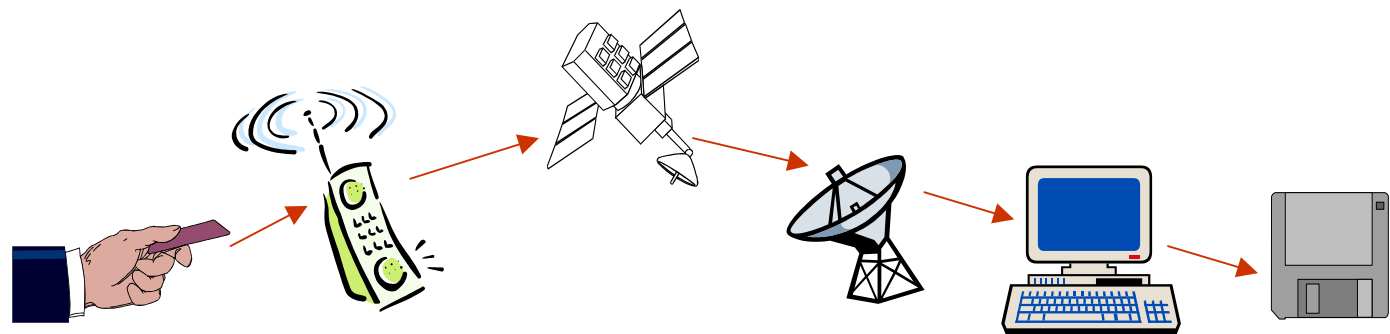
NIST IR 6529-A

www.nist.gov/cbef

CBEFF

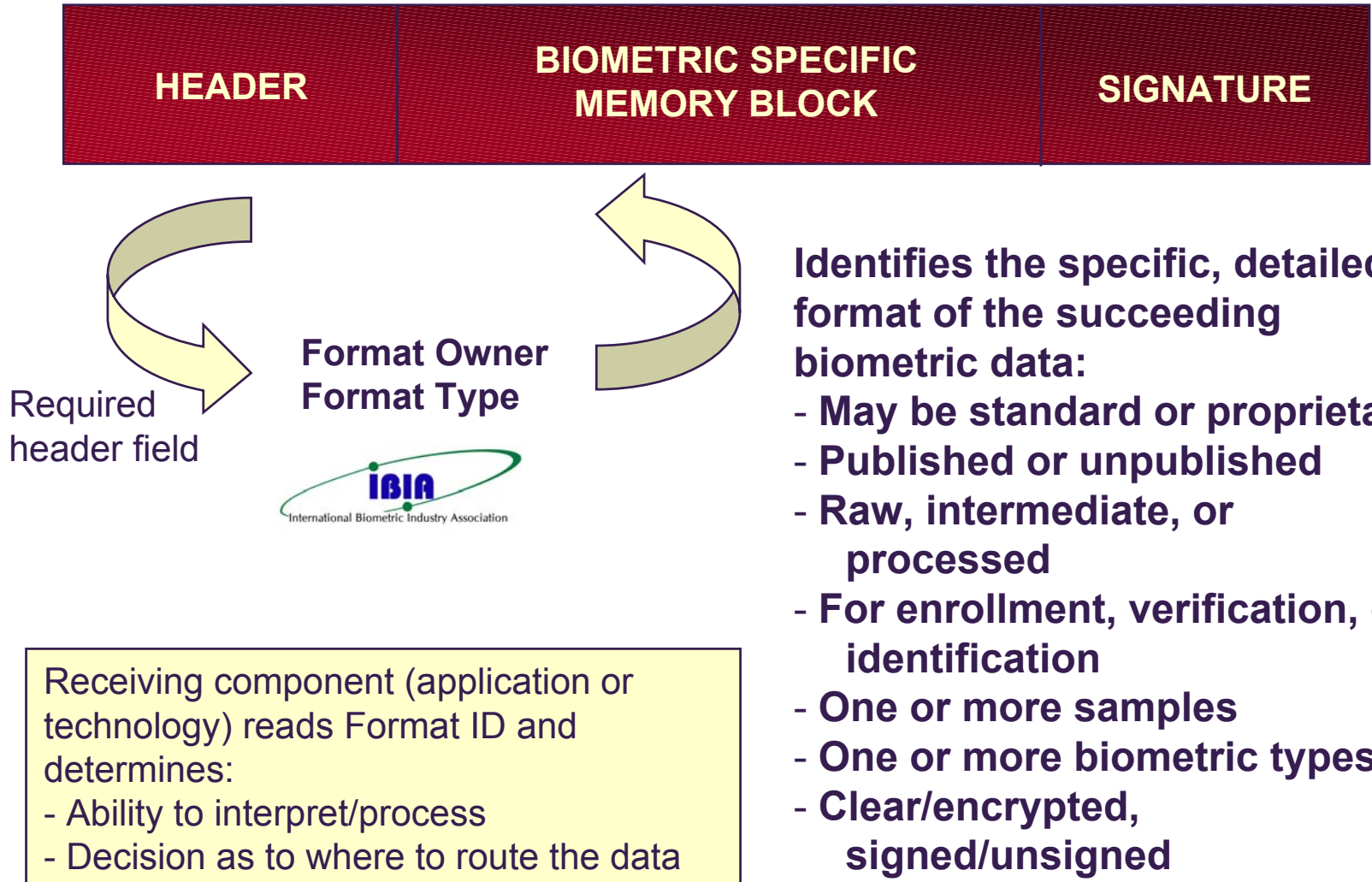
- Spearheaded by NIST and the BC
- Developed in coordination with:
 - The BioAPI Consortium
 - ANSI X9F4 Working Group (Financial Services)
 - The International Biometric Industry Association
 - The Interfaces Group of TeleTrust (Germany)

CBEFF describes a set of data elements necessary to support biometric technologies in a common way.



- Features:
 - Facilitates biometric data interchange between different system components or systems
 - Promotes interoperability of biometric-based application programs and systems
 - Provides forward compatibility for technology improvements

Common Data Structure



Data Interchange Formats

➤ Motivation

- Exchange of biometric data in nonproprietary format among multiple vendors/applications
- Compile biometric databases for use in evaluating multiple algorithms
- Produce enrollment databases that enable re-enrollment using future algorithms or algorithm enhancements

➤ Relationship to other standards

- Data compliant with interchange formats are embedded in CBEFF (NISTIR 6529-A) Biometric Data Block
- Certain of the formats reference ANSI/NIST-ITL 1-2000 Standard Data Format for the Interchange of Fingerprint, Facial, & Scar mark & Tattoo (SMT) Information
- Compliance assured with ANSI/INCITS 358-2002 standard (the BioAPI Specification)



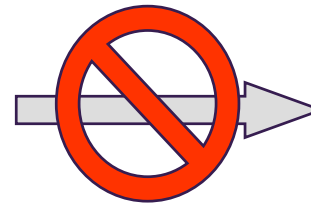
Practical Benefits

Vendor A

Vendor B

Today
(Proprietary
Formats)

Enroll
Capture
Process
Match



Enroll
Capture
Process
Match

Soon
(Standard
Formats)

Enroll



Capture
Process
Match

Capture
Process



Match

Capture



Process
Match



Biometric Profiles

➤ Parts

- Functional environment for the application - for example - Border Management:
 - Pre-arrival
 - Arrival
 - Stay Management
 - Departure
 - Database Reconciliation/Management
- Biometric functions for an application:
 - Enrollment
 - Verification
 - Identification
 - Watchlist Identification
- Standards requirements

➤ Specify the use of:

- Mandatory and optional requirements in *base biometric standards* to support the functional environment and biometric functions of the application profile - *for example*
 - API - INCITS 358-2002, BioAPI Specification, Version 1.1
 - File Format - Common Biometric Exchange File Format (CBEFF) NISTIR 6529
- Mandatory and optional requirements in *other base standards* to support the application profile - *for example*
 - Compression - JPEG, JPEG 200
 - Encryption - AES



Performance Testing Standards

➤ Need

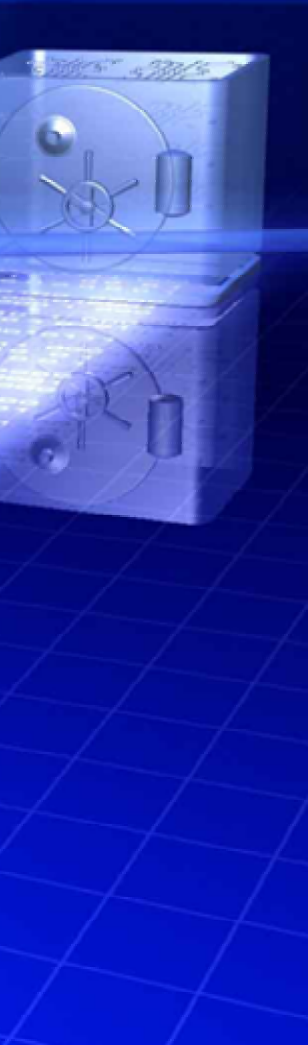
- Inconsistently reported performance measures are difficult or impossible to compare
- Disparate evaluation techniques thwart efforts to engineer systems with predictable performance
- Performance claims that conflict with user experience diminish confidence in biometric technologies

➤ Goals

- Provide uniform, repeatable methods for evaluating & reporting performance of biometric technologies & systems
- Provide data needed by customers and system integrators to design systems that meet specific performance requirements
- Improve user perception of biometric technologies

US Standard Structure

- Part 1 – Framework
 - Definitions, common elements
- Part 2 – Technology Testing
 - Specific methodologies, data collection & metric reporting requirements for technology tests
- Part 3 – Scenario Testing
 - Specific methodologies, data collection & metric reporting requirements for scenario tests
- Part 4 – Operational Testing
 - Specific methodologies, data collection & metric reporting requirements for operational tests



SC37 Structure

WG1 Harmonized Biometric Vocabulary and Definitions Canada

WG2 Biometric Technical Interfaces Korea

WG3 Biometric Data Interchange Formats Germany

WG4 Profiles for Biometric Applications USA

WG5 Biometric Testing and Reporting UK

WG6 Cross Jurisdictional and Societal Aspects Italy

Secretariat and Chair: US / ANSI



SC37

➤ Charter

- SC 37 was established by JTC 1 in June 2002 as an formal international standards forum able to coalesce a wide range of interests among IT and biometric industry and users of biometric-based solutions for multiple Identification and Verification applications.

➤ Scope

- *Standardization of generic biometric technologies pertaining to human beings to support interoperability and data interchange among applications and systems*
- Excluded is the work in ISO/IEC JTC 1/SC 17 to apply biometric technologies to cards and personal identification.
- Excluded is the work in ISO/IEC JTC 1/SC 27 for biometric data protections techniques, biometric security testing, evaluations, and evaluations methodologies.



SC37 Schedule

➤ **Since SC 37 was established, SC 37 has maintained an accelerated pace of biometric standards development.**

➤ **Meeting Schedule:**

- Dec 2002: Inaugural meeting: Orlando, FL, USA
- Mar 2003: SC 37 Special Group meetings: Ottawa, Canada
- Sep 2003: 2nd SC 37 Plenary & SG meetings: Rome, Italy
- Feb 2004: SC 37 Working Group meetings: Sydney, Australia
- Jun 2004: 3rd SC 37 Plenary & WG meetings: Seoul, Korea
- Nov 2004 SC 37 WG meetings: Paris, France
- Jun/Jul 2005 SC 37 Plenary and WG meetings: South Africa



SC37 Membership

➤ 21 P - Members:

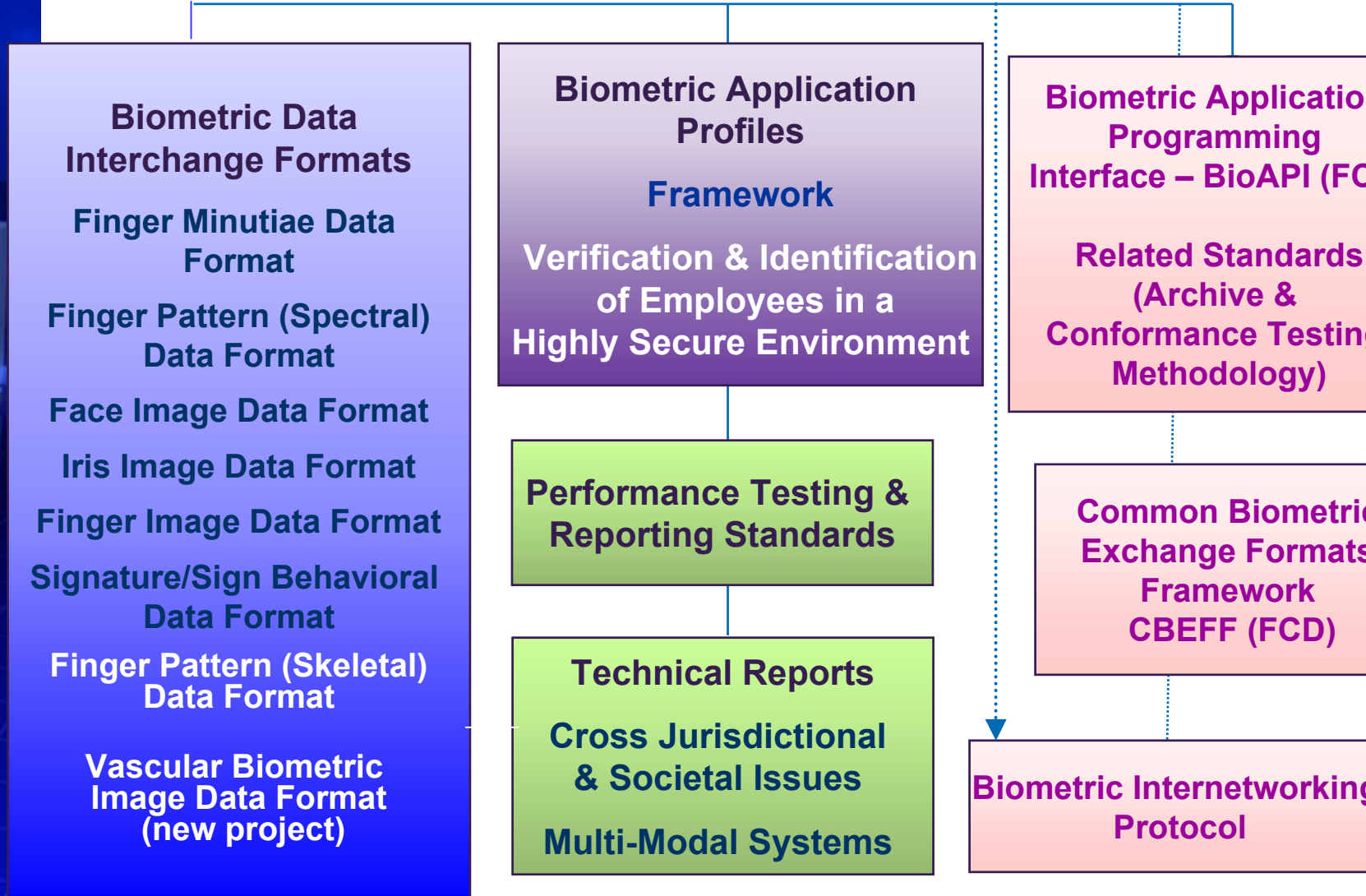
- AUSTRALIA, CANADA, CHINA, FINLAND, FRANCE, GERMANY, IRELAND, ITALY, JAPAN, REPUBLIC OF KOREA, MALAYSIA, NETHERLANDS, NEW ZEALAND, NORWAY, RUSSIAN FEDERATION, SINGAPORE, REPUBLIC OF SOUTH AFRICA, SWEDEN, SWITZERLAND, UNITED KINGDOM, and USA.

➤ 6 O - Members:


- AUSTRIA, CZECH REPUBLIC, DENMARK, ISRAEL, HUNGARY, POLAND



SC37 Representative Projects



Standards Terminology/Process

- 
- **TC** – Technical Committee (industry)
 - **SC** – Subcommittee (segment)
 - **WG** – Working Group (project)
 - **Progression of Work**
 - New Work Item (NWI) Proposal (NP)
 - Results in approved project
 - Working Draft (WD)
 - Committee Draft (CD)
 - Final Committee Draft (FCD)
 - Final Draft International Specification (FDIS)
 - International Standard (IS)
 - Note: Votes are by National Bodies (countries)

SC37 Program of Work

➤ WG1 – Vocabulary

- Standing document on harmonized vocabulary
- Work in progress, draft posted as SD2

➤ WG2 – Interfaces

- BioAPI (19784): FCD2 out for ballot
- CBEFF (19785): FCD out for ballot
 - Part 2: Registration Authority Procedures
- Biometric Interworking Protocol (24708): WD2
- Conformance Testing Methodology for BioAPI (24709): WD2
- Multimodal Technical Report (24722): WD1
- Archive Function Provider Interface for BioAPI (Pt 2): WD1
- Conformance Test Methodology for BioAPI (24709): WD2
- Proposed new work items:
 - Biometric Tutorial (Technical Report)
 - BioGUI amendment to BioAPI
 - BioAPI Lite



SC37 Program of Work (cont'd)

➤ WG3: Data Interchange Formats

- Multi-Part Standard (19794)
 - Part 1: Framework – CD
 - Part 2: Finger Minutiae – FCD
 - Part 3: Finger Pattern Spectral – CD2
 - Part 4: Finger Image – FCD
 - Part 5: Face Image – FCD
 - Part 6: Iris Image – FCD
 - Part 7: Signature/Sign – WD3
 - Part 8: Finger Pattern Skeletal – WD1
- New proposals
 - Part N: Vascular – NP being resubmitted
 - Part N: Hand Geometry
- Call for contributions on Quality



SC37 Program of Work (cont'd)

➤ WG4: Biometric Profiles

– Multipart standard (24713):

- Part 1: Reference Architecture – CD
- Part 2: Employee Identification - CD
- Part 3: Seafarers – NP
- Call for contributions for commercial applications

➤ WG5: Performance Testing

– Multi-Part Standard (19795)

- Part 1: Test Principles – CD
- Part 2: Methodologies – WD2
- Part 3: Specific Testing Methodologies – Call out
- Part 4: Specific Test Programmes – WD1


➤ WG6: Cross Jurisdictional and Societal Aspects

– Technical Report (24714)

- Cross Jurisdictional and Societal Aspects of Implementations of Biometric Technology – WD1




Target Dates



Biometric Data Interchange Formats	ANSI INCITS	ISO/IEC
Finger Minutiae Data Interchange Format	1Q 04*	1Q 05
Finger Pattern Data Interchange Format	1Q 04*	4Q 05
Face Image Data Interchange Format	2Q 04*	1Q 05
Iris Image Data Interchange Format	2Q 04*	1Q 05
Finger Image Data Interchange Format	2Q 04*	1Q 05
Signature/Sign Data Interchange Format	1Q 05	4Q 05
Hand Geometry Data Interchange Format	4Q 04	4Q 05

* Approved standards

Target Dates



Biometric Application Profiles	ANSI INCITS	ISO/IEC
Verification & Identification of Transportation Workers	3Q 04*	NA
Personal Identification for Border Management	4Q 04	NA
Point of Sale Biometric Identification	1Q 05	NA
DoD Implementations	2Q 05	NA
Residential and Commercial Access Control	3Q 05	NA
Biometric Reference Architecture	NA	4Q 05
Employees in a Highly Secure Environment	NA	3Q 05

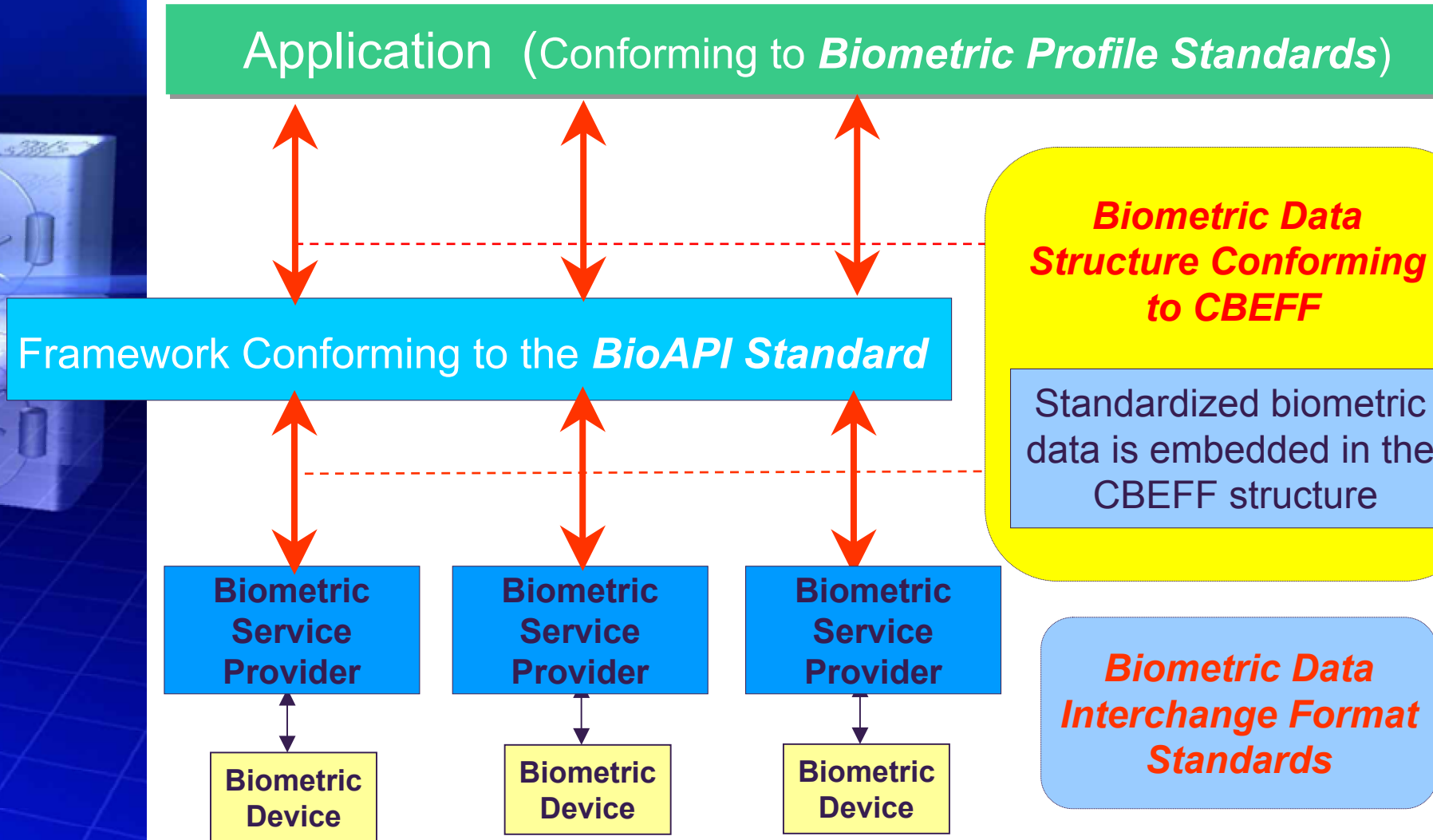
* Approved standards

Target Dates


Biometric Application Profiles	ANSI INCITS	ISO/IEC
Verification & Identification of Transportation Workers	3Q 04*	NA
Personal Identification for Border Management	4Q 04	NA
Point of Sale Biometric Identification	1Q 05	NA
DoD Implementations	2Q 05	NA
Residential and Commercial Access Control	3Q 05	NA
Biometric Reference Architecture	NA	4Q 05
Employees in a Highly Secure Environment	NA	3Q 05

* Approved standards

Interoperability and Interchange



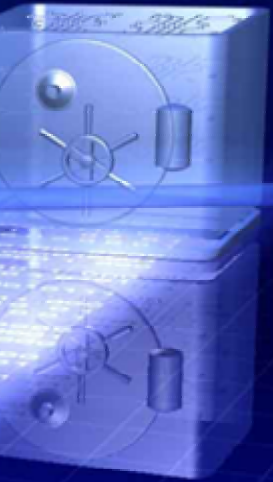
Related Standards Activities

- 
- Smart Card Interoperability – B10 & SC17
 - Transposition of NISTIR 6887, GSC-IS v2.1
 - TC68 – X9.84 Transposition
 - Biometric Information Management and Security
 - ANSI X9.84-2003 published June 2003
 - ISO WD 19092 ballot just passed
 - SC17 – ISO/IEC 7816-11
 - Integrated circuit(s) cards with contacts – Part 11: Personal verification through biometric methods
 - FDIS status
 - SC27 – Projects
 - Biometric Evaluation Methodology
 - Template Protection (pending)
 - ICAO NTWG – Machine Readable Travel Documents
 - Reports recently published
 - Supported by SC17 WG3
 - OASIS XCBF
 - XML version of CBEFF

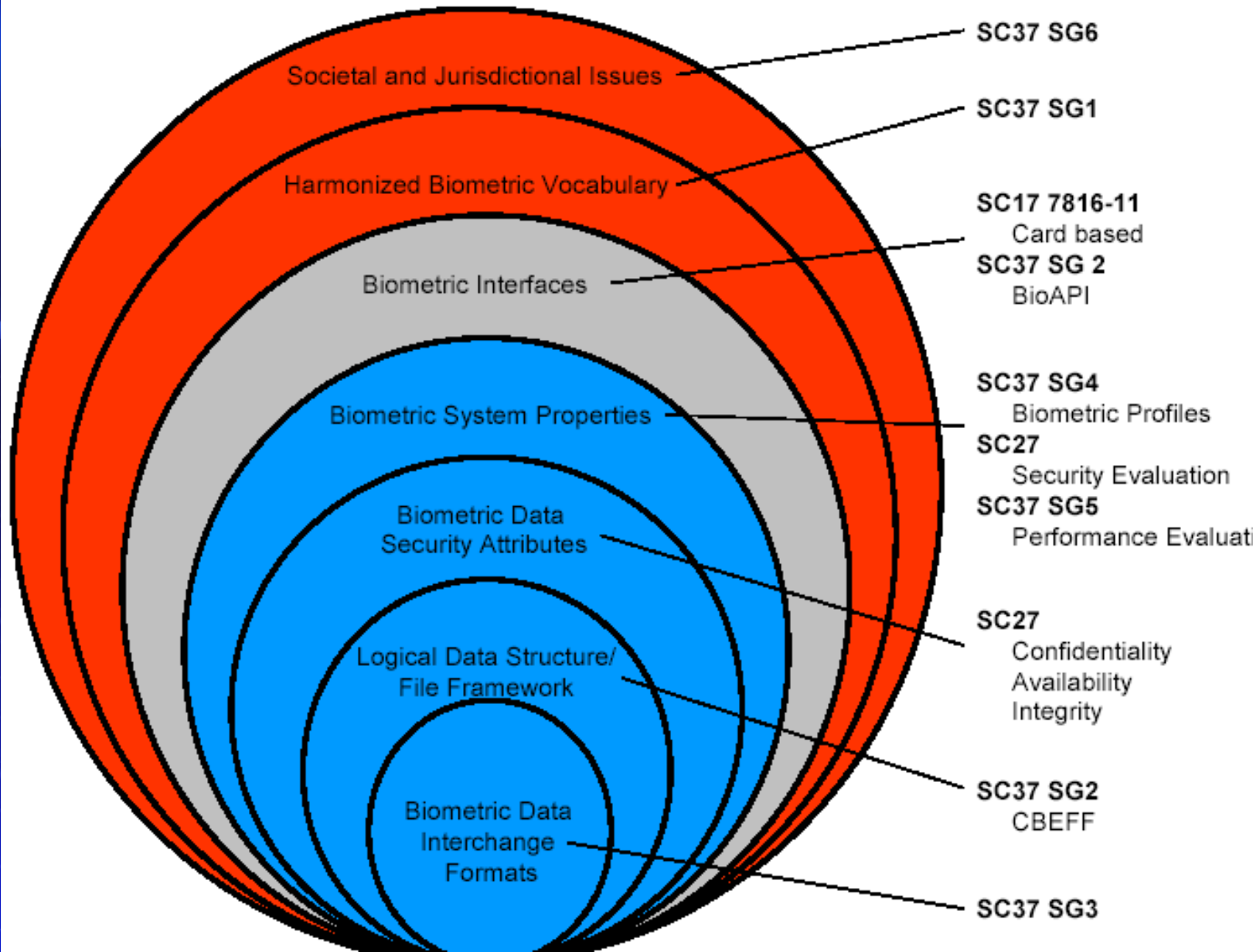
Related Standards Activities

➤ Law enforcement and forensics


- Data Format for the Interchange of Fingerprint Information (ANSI/NIST-ITL 1-2000)
 - Image: 500 dpi, 8-bit grayscale
 - Template: minutiae location (X, Y, theta)
- FBI WSQ standard for fingerprint image compression/decompression (15:1)
 - CJIS/FBI IAFIS-IC-0110
- FBI Electronic Fingerprint Transmission Specification (EFTS)
 - <http://www.fbi.gov/hq/cjisd/iafis/efts70/cover.htm>
- FBI Appendix F & G
 - CJIS-RS-0010(v)7
 - Fingerprint image quality specification (IQS)
- AAMVA DL/ID 2000
 - Drafted as B10.8, but not published
 - Includes finger imaging, minutiae record, facial photo, signature, and compression



Hierarchy & Interrelationships



Conclusion

- 
- The past year has seen an explosion of activity in the biometric standards area resulting in an acceleration of the standardization process
 - Standards activity indicators of widespread interest in biometrics
 - Standards needed to grow the biometrics market, especially the commercial market
 - Standards will:
 - Provide flexibility
 - As technology evolves
 - To accommodate a variety of situations
 - Drive biometrics to a commodity
 - Make biometrics plug-and-play
 - Lower implementation risk

More information

- 
- INCITS: www.incits.org
 - Select Technical Committee M1-Biometrics
 - ISO: www.jtc1.org
 - Select Subcommittee 37 – Biometrics
 - Also: www.tc68.org
 - ANSI: www.ansi.org; X9: www.x9.org
 - BioAPI Consortium: www.bioapi.org
 - CBEFF: www.nist.gov/cbeff
 - JCF: www.javacardforum.org
 - OASIS: www.oasis-open.org
 - ICAO: www.icao.org
 - IBIA (registration authority): www.ibia.org/formats

The image shows two open metal safes stacked on a blue grid floor. The safes are silver-colored with circular dials and handles. The top safe is open, revealing its interior. The bottom safe is also open, showing its interior. The background is a solid blue color.

Thanks!

**Catherine J. Tilton
Chair, BioAPI Consortium
International Rep, INCITS M1
VP, Standards & Technology
SAFLINK Corporation
1875 Sunrise Valley Drive, Suite 301
Reston, VA 20191
703-547-0404
Fax: 703-547-0399
ctilton@saflink.com
www.saflink.com**