

The exchange of biometric data among government entities:

The ANSI/NIST-ITL standard

Government agencies have several reasons to exchange information that can establish or verify the identity of an individual. Law enforcement use of fingerprints has long been established in the international community. With the advent of automated search techniques and the capability to transmit data electronically, a need emerged to standardize how the data was sent, received and stored. To effectively exchange identity data across jurisdictional lines or between dissimilar systems made by different manufacturers, a standard is needed to specify a common format for the data exchange. The ANSI/NIST-ITL standard (as it is now called) was created in 1986 to meet this need. Originally it focused only on fingerprint minutiae. Over the years, it has been expanded to meet the increased needs of government agencies around the world. Over the years, the user community has expanded greatly for the standard. It is still primarily focused upon law enforcement, military, homeland security, disaster recovery and related uses. This standard now forms the basis for the exchange of biometric and related identity information around the world. Many laws and regulations, such as the European Union's regulations for the exchange of fingerprint data and the FBI's requirements for biometrics transmission from state and local law enforcement agencies require use of the ANSI/NIST-ITL standard.

Biometric data refers to a digital or analog representation of a behavioral or physical characteristic of an individual that can be used by an automated system to distinguish an individual as belonging to a subgroup of the entire population or in many cases, can be used to uniquely establish or verify the identity of a person (compared to a claimed or referenced identity). Biometric modalities specifically included in the ANSI/NIST-ITL standard are: fingerprints, palmprints, facial images, and iris images. Identifying characteristics that may be used manually to establish or verify the identity of an individual are included in the standard. This includes scars, marks, tattoos, and certain characteristics of facial photos and iris images. Latent friction ridge prints (fingerprint and palmprint) are included in the current version of the standard and may be used in either an automated system or forensically (or both).

Some data may be stored and/or transmitted in image or processed versions. The image may be 'raw' (as captured), compressed, cropped, or otherwise transformed. It is important, therefore that information associated with the image(s) be transmitted to the receiving organization that fully describes the biometric data. This standard also allows for the transmission of processed sample data, such as minutiae and other features from friction ridge biometrics.

Locations of systems with the ANSI/NIST-ITL standard installed for data transfer (known to NIST)



Blue: National and International System Use
 Red: State / Provincial / Local System Use

FIGURE 1

Some examples of the standard's use are shown below:

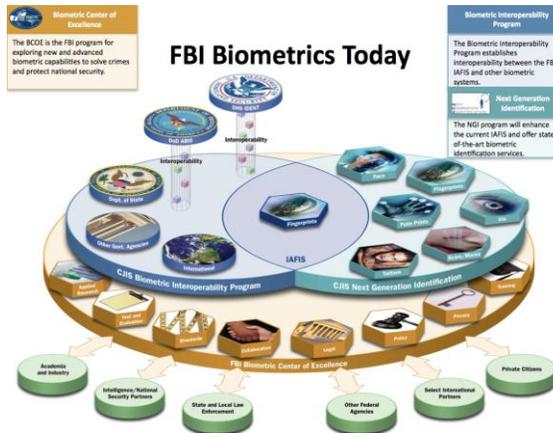


FIGURE 2: FBI

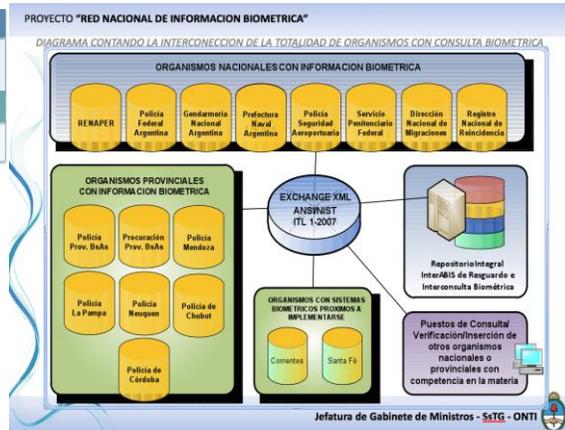


FIGURE 3: Argentina

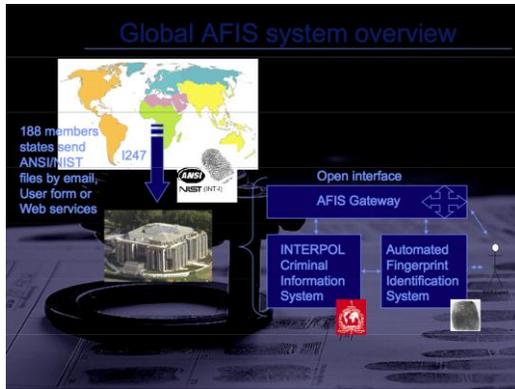


FIGURE 4: INTERPOL



FIGURE 5: Germany

This year, the standard will be expanded to meet the increased needs of Governments around the world for the exchange of biometrics and related information. NIST held a Workshop in July 2010 to determine what updates should be included in the next revision. Based upon that workshop, several working groups were created, with participants from government, academia and industry. The outputs of those working groups came to NIST in December and are now compiled into a draft version of the standard. A second workshop will be held on March 1-3, 2011 at NIST in Gaithersburg, Maryland, USA (near Washington, D.C.). All interested parties are encouraged to participate. Further information is available at http://www.nist.gov/itl/iad/ig/ansi_workshop-2011.cfm. You must register in order to attend the workshop. Your organization can still participate and vote on the final version of the standard, even if you do not come to the workshop. Please see the home page at: http://www.nist.gov/itl/iad/ig/ansi_standard.cfm

A major change with this version of the standard is that it is 'content based' and allows different encodings. The two encodings that will be currently specified are Traditional and NIEM-conformant XML. Encoding instructions are included as Annexes to the standard. Thus, the 2007 version (Traditional) and the 2008 version (NIEM-conformant XML) are combined into one document. Additionally, since NIEM (the National Information Exchange Model) is updated on a different schedule than the ANSI/NIST-ITL standard, a new "Biometrics Domain" namespace is being established with the capability to be updated on the ANSI/NIST-ITL schedule.

The updates that have been included in the draft of the standard (now available) are:

- A new record type for DNA and related information, including pedigree trees
- A new record type for plantars (footprints)
- A new record type for source representation for the biometric data
- A new record type for associated context data
- A new record type for information assurance

In addition, new fields have been added throughout the standard:

- Geographic sample location
- Hash of the biometric data
- Annotated information on data preparation

Major changes within record types include:

- Addition of the Extended Feature Set for latent print markups (Type-9)
- Addition of 3D anthropomorphic markups for facial images (Type-10)
- Addition of image markup fields for iris and face images (Types 10 and 17)
- Inclusion of Subject Acquisition Profiles for Fingerprint and Iris and extensions to the codes for Fingerprint, to reflect the *Mobile ID Best Practice Recommendation*
- Extension of Type-10 to include images of all body parts
- Adoption of compact iris image storage formats
- Extension of the domain to allow for multiple domain conformance in a transaction
- And many smaller revisions and updates

The ANSI/NIST-ITL standard is being updated in a manner to ensure maximum possible consistency with the individual modality standards created in ISO/SC37, the 19794 series. The DNA and iris records, in particular, have been closely harmonized in their development.

There is continuing work on a voice record and potentially a dental record, but those additions will not be included in this version of the standard. In preparation for the eventual addition of voice biometrics, the source representation and associated context fields allows for the transmission of audio and visual data as well referencing externally stored large data files.

The expected schedule for the update is as follows:

January 2011:

- Draft version available for review and comment
- Registration begins for the Second Workshop

March 2011:

- Second Workshop held at NIST in Gaithersburg, Maryland
 - Participants will determine the final content to be in the version presented to the canvasees for a vote
- Editor will update the draft to reflect results of the workshop

April 2011:

- Posting of the revised draft for review and comment (to correct typos and minor representational errors)

May 2011:

- Beginning of formal standard update procedure
 - Distribution of document and ballots

June 2011:

- Closing of ballot
- Announcement of results
- Submission of final document to ANSI (if ballot is affirmative)

July 2011:

- Acceptance of update by ANSI (if ballot is affirmative)

At that point, the ANSI/NIST-ITL 1-2011 version will become official. We anticipate that the addition of these new capabilities will have a major positive impact on government organizations around the world.

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Brad works for NIST and one of his responsibilities, as Biometrics Standards Coordinator is to serve as editor of the ANSI/NIST-ITL standard. With degrees in Operations Research Analysis he has worked for private industry, at the Department of Energy, Immigration and Naturalization Service, and the Department of Homeland Security prior to joining NIST. He served as the US technical representative for the development of e-passports and as co-chair of the National Science and Technology Council Subcommittee on Biometrics and Identity Management.