

US National Body Contribution on the Augmented Version of the Common Biometric Exchange Framework Format (CBEFF) and US National Body's Interest in Submitting the Specification for JTC 1 Fast Track Processing and Placement in JTC 1 SC 37.

The US National Body considers the augmented version of the Common Biometric Exchange Framework Format (CBEFF) [1] specification suitable for JTC 1 Fast Track Processing. The US believes that this specification meets the criteria set up for the JTC 1 Directives, Section 13 and is soliciting the opinion and comments of SC 37 members on the feasibility of submitting the augmented CBEFF specification for JTC 1 Fast Track processing and placement in JTC 1 SC 37.

The original CBEFF specification (NISTIR 6529) [2] reflected the result of intensive harmonization efforts among different consortia and technical standards committees developing related standards and specifications. The augmented version of CBEFF has been developed under the NIST/BC Biometric Interoperability, Performance and Assurance Working Group [3], an international organization established by the US National Institute of Standards and Technology [4] and the Biometric Consortium [5].

Worldwide acceptance of CBEFF is growing. The biometric data structure specified in ANSI/INCITS 358, the BioAPI specification V 1.1 [6], developed by the BioAPI Consortium [7] is fully compliant with CBEFF. The biometric data object specified in ANSI X9.84-2000, Biometrics Management and Security For The Financial Services Industry© [8], developed by an ANSI X9 [9] Working Group (X9.84) is an instantiation of CBEFF. The Biometric Information Data Objects described in ISO/IEC FCD 7816-11 [10], in Annex C are based on the CBEFF Framework. The Open Group's Human Recognition Services (HRS) Module of the Common Data Security Architecture [11] has been made consistent with the BioAPI standard and, therefore, is also CBEFF compliant.

In addition to its adoption as the common biometric data structure in many specifications and standards, vendors that claim CBEFF compliance are registering their formats through the CBEFF Format Owner's Registration Authority, the International Biometric Industry Association [12] [13]. CBEFF is a requirement for compliance in several USA government solicitations. Consortia and standards organizations have approached the original developers of CBEFF, to request CBEFF Patron status (a CBEFF Patron is an organization that has defined a standard or specification incorporating biometric data objects that meet CBEFF requirements).

The augmentation of CBEFF has been driven by additional requirements from end-users and standards organizations. A brief history of the CBEFF development, an introduction to CBEFF, its scope, and a summary of the additional features included in the augmented version of CBEFF are included in the attached document.

History of the CBEFF Development

On February 21, 1999, the Information Technology Laboratory of the National Institute of Standards and Technology (NIST) and the Biometric Consortium sponsored a Workshop to discuss the potential for reaching industry consensus in a common fingerprint template format. The participants identified the need for a technology-independent biometric format that would facilitate the handling of different biometric types, versions, and biometric data structures in a common way. This common format would facilitate exchange and interoperability of biometric data. A technology-independent biometric format would “include all modalities of biometrics and would not bias, encourage, or discourage any particular vendor or biometric technology from another. It would not attempt to translate among different biometric technologies, but would identify them and facilitate their co-existence”.

The CBEFF’s initial conceptual definition was achieved through a series of Workshops co-sponsored by the National Institute of Standards and Technology and the Biometric Consortium. A Technical Development Team, formed as a result of these Workshops, developed CBEFF as described in NISTIR 6529. To ensure that the biometric data format would be in agreement with other biometric efforts, the development was coordinated with industrial consortium and standards organizations.

A significant effort was made to harmonize the data formats among CBEFF, ANSI standard X9.84 and the BioAPI specification. The original CBEFF specification reflected the result of these harmonization efforts. Further CBEFF development was proposed under the umbrella of NIST/BC Biometric Interoperability, Performance, and Assurance Working Group, an organization co-sponsored by NIST and the Biometric Consortium. The result of this further development is the augmented CBEFF specification. Once again, this effort was achieved through the collaboration of many technical experts of NIST/BC Biometrics Interoperability, Performance, and Assurance Working Group as well as its liaison organizations.

Introduction to CBEFF

The expected enormous growth in the use of biometric-based systems and applications highlights the need for exchange and interoperability of biometric data. It is conceivable that many biometric-based systems and applications are expected to support multiple biometric devices and biometric data. CBEFF promotes interoperability of biometric-based application programs and systems developed by different vendors by allowing biometric data interchange. It defines a common set of data elements necessary to support these biometric technologies. The current CBEFF specification is an augmented version of the original CBEFF specification that was published as a National Institute of Standards and Technology publication (NISTIR 6529). The current augmented version is fully downward compatible with the original version of CBEFF. The expected benefits of CBEFF are the ability to identify different biometric data structures (standard or proprietary) supporting multiple biometric types within a system or application, the

ability to reduce the need for additional software development and the ability to promote development cost savings.

CBEFF describes a set of “Required” and “Optional” fields, a “Domain of Use” to establish the applicability of a standard or specification that meets CBEFF requirements, and a process by which new technology or systems can create formats that meet these requirements. CBEFF allows for these standards or specifications to define a format and for these formats to define the data encoding. Adoption of CBEFF and compliance to those standards or specifications promotes interoperability of biometric-based application programs and systems developed by different vendors by allowing biometric data interchange. By focusing on the description of the Biometric data elements, details such as data encoding, data and non-common elements can be left up to a standard or specification that meets CBEFF requirements. By describing a process to establish new formats, CBEFF can allow for biometrics data to be placed in new technologies and systems.

The common set of data elements described in CBEFF can be placed in a single file, record, or data object used to exchange biometric information between different system components (the Common Biometric Exchange Framework Format). Formatting the data (e.g. allowing individual components to be referenced) allows an application to easily recognize important processing information about the biometric data such as what type of biometric is available, what version number, vendor’s name, etc.

Formatting the data also provides pointers to the proper biometric data. These characteristics foster interoperability between different types of biometric systems, allow for the exchange of biometric related information between different systems, and allow systems with different requirements to translate between different formats.

Scope

CBEFF includes the definition of format and content for data elements such as:

- A biometric data header that contains such information as version number, length of data, whether the data is encrypted or not, etc., for each biometric type available to the application or system;
- Biometric data (content not specified);
- A Basic Biometric Data Structure (Data Header plus Biometric Data);
- Any other required biometric data or data structures.

CBEFF also describes a nested Biometric Data Structure; and the means for obtaining a unique value for identifying the format (owner and type) of the biometric data.

CBEFF focuses on the description of the Biometric data elements. In order to decode CBEFF data, the applications need to have previous knowledge of the organization that has defined a standard or specification incorporating biometric data objects that meet CBEFF requirements and the data encoding scheme that was used. These organizations are defined as CBEFF Patrons. A Patron identifier is not included within the CBEFF

definition. Each CBEFF Patron is required to define which CBEFF optional fields are present in their format and how the data elements are extracted and processed (details such as the data encoding scheme are left up to the CBEFF Patrons). The Biometric data elements transported in a CBEFF structure can represent processed or unprocessed (raw) data.

Summary of Additional Features included in the Augmented Version of the CBEFF Specification

In addition to the name change, which reflects more accurately the scope of the specification, this revised version incorporates the following new features:

- A CBEFF Nested Structure that consists of a Root Header followed by optional Sub-Headers, one or more CBEFF Basic Structures, and an optional Signature Block. A CBEFF nested structure can include: (a) standard or non-standard biometric data; (b) challenge; and (c) payload. In addition, this structure is able to handle multiple data types (e.g., biometric data generated by more than one biometric) and/or multiple biometric data from the same biometric type (e.g., more than one finger biometric template in a CBEFF data structure). Nesting CBEFF structures accommodates for these different requirements and avoids having to utilize multiple consecutive CBEFF data structures for one specific operation.
- A Subheader/Basic Structure Count. The CBEFF nested structure has required defining this new field. This optional field specifies the number of Basic Data Structures that follow a Sub-Header or the number of Sub-Headers that follow the Root Header in a CBEFF nested structure.
- The additional following fields:
 - A Biometric Feature optional field to further define the type of biometric data being placed in the file.
 - A Validity Period optional field to denote the period (not before-not after) when the biometric data block is valid. It complies with the format specified in ANSI X9.F4-2001.
 - An expanded definition of the Creator field. In this specification the Creator Field (optional field) specifies a Product Identifier (PID). It now contains the Format Owner and Type value of the entity (e.g., Biometric Service Provider (BSP) or transformation application) that created the biometric data object. This field allows to uniquely identify from any specific block of biometric data structure the format “owner”, the format of the biometric data and the biometric data block originator (e.g., a BSP-Biometric Service Provider or an entity, i.e., an application that applies a transformation to a biometric template).

- An Index field. This optional field contains a unique value associated with a specific instance of biometric reference (enrollment) data. It may represent a database index. Uniqueness pertains only to a specific database. Use and management of this data is the responsibility of the application.
- A Challenge-Response field. This optional field specifies the type of information used to present a challenge to the user or the system.
- A Payload field: This optional field contains data (e.g. a person identification number) to be attached in a secure way to biometric reference data and used by a service system (e.g. access control system) in case the biometric verification is positive. Reference data is to be specified by the CBEFF Patron. Examples include a filename, database item, or URL.
- A new Format has been added: Format D - Biometric Information Data Objects for Use within Smart Cards or Other Tokens. This format has been defined with the collaboration of technical experts from ISO/IEC JTC 1 SC 17 WG4 and INCITS Technical Committee B10. The Patron for this new Format is NIST/BC Biometric Interoperability, Performance, and Assurance Working Group.

In addition, more detailed information on the CBEFF Patron, the current list of Patrons and how to apply as a new CBEFF Patron have been added.

References

[1] The augmented version of CBEFF is in editorial review at the National Institute of Standards and Technology (NIST). Upon approval, it will be published as NISTIR 6529-A, "Common Biometric Exchange Framework Format (CBEFF)"

[2] NISTIR 6529, "Common Biometric Exchange File Format (CBEFF)", January 3, 2001. A copy of NISTIR 6529 can be downloaded from the CBEFF web site:
<http://www.nist.gov/cbeff>

[3] NIST/BC Biometric Interoperability, Performance, and Assurance Working Group
<http://www.nist.gov/bcwg>

[4] National Institute of Standards and Technology (NIST) web site: <http://www.nist.gov>

[5] Biometric Consortium web site: <http://www.biometrics.org>

[6] InterNational Committee for Information Technology Standards (INCITS) On-Line web site: <http://www.techstreet.com/ncitsgate.html>

[7] BioAPI Consortium web site: <http://www.bioapi.org>

[8] American National Standards Institute web store
<http://webstore.ansi.org/ansidocstore/dept.asp>

[9] <http://x9.org>

[10] Information technology – Identification cards – Integrated circuit(s) cards with contacts – Part 11: personal verification through biometric methods ISO/IEC FCD 7816-11, 2002-07-15

[11] Common Security: CDSA and CSSM, Version 2 (with corrigenda)
<http://www.opengroup.org/publications/catalog/c914.htm>

[12] International Biometric Industry Association (IBIA) web site: <http://www.ibia.org/>

[13] Web Page for registration of Common Biometric Exchange File Format (CBEFF) Format Owner and Format Type Values under IBIA: <http://www.ibia.org/formats.htm>