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Information technology — Common Biometric Exchange Formats Framework —

Part 1: Data element specification

Technologies de l'information — Cadre de formats d'échange biométriques communs —

Partie 1: Spécifications de données d'élément

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 37, *Biometrics*.

This second edition cancels and replaces the first edition (ISO/IEC 19785-1:2006), which has been technically revised.

ISO/IEC 19785 consists of the following parts, under the general title *Information technology — Common Biometric Exchange Formats Framework*:

— *Part 1: Data element specification*

— *Part 3: Patron format specifications*

— *Part 4: Security block format specifications*

This is the second ISO/IEC standard on CBEFF. Previous versions were published by the National Institute of Standards and Technology (an agency of the government of the United States of America) and the Biometric Consortium Working Group. Since the last official non-ISO/IEC release was designated Version 1.1, the first version of this ISO/IEC 19785-1 International Standard was designated Version 2.0, and this version is designated Version 3.0. This is to distinguish the versions of CBEFF products in the marketplace. Version 3.0 is fully backward compatible with Version 2.0.

Introduction

The Common Biometric Exchange Formats Framework (CBEFF) promotes interoperability of biometric-based applications and systems by specifying standard structures for biometric information records (BIRs) and a set of abstract data elements and values that can be used to create the header part of a CBEFF-compliant BIR.

A biometric information record (BIR) is an encoding in accordance with a CBEFF patron format (see below). It is a unit of biometric data for storage in a database or for interchange between systems or parts of systems. A BIR always has at least two parts: a) a standard biometric header (SBH); b) at least one biometric data block (BDB). It may also have a third part called the security block (SB). CBEFF places no requirements on the content and encoding of a BDB except that its length is to be an integral number of octets; the several parts of ISO/IEC 19794 specify standardized BDB formats for a number of biometric types.

The primary purpose of CBEFF is to define abstract data elements (data elements with a set of defined abstract values, with their semantics) that are expected to be of general utility as parts of the SBH in biometric information records. This part of ISO/IEC 19785 defines these data elements.

A CBEFF patron format is defined for a particular domain of use. A CBEFF patron format is a full bit-level specification of encodings that can carry some or all of the abstract values of the CBEFF data elements defined in this part of ISO/IEC 19785 (possibly with additional abstract values determined by the CBEFF patron), together with one or more biometric data blocks (BDBs) containing biometric data. It is intended that there be a limited number of CBEFF patron formats in any given domain of use. However, new technologies may evolve that need new encoding rules (or support of more or different CBEFF data elements) and hence may require new CBEFF patron formats for a given domain of use.

CBEFF also has a requirement that a Biometric Registration Authority exists to assign unique identifiers to biometric organizations, to biometric data block (BDB) formats, to security block (SB) formats, and to CBEFF patron format specifications (see below), to publish them where appropriate, and to ensure that no conflicts occur between identifiers.

CBEFF introduces the concept of assigning a unique identifier to a biometric organization. A CBEFF biometric organization is any organization, public or private, that requests and receives a biometric organization identifier from the Biometric Registration Authority.

CBEFF also introduces the concept of a CBEFF patron. A CBEFF patron is an organization (registered as a biometric organization) that specifies or intends to specify one or more CBEFF patron formats in an open and public manner. Only public standards organizations such as a standards body, working group, or industry consortium can register as CBEFF patrons (other CBEFF biometric organizations are not CBEFF patrons). A CBEFF patron obtains a biometric organization identifier from the Biometric Registration Authority but has privileges beyond those of ordinary CBEFF biometric organizations: it can define, register, and publish one or more CBEFF patron formats. The biometric organization identifier of a CBEFF patron can (but need not) be encoded in BIRs conforming to the patron formats defined by that CBEFF patron.

CBEFF also defines the concept of a CBEFF biometric data block (BDB) format owner. A CBEFF BDB format owner is an organization (registered as a CBEFF biometric organization) that specifies one or more BDB format specifications. A BDB format owner obtains a CBEFF biometric organization identifier from the Biometric Registration Authority. A BDB format owner can be a public standards organization (that would, coincidentally, also qualify as a CBEFF patron) or any organization that has a need to define its own vendor-specific BDB formats, whether they are to be published or not.

A CBEFF BDB format owner defines one or more BDB formats and assigns a BDB format identifier that unambiguously identifies that BDB format within those defined by the BDB format owner. A BDB format identifier (and the corresponding format) may, but need not, be registered with the Biometric Registration Authority.

CBEFF also defines the concepts of CBEFF biometric product owner as well as owners or vendors for the following specific product types: a) capture device; b) feature extraction algorithm; c) comparison algorithm; d) quality algorithm; e) compression algorithm; f) presentation attack detection (PAD) technique. A CBEFF biometric product owner is an organization (registered as a CBEFF biometric organization) that assigns a biometric product identifier to a biometric product. A biometric product owner can be a public standards organization such as a standards body, working group, or industry consortium (such an organization would, coincidentally, also qualify as a CBEFF patron), or any organization, such as a vendor or integrator, that has a need to assign biometric product identifiers to biometric products. A given organization can be the owner of one or more entities in one or more of these categories (also including BDB formats and SB formats as additional categories) with no restrictions on the number of entities owned by the organization or on which categories those entities may belong to.

A CBEFF biometric product owner assigns biometric product identifiers to one or more biometric products. The identified products can be hardware or software products or a combination of hardware and software. Examples of biometric products are biometric service providers (BSPs as defined by ISO/IEC 19784-1) and biometric transforming applications, as well as the specific product types mentioned in the previous paragraph. A biometric product identifier unambiguously identifies a biometric product within those that have been assigned an identifier by the biometric product owner. A biometric product identifier may, but need not, be registered with the Biometric Registration Authority.

A CBEFF capture device type owner, feature extraction algorithm owner, comparison algorithm owner, quality algorithm owner, compression algorithm owner, or PAD technique vendor assigns capture device type identifiers (or feature extraction algorithm identifiers, etc.) to one or more capture device types (or feature extraction algorithms, etc.), respectively. A capture device type identifier (or feature extraction algorithm identifier, etc.) unambiguously identifies a capture device type (or feature extraction algorithm, etc.) within those that have been assigned an identifier by the owner/vendor. A capture device type identifier (or feature extraction algorithm identifier, etc.) may, but need not, be registered with the Biometric Registration Authority.

CBEFF also defines the concept of a CBEFF security block (SB) format owner. A CBEFF security block format owner is an organization (registered as a CBEFF biometric organization) that assigns a security block format identifier to a security block format. A CBEFF security block format owner can be a public standards organization such as a standards body, working group, or industry consortium (such an organization would, coincidentally, also qualify as a CBEFF patron) or any organization, such as a vendor or integrator, that has a need to assign security block format identifiers to security block formats. A security block format owner can also, but need not, be a BDB format owner and vice versa.

A CBEFF security block format owner assigns security block format identifiers to one or more security block formats. A security block format identifier unambiguously identifies a security block format within those that have been assigned an identifier by the biometric security block format owner. A security block format identifier may, but need not, be registered with the Biometric Registration Authority.

This part of ISO/IEC 19785 specifies a simple CBEFF BIR structure (the format of which can only be inferred from the domain of use in which such a BIR is encountered) and a complex CBEFF BIR structure (the format of which can also only be inferred from the domain of use in which such a BIR is encountered) and gives the requirements for the specification of a CBEFF patron format based on either of these abstract data structures.

This part of ISO/IEC 19785 also specifies a self-identifying simple CBEFF BIR structure that includes mandatory data elements that identify the format of the structure.

This part of ISO/IEC 19785 also specifies a multiple CBEFF BIR structure upon which patrons can specify BIR formats that support one or more sub-BIRs. BIR formats conforming to this structure may or may not be self-identifying.

This part of ISO/IEC 19785 also specifies transformations of BIRs from one CBEFF patron format into a different CBEFF patron format.

Clause 2 specifies the conformance requirements for CBEFF patrons that define CBEFF patron formats. It also specifies the conformance requirements for biometric transforming applications and for implementations claiming conformance to a specific patron format.

Clause 9 specifies the CBEFF-defined abstract data elements and the transformation requirements for each data element. CBEFF permits CBEFF patrons to specify additional abstract data elements.

Annex A is normative. It defines a patron format conformance statement that patrons are to complete and publish as part of their patron format specifications as assurance that the format fully complies with CBEFF requirements.

Annex B is informative. It explains the naming conventions used for data elements and abstract values specified in this part of ISO/IEC 19785 and in ISO/IEC 19785-3.

Annex C is informative. It identifies the CBEFF Registration Authority.

Information technology — Common Biometric Exchange Formats Framework —

Part 1: Data element specification

1 Scope

This part of ISO/IEC 19785 defines structures and data elements for biometric information records (BIRs).

This part of ISO/IEC 19785 defines the concept of a domain of use to establish the applicability of a standard or specification that complies with CBEFF requirements.

This part of ISO/IEC 19785 defines the concept of a CBEFF patron format, which is a published BIR format specification that complies with CBEFF requirements, specified by a CBEFF patron.

This part of ISO/IEC 19785 defines the abstract values (and associated semantics) of a set of CBEFF data elements to be used in the definition of CBEFF patron formats.

This part of ISO/IEC 19785 specifies the use of CBEFF data elements by a CBEFF patron to define the content and encoding of a standard biometric header (SBH) to be included in a biometric information record (i.e. the definition of a CBEFF patron format).

This part of ISO/IEC 19785 provides the means for identification of the formats of the BDBs in a BIR but the standardization and interoperability of BDB formats are not in the scope of this part of ISO/IEC 19785. It also provides a means (the security block) for BIRs to carry information about the encryption of a BDB in the BIR and about integrity mechanisms applied to the BIR as a whole; the structure and content of security blocks are not in the scope of this part of ISO/IEC 19785. Further, the specification of encryption mechanisms for BDBs and of integrity mechanisms for BIRs is not in the scope of this part of ISO/IEC 19785.

This part of ISO/IEC 19785 specifies transformations from one CBEFF patron format to a different CBEFF patron format.

The encoding of the abstract values of CBEFF data elements to be used in the specification of CBEFF patron formats is not in the scope of this part of ISO/IEC 19785.

ISO/IEC 19785-3 specifies several patron format specifications for which ISO/IEC JTC 1 SC 37 is the CBEFF patron.

ISO/IEC 19785-4 specifies several security block format specifications for which ISO/IEC JTC 1 SC 37 is the CBEFF patron.

Protection of the privacy of individuals from inappropriate dissemination and use of biometric data is not in the scope of this part of ISO/IEC 19785 but may be subject to national regulation.

2 Conformance

2.1 A conforming CBEFF patron

a) shall define CBEFF patron formats in accordance with the requirements of 7.2 (CBEFF simple BIR structure) or in accordance with the requirements of 7.3 (CBEFF complex BIR structure) or in accordance with the requirements of 7.4 (self-identifying simple CBEFF BIR structure) or in accordance with the requirements of 7.5 (multiple CBEFF BIR structure),

b) shall include in the specification of a patron format

1) the (human-readable) name of the CBEFF patron,

2) the decimal and hex values of the patron identifier assigned by the Biometric Registration Authority,

3) the (human-readable) patron format name,

4) the decimal and hex values of the patron format identifier that the CBEFF patron has assigned to this patron format,

5) the full ASN.1 object identifier for this patron format in both ASN.1 value notation and in XML value notation formats,

6) a description of the intended domain of use,

7) the version identifier of the patron format,

8) the version of CBEFF under which the patron format is specified,

9) the specification of the CBEFF-defined data elements and abstract values that are supported, and

10) the specification of any additional patron-defined data elements and abstract values that are supported, and

c) shall include a completed patron format conformance statement in its patron format specification.

2.2 A conforming biometric transformation implementation shall transform a BIR in one CBEFF patron format into a BIR in the same or a different CBEFF patron format in accordance with the requirements of Clause 8.

2.3 An implementation shall claim to support a (specified) CBEFF patron format if and only if it is capable of encoding abstract values into or decoding abstract values from that (specified) CBEFF patron format.

3 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 2382-37, *Information technology — Vocabulary — Part 37: Biometrics*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 2382-37 and the following apply.

4.1
BDB format identifier
unique (within a biometric organization) identifier of a format for a BDB, where that format has been fully defined by a CBEFF biometric organization called the *BDB format owner* (4.2)

4.2
BDB format owner
CBEFF biometric organization that defines a BDB format and assigns a BDB format identifier to it

4.3
biometric
pertaining to the field of biometrics

Note 1 to entry: "biometric" should never be used as a noun.

4.4
biometrics
automated recognition of individuals based on their behavioural and biological characteristics

4.5
biometric data block
BDB
block of data conforming to a defined format

Note 1 to entry: The BDB is normally opaque to the processing of an SBH and is not required to be self-delimiting.

4.6
biometric information record
BIR
data structure containing one or more BDBs together with information identifying the BDB formats and possibly further information such as whether a BDB is encrypted or the BIR is signed

4.7
biometric product
software or hardware product or a combination of software and hardware, which is assigned a biometric product identifier by a CBEFF biometric organization called the biometric product owner of the biometric product

4.8
biometric product identifier
identifier assigned to a biometric product that unambiguously identifies the biometric product within the biometric products that have been assigned an identifier by a biometric product owner

4.9
biometric product owner
CBEFF biometric organization that assigns biometric product identifiers to biometric products

Note 1 to entry: The organization may or may not be the manufacturer of the products.

4.10
biometric sample
analog or digital representation of biometric characteristics prior to biometric feature extraction

EXAMPLE A record containing the image of a finger is a biometric sample.

4.11
biometric template
set of stored biometric features comparable directly to probe biometric features

4.12
biometric transformation
transformation of a BIR in an initial patron format into a BIR in a target patron format

Note 1 to entry: This can (but need not) include processing of the content of the BDB (see 9.23 and 9.26).

4.13
capture device type
hardware product or a combination of software and hardware which is assigned a capture device type identifier by a CBEFF biometric organization

4.14
capture device type identifier
identifier assigned to a capture device by a capture device type owner that unambiguously (given the capture device type owner) identifies the capture device

4.15
capture device type owner
CBEFF biometric organization that assigns capture device type identifiers to capture devices

Note 1 to entry: The organization may or may not be the manufacturer of the capture devices.

4.16
captured biometric sample
biometric sample resulting from a biometric capture process

4.17
CBEFF biometric organization
organization that is accepted for registration with the Biometric Registration Authority

Note 1 to entry: A CBEFF biometric organization can define BDB formats, assign BDB format identifiers to them, assign biometric product identifiers to biometric products, assign capture device identifiers to capture devices, assign feature extraction algorithm identifiers to feature extraction algorithms, assign comparison algorithm identifiers to comparison algorithms, assign quality algorithm identifiers to quality algorithms, assign compression algorithm identifiers to compression algorithms, assign PAD technique identifiers to PAD techniques, and define SB formats and assign SB format identifiers to them. If the organization is also accepted as a CBEFF patron, it can also define CBEFF patron formats.

4.18
CBEFF biometric organization identifier
unique identifier assigned to a CBEFF biometric organization when it registers with the Biometric Registration Authority

4.19
CBEFF patron
recognized standards development organization (which can be a standards body, working group, or industry consortium) that has been accepted for registration with the Biometric Registration Authority as a CBEFF patron and that can therefore specify one or more CBEFF patron formats

4.20
CBEFF patron format
format for a BIR that is fully defined by a CBEFF patron

Note 1 to entry: See 7.2, 7.3, 7.4, and 7.5.

4.21
CBEFF root header
CBEFF standard biometric header that precedes all other standard biometric headers in a complex CBEFF BIR structure or a multiple CBEFF BIR structure and which does not have a BDB associated with it

4.22
CBEFF sub-header
CBEFF standard biometric header in a complex CBEFF BIR structure that follows the CBEFF root header and that either immediately precedes a BDB or is followed by further CBEFF sub-headers

Note 1 to entry: See 7.3.

4.23
comparison algorithm
algorithm which is assigned a comparison algorithm identifier by a CBEFF biometric organization

4.24
comparison algorithm identifier
identifier assigned to a comparison algorithm that unambiguously (given the comparison algorithm owner) identifies the algorithm

4.25
comparison algorithm owner
CBEFF biometric organization that assigns comparison algorithm identifiers to comparison algorithms

Note 1 to entry: The organization may or may not be the intellectual property owner of the comparison algorithms.

4.26
complex CBEFF BIR structure
structure for a CBEFF BIR that can contain multiple BDBs, each having its own SBH, plus additional SBHs that express the relationships among the BDBs

Note 1 to entry: See 7.3.

4.27
compression algorithm
algorithm which is assigned a compression algorithm identifier by a CBEFF biometric organization

4.28
compression algorithm identifier
identifier assigned to a compression algorithm that unambiguously (given the compression algorithm owner) identifies the algorithm

4.29
compression algorithm owner
CBEFF biometric organization that assigns compression algorithm identifiers to compression algorithms

Note 1 to entry: The organization may or may not be the intellectual property owner of the compression algorithms.

4.30
domain of use
application space defined by a CBEFF patron where a CBEFF patron format specified by that patron is intended to be used

4.31
feature extraction algorithm
algorithm which is assigned a feature extraction algorithm identifier by a CBEFF biometric organization

4.32
feature extraction algorithm identifier
identifier assigned to a feature extraction algorithm that unambiguously (given the feature extraction algorithm owner) identifies the algorithm

4.33
feature extraction algorithm owner
CBEFF biometric organization that assigns feature extraction algorithm identifiers to feature extraction algorithms

Note 1 to entry: The organization may or may not be the intellectual property owner of the feature extraction algorithms.

4.34
intermediate biometric sample
biometric sample resulting from intermediate biometric sample processing

4.35
multiple CBEFF BIR structure
structure for a CBEFF BIR that can contain one or more BIRs and that is not a complex CBEFF BIR

Note 1 to entry: *complex CBEFF BIR structure* (4.26).

4.36
PAD technique
technique that is assigned a PAD technique identifier by a CBEFF biometric organization

4.37
PAD technique identifier
identifier assigned to a PAD technique that unambiguously (given the PAD technique vendor) identifies the technique

4.38
PAD technique vendor
CBEFF biometric organization that assigns PAD technique identifiers to PAD techniques

4.39
processed biometric sample
biometric sample suitable for comparison

4.40
quality algorithm
algorithm which is assigned a quality algorithm identifier by a CBEFF biometric organization

4.41
quality algorithm identifier
identifier assigned to a quality algorithm that unambiguously (given the quality algorithm owner) identifies the algorithm

4.42
quality algorithm owner
CBEFF biometric organization that assigns quality algorithm identifiers to quality algorithms

Note 1 to entry: The organization may or may not be the intellectual property owner of the quality algorithms.

Note 2 to entry: For the purposes of this part of ISO/IEC 19785, quality algorithm owner is generally synonymous with the term "quality algorithm vendor" used in some parts of ISO/IEC 19794.

4.43
security block
SB
block of data with a defined format that contains information concerning the encryption of BDBs in a BIR and the integrity of the BIR

4.44
security block format identifier
unique (within a biometric organization) identifier of a format for a security block, where that format has been fully defined by a CBEFF biometric organization (called the security block format owner)

4.45
security block format owner
CBEFF biometric organization that defines a security block format and assigns a security block format identifier to it

4.46
self-identifying simple CBEFF BIR structure
structure for a CBEFF BIR that contains one SBH and one or more BDBs and includes the character string "SBIR" in the SBH's first four bytes and includes the data elements CBEFF_BIR_self_id_owner and CBEFF_BIR_self_id_type in the SBH

Note 1 to entry: See 7.4, 9.5, and 9.6.

4.47
simple CBEFF BIR structure
structure for a CBEFF BIR that contains precisely one SBH and one or more BDBs

Note 1 to entry: See 7.2.

4.48
source BIR
CBEFF BIR that is the input to a transforming application

4.49
standard biometric header
SBH
part of a CBEFF compliant BIR structure that provides encodings for abstract values of CBEFF data elements and enables an application to obtain knowledge about the format of the BDBs that are contained in the BIR without having to process the BDBs themselves

Note 1 to entry: BDBs are not required to be (and generally are not) self-identifying. Identification of BDB formats is provided in CBEFF data elements.

4.50
target BIR
CBEFF BIR that is the output BIR of a transforming application

5 Symbols and abbreviated terms

BDB	biometric data block
BIR	biometric information record
BSP	Biometric Service Provider
CBEFF	Common Biometric Exchange Formats Framework
MAC	message authentication code
PAD	presentation attack detection
SB	security block
SBH	standard biometric header
UTC	Coordinated Universal Time (see ISO 8601)

6 Biometric Identifiers

Biometric-based authentication systems and applications are expected to support multiple biometric devices, multiple biometric data formats, and multiple algorithms for feature extraction, comparison, quality determination and compression, and PAD (Presentation Attack Detection) techniques, possibly each from a different vendor. The Common Biometric Exchange Formats Framework (CBEFF) promotes interoperability of biometric-based application programs and systems developed by different vendors by facilitating biometric data interchange. Such exchanges are supported by providing *unambiguous*

identification of biometric organizations, formats and products, with separate registration of identifiers for components of products that are biometric products, including specialised products like capture devices, feature extraction algorithms, comparison algorithms, quality algorithms, compression algorithms, or PAD techniques.

The Biometric Registration Authority (RA) exists to insure unambiguous assignment of biometric identifiers to organizations, products, algorithms and techniques. The RA publishes registries of these identifiers to facilitate their use by biometric applications.

The registration process is universal, assigns unique and unambiguous identifiers, and avoids changes in identifiers over time.

The publication of the registers promotes compatibility in interchange of biometric data and improves interoperability of biometric systems. Registration provides an identifier, but registration should not be regarded as a standardization procedure. Nevertheless, as a matter apart from registration, the registered object may, but need not, be the subject of an international, national, or other standard.

6.1 Assignment of identifiers to biometric organizations and biometric objects

The Biometric Registration Authority shall assign identifiers to biometric organizations and shall record such values in the biometric organization register. Identifiers shall be expressible as 16-bit positive integers (see 6.2.4). The value zero and the values in sequence beginning from 61440 (F000 hex) to 65535 (FFFF hex) shall be reserved in the register of biometric organizations and shall not be assigned. Values assigned to Subcommittees of ISO IEC JTC 1 shall be assigned in sequence beginning from 257 (0101 hex) to 511 (01FF hex). Values assigned to all other biometric organizations shall be assigned in sequence beginning from one (0001 hex) to 256 (0100 hex), and 512 (0200 hex) to 61439 (EFFF).

ASN.1 object identifier components are assigned to:

a) Organizations concerned with the specification of biometric formats or with biometric products that either directly, or through the data that they produce, claim conformance to or can be used in conjunction with ISO/IEC 19785, ISO/IEC 19784, or one of the parts of ISO/IEC 19794;

b) Biometric objects of various types where the relevant ISO/IEC Subcommittee has formally defined each type in an International Standard and has requested the Biometric Registration Authority to establish and maintain a register for that type.

NOTE International Standards do not require the registration of biometric objects, but registration is possible if a CBEFF biometric organization considers that registration would be beneficial.

Individual biometric organizations shall assign identifiers to the biometric objects that they seek to register. Biometric organizations shall not assign duplicate identifiers to objects of the same object type. As with biometric organization identifiers, biometric object identifiers shall be expressible as 16-bit positive integers.

6.2 Identifier attributes

6.2.1 ASN.1 object identifiers are a form of worldwide unambiguous identification based on a hierarchical tree structure, and independent hierarchical registration authorities. The ASN.1 object identifier tree has a root arc, arcs beneath that root arc, arcs beneath each of those arcs, and so on, to any depth. Arcs are identified by positive integer values (zero upwards) that provide unambiguous identification of an arc within the superior arc. Arcs can also be given names, but these are subsidiary to the numerical values and are not required. (Names shall consist of an arbitrary number (one or more) of letters, digits, and hyphens. The first character shall be a lower-case letter. The last character shall not be a hyphen. A hyphen shall not be immediately followed by another hyphen.) An object is identified by the sequence of arc values (numerical, or for early arcs, arc names) from the root to the object.

NOTE For a fuller description of the ASN.1 object identifier tree, see ISO/IEC 8824-1.

6.2.2 It is possible in representations of an object identifier to imply (by the context of that representation) identification of part of the path from the root to a node in the object identifier tree. In the extreme case, only a single object identifier component from that implied node need be represented.

NOTE This is the approach taken by ISO/IEC 19785-1 and by ISO/IEC 19784. These use a sixteen-bit field to provide the identification of an object identifier arc beneath an arc that is implied by the context. In other contexts, the full object identifier value should be given.

6.2.3 Components of ASN.1 object identifiers are positive integers (including zero) of unlimited magnitude. However, there are standards, for example ISO/IEC 19784-1, using the components allocated by this RA that use a simple 16-bit positive integer encoding for such components. The RA is therefore required to allocate values for arcs that can be represented as a 16-bit positive integer, and to alert the relevant ISO/IEC Subcommittee before making allocations with any of the top three bits set to one.

NOTE It is expected that allocations will normally start at zero and proceed incrementally upwards except under exceptional requirements.

6.2.4 Successful registration as a biometric organization provides that biometric organization with a CBEFF biometric organization identifier. This is a sixteen-bit binary value (that can be interpreted as a positive integer) for an ASN.1 object identifier arc under

{iso registration-authority cbeff(19785) biometric-organization(0)}

The allocated object identifier value is worldwide unambiguous, but the CBEFF biometric organization identifier can also be used alone in contexts where the preceding arcs are implied.

6.2.5 A biometric organization that is recognized by the RA as the producer of open standards (standards that are subject to vetting procedures that ensure that they are technically correct and accurate and have wide-spread approval) will be recorded as having open standardization privileges, and is then called a CBEFF patron, and its CBEFF biometric organization identifier is called a CBEFF patron identifier. Any registered biometric organization can register BDB formats (see 6.2.7), SB formats (see 6.2.8), and biometric products (see 6.2.9 and 6.2.10), but only a CBEFF patron can register a BIR format - a CBEFF patron format (see 6.2.6).

6.2.6 Successful registration of a BIR format by a CBEFF patron records that the BIR format is identified by an arc with a sixteen-bit BIR format identifier (provided by the CBEFF patron) and also called a CBEFF patron format identifier, under the arc

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id > birs(1)}

and enables publication of a reference to the specification of that BIR format (CBEFF patron format). The <organization id> is either the decimal value of the sixteen-bit CBEFF patron identifier of the definer of the CBEFF patron format, or is an arc identifier followed by the decimal value in parentheses. The allocated object identifier value is worldwide unambiguous, but the BIR format identifier can also be used alone in contexts where the preceding arcs are implied.

6.2.7 Successful registration of a BDB format by a biometric organization records that the BDB format is identified by an arc with a sixteen-bit BDB format identifier (provided by the CBEFF biometric organization) under the arc

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id> bdbs(0)}

and enables publication of a reference to the specification of that BDB format. The <organization id> is either the decimal value of the sixteen-bit CBEFF biometric organization identifier of the definer of the BDB format, or is an arc identifier followed by the decimal value in parentheses. The allocated object identifier value is worldwide unambiguous, but the BDB format value can also be used alone in contexts where the preceding arcs are implied.

6.2.8 Successful registration of an SB format by a biometric organization records that that SB format is identified by an arc with a sixteen-bit SB format identifier (provided by the CBEFF biometric organization) under the arc

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id > sb-formats(3)}

and enables publication of a reference to the specification of that SB format. The <organization id> is either the sixteen-bit CBEFF biometric organization identifier of the definer of the SB format, or is an arc identifier followed by the decimal value in parentheses. The allocated object identifier value is worldwide unambiguous, but the SB format value can also be used alone in contexts where the preceding arcs are implied.

6.2.9 Successful registration of a biometric product by a CBEFF biometric organization records that the biometric product is identified by an arc with a CBEFF biometric product identifier allocated by the Registration Authority. This is a sixteen-bit binary value (that can be interpreted as a positive integer) for an ASN.1 object identifier arc under

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id> products(2)}

The <organization id> is either the sixteen-bit CBEFF biometric organization identifier of the owner of the biometric product, or is an arc identifier followed by the decimal value in parentheses. The allocated object identifier value is worldwide unambiguous, but the biometric product identifier can also be used alone in contexts where the preceding arcs are implied.

6.2.10 Successful registration of a specialised biometric product by a CBEFF biometric organization records that the specialised biometric product is identified (within its category) by an arc with a CBEFF biometric product identifier allocated by the Registration Authority. This is a sixteen-bit binary value (that can be interpreted as a positive integer) for an ASN.1 object identifier arc under one of the arcs:

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id>capture-device(4)}

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id>feature-extraction-algorithm(5)}

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id>comparison-algorithm(6)}

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id>quality-algorithm(7)}

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id>compression-algorithm(8)}

{iso registration-authority cbeff(19785) biometric-organization (0) <organization id>PAD-technique(9)}

according to the category of the specialised product. The <organization id> is either the sixteen-bit CBEFF biometric organization identifier of the owner of the biometric product, or is an arc identifier followed by the decimal value in parentheses. The allocated object identifier value is worldwide unambiguous, but the biometric product identifier can also be used alone in contexts where the category of the specialised product (and earlier arcs) is implied.

6.2.11 All the above 16 bit identifiers are notified to applicants, and recorded in the registers as four hexadecimal digits. These four hexadecimal digits can also be considered as a positive integer value, and the use of the hexadecimal format does not carry any implications of the representation of this value in machine-readable or other material.

7 Biometric Information Record (BIR) structures

7.1 General

7.1.1 CBEFF allows the specification of CBEFF patron formats based on the simple CBEFF BIR structure (see 7.2), the complex CBEFF BIR structure (see 7.3), the self-identifying simple CBEFF BIR structure (see 7.4), or the multiple CBEFF BIR structure (see 7.5).

7.1.2 CBEFF patron formats may, but need not, be registered and have their patron-assigned identifiers published by the Biometric Registration Authority.

NOTE Patron formats that are not registered may not be usable in environments where interoperability or transformation of BIRs is a requirement.

7.1.3 It is intended that a single CBEFF patron format would normally be the only patron format used in a given domain of use, so its identification could be implicit in that domain of use. Where more than one CBEFF patron format is needed in a given domain of use (perhaps for historical reasons), the identification of the multiple patron formats is by local means, which could, but need not, make use of a registered patron format identifier, or of an identification issued by a CBEFF patron that is recognized for that domain of use. CBEFF Version 3.0 (this version) adds the concept of the self-identifying BIR structure.

7.1.4 A CBEFF biometric organization can define BDB formats and SB formats and assign identifiers to them. BDB format and SB format identifiers shall be integers within the range 1 to 65535. Each identifier shall be unambiguous within the BDB formats or SB formats defined by the CBEFF biometric organization. The biometric organization is called the BDB format owner or SB format owner of that BDB or SB format. The pair "BDB format owner - BDB format identifier" thus identifies the BDB format and the pair "SB format owner - SB format identifier" identifies the SB format. The BDB or SB format owner may (but need not) register the BDB or SB format identifier with the Biometric Registration Authority.

7.1.5 One of the goals of CBEFF is to uniquely identify the format of every BDB and SB within a BIR. The combination of BDB or SB format owner and BDB or SB format identifier meets this objective.

7.1.6 Another goal of CBEFF is to enable the unique identification of the originator of a BDB within a BIR. The combination of BDB product owner and BDB product identifier, when included in a patron format, meets this objective. A CBEFF biometric organization can assign a biometric product identifier to a software or hardware product. The product may (but need not) be produced or specified by that organization. A biometric product identifier shall be an integer within the range 1 to 65535 and shall be unambiguous within the biometric products that have been assigned an identifier by that CBEFF biometric organization. The biometric organization is called the biometric product owner of that product. The pair "biometric product owner - biometric product identifier" thus identifies the product. The biometric product owner may, but need not, register the biometric product identifier with the Biometric Registration Authority.

7.1.7 Another goal of CBEFF is to enable the unique identification of the capture device type, feature extraction algorithm, comparison algorithm, quality algorithm, compression algorithm, and PAD technique that were used to produce a BDB (possibly at different stages of its lifecycle). The combination of capture device type owner and capture device type identifier (or feature extraction algorithm owner and feature extraction algorithm identifier, etc.) meets this objective. A CBEFF biometric organization can assign a capture device type identifier to a capture device type. The capture device may (but need not) be produced or specified by that organization. A capture device type identifier shall be an integer within the range 1 to 65535 and shall be unambiguous within the capture device types that have been assigned an identifier by that CBEFF biometric organization. The biometric organization is called the capture device type owner of that capture device type. The pair "capture device type owner and capture device type identifier" thus identifies the capture device type. The capture device type owner may, but need not, register the capture device type identifier with the Biometric Registration Authority. Referencing an unregistered capture device type identifier is not permitted. The provisions in this subclause also apply

to feature extraction algorithms, comparison algorithms, quality algorithms, compression algorithms, and PAD techniques and to their respective owners and identifiers, by replacement of the term “capture device” with “feature extraction algorithm”, etc., wherever it occurs in this subclause.

7.1.8 There is no CBEFF abstract value NO VALUE AVAILABLE for data elements defined as mandatory, and such an abstract value shall not be added by patron format specifications for such data elements.

7.1.9 CBEFF defines certain of the data elements in Clause 9 to be “optional.” This means that a patron format can require such a data element to always be included in an encoding of the patron format, to never be included, or to be included only under certain conditions. If the patron format requires the data element to never be included, then the patron format shall define no abstract values or encodings for that data element, and any transformations from or to that patron format will assume the abstract value NO VALUE AVAILABLE for that data element. If the patron format requires the data element to always or conditionally be included, then an encoding for the abstract value NO VALUE AVAILABLE shall be specified, and encodings for other abstract values of the CBEFF data element may be specified as options of the patron format. CBEFF patron formats that include data elements marked “Optional” shall enumerate the CBEFF-defined abstract values that are supported in that patron format.

7.1.10 CBEFF imposes no requirement regarding the order of data elements in a patron format specification, except for self-identifying CBEFF BIR structures (see 7.4).

7.1.11 CBEFF imposes the general requirement that an entire SBH shall not be encrypted, unless used in an environment in which all information is encrypted. One of the important goals of CBEFF is that applications using biometric data be able to easily determine whether they need to process a particular BDB without having to examine the contents of the BDB itself. The data elements encoded in unencrypted standard biometric headers enable this determination to be made.

NOTE CBEFF permits the encryption of certain CBEFF-defined data elements that will not be processed until after the application has determined that the BDB is to be processed. See 9.12 and 9.36.

7.1.12 If a simple BIR or self-identifying BIR has integrity applied to it, either via MAC (Message Authentication Code) or digital signature, then the SBH and BDBs shall be included in the data covered by the MAC or signature. If the BIR is a complex BIR or multiple BIR, then integrity can optionally be applied to the entire complex BIR, and integrity can also, optionally, be separately applied to individual simple or complex BIRs that are combined into the complex BIR.

7.1.13 The specification of the CBEFF patron format can require that the BDBs in a BIR shall be encrypted using specified encryption algorithms (specified dynamically in the SB, or statically in the BIR specification), or that they shall not be encrypted, or that encryption of the BDBs is optional (using specified encryption algorithms, or using any identified (dynamically or statically) encryption algorithms).

NOTE Specifying that encryption or integrity is to be used normally requires identification of an encryption or integrity algorithm and agreement between parties on parameters and keys associated with those algorithms. This International Standard does not predetermine the means of agreement on these encryption or integrity parameters, but it does provide a CBEFF data element (the SB) for the specification of the encryption and integrity algorithm(s) used, as well as CBEFF data elements that identify the format and content of the SB.

7.1.14 A BDB shall be an integral multiple of eight bits.

NOTE There is no CBEFF-defined data element for length determination of the BDB, as this is an encoding issue that is not relevant at the abstract (coding-independent) level.

7.2 Defining a CBEFF patron format using the simple CBEFF BIR structure

In a CBEFF patron format for a BIR that is specified using the simple CBEFF BIR structure, fields corresponding to CBEFF data elements shall be included as part of a single SBH (see 7.2.1). The SBH shall be followed by a field that contains one or more BDBs (in any standardized or vendor-defined

format – see 7.2.2). The BDBs may be followed (in some or in all instances of the BIR, as specified by the CBEFF patron format) by a security block (SB) (see 7.2.3). Figure 1 illustrates such a BIR. Each section of the BIR is defined in the following sub-clauses.

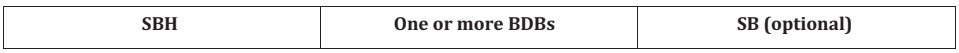

Figure 1 — Simple BIR structure

7.2.1 Standard biometric header (SBH)

This clause specifies the requirements on CBEFF patrons that define an SBH for use in a BIR specified using the simple CBEFF BIR structure.

7.2.1.1 The SBH shall be a fully specified encoding of abstract values of CBEFF data elements, together (optionally) with additional data elements and abstract values specified by the CBEFF patron. In particular, if any of the BDBs to be used with a patron format are not self-delimiting, that patron format shall include patron-specified data elements and values as needed to fully parse the entire BIR encoding.

7.2.1.2 It is mandatory that the following CBEFF data elements be encoded in the SBH of a simple BIR structure:

a) CBEFF_BDB_format_owner (see 9.1)

b) CBEFF_BDB_format_type (see 9.2)

c) CBEFF_BDB_encryption_options (see 9.3)

d) CBEFF_BIR_integrity_options (see 9.4)

NOTE If a patron format requires either that all BDBs be encrypted or that all BDBs not be encrypted, then, because only one abstract value is possible, the patron format may specify the encoding of CBEFF_BDB_encryption_options as a zero length field, and similarly for CBEFF_BIR_integrity_options of the BIR.

7.2.1.3 The CBEFF data elements CBEFF_BIR_self_id_owner and CBEFF_BIR_self_id_type shall not be encoded in the SBH of a simple BIR structure (see 9.5 and 9.6).

7.2.2 The Biometric data block (BDB)

The BDB is a block of data with a defined format that contains one or more biometric samples or biometric templates or other biometric data. The values of the mandatory CBEFF data elements CBEFF_BDB_format_owner (see 9.1) and CBEFF_BDB_format_type (see 9.2) encoded in the SBH identify the format of the BDB.

NOTE 1 The BDB format can be vendor-specific, or it can be a format defined by a standards body, or industry consortium where the standards body, consortium or vendor has registered with the Biometric Registration Authority to obtain a CBEFF biometric organization identifier (providing the CBEFF_BDB_format_owner value) and has defined a BDB format and assigned a BDB format identifier (forming the CBEFF_BDB_format_type value) to it.

EXAMPLE A BDB may be a 19794 “record”.

NOTE 2 The simple CBEFF BIR structure permits more than one BDB to be associated with one SBH. This could be desirable, for example, if several BDBs of different types are generated by a single interaction between a user and a biometric device (e.g. the captured data of several fingers, the processed templates and the PAD data) and the application deems it valuable to keep the BDBs together as a group, and the formats of the BDBs include information that would otherwise be duplicated in an SBH. Of course, a more or less equivalent result could be achieved if each BDB had its own SBH and the resulting BIRs were collected in a multi-BIR structure. CBEFF supports the application designer making that decision based on the specific situation.

NOTE 3 A patron format that supports more than one BDB associated with an SBH obviously must provide the means of locating each BDB, of knowing how many BDBs there are, and suitable descriptive information about each BDB, including the CBEFF_BDB_format_owner and CBEFF_BDB_format_type data elements for each BDB. It is not in the scope of this part of ISO/IEC 19785 to specify data elements and abstract values to provide such means (except for CBEFF_BDB_format_owner and CBEFF_BDB_format_type), but a CBEFF Patron has the authority to specify suitable data fields and values as needed to achieve a successful implementation.

7.2.3 Security block (SB)

7.2.3.1 CBEFF defines the SB as the top level of a structure that is fully specified by a security block format owner and is identified by a unique, to that owner, security block format identifier.

7.2.3.2 The specification of the CBEFF patron format shall make provision for the presence of the SB if either or both of the following abstract values are supported:

a) the CBEFF_BIR_integrity_options abstract value INTEGRITY

b) the CBEFF_BDB_encryption_options abstract value ENCRYPTION

7.3 Defining a CBEFF patron format using the complex CBEFF BIR structure

7.3.1 A CBEFF patron may define a CBEFF patron format that supports multiple BDBs (each with its own SBH) of the same or different biometric data types (e.g., fingerprint, face and voice, or fingerprint BDBs from more than one finger) in a single BIR. The complex CBEFF BIR structure supports such requirements.

Figure 2 is an example of a patron format based on the complex CBEFF BIR structure that includes both finger minutiae data and iris data.

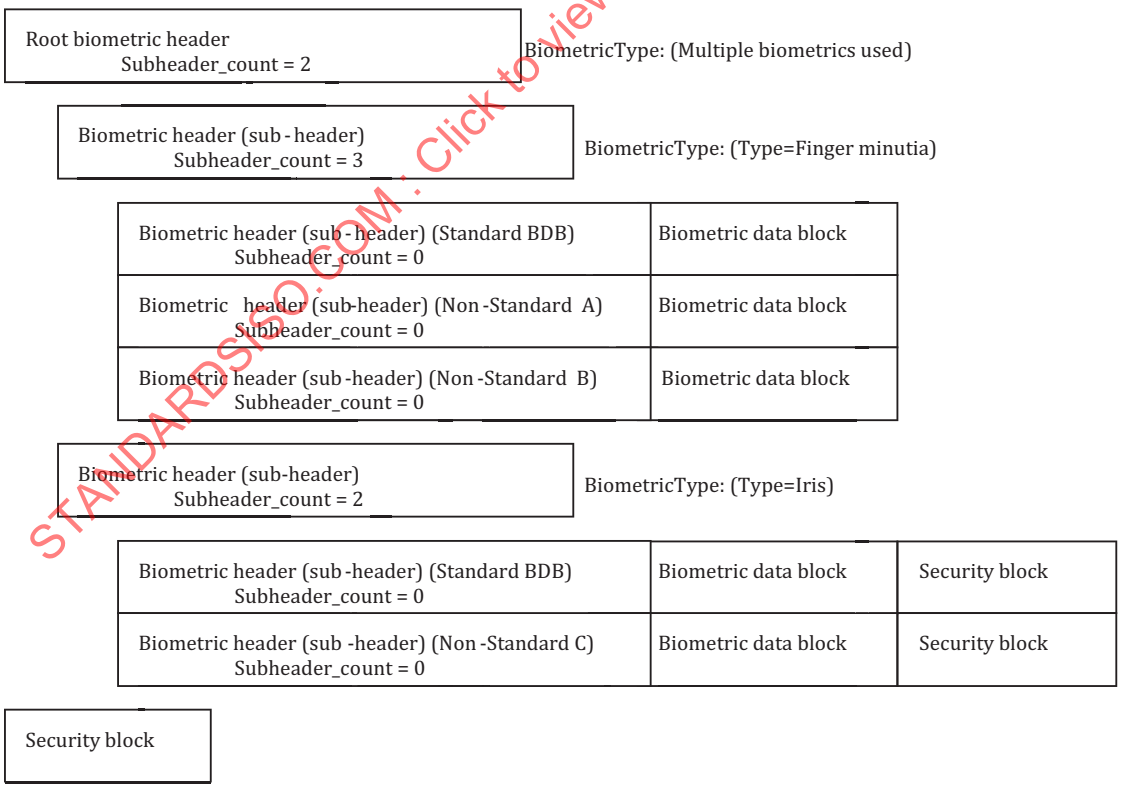

Figure 2 — Example of a patron format based on the complex CBEFF BIR structure

7.3.2 A CBEFF patron format based on the complex CBEFF BIR structure shall consist of:

a) An initial single CBEFF root header (an SBH) followed by

b) either

   1) one or more sub-header blocks, or

   2) one or more level-zero sub-header blocks;

c) and, optionally, a security block. If a patron format includes this security block then the root header shall support the abstract value INTEGRITY of the CBEFF data element CBEFF_BIR_integrity_options. The scope of this security block is the entire complex BIR.

NOTE 7.3.5 requires that the CBEFF data element CBEFF_BDB_encryption_options shall not be supported in a root header.

7.3.2.1 A sub-header block that is not level zero shall consist of:

a) An initial single CBEFF sub-header (an SBH) followed by

b) either

   1) one or more level-zero sub-header blocks or

   2) one or more sub-header blocks that are not level-zero.

7.3.2.2 A level-zero sub-header block shall consist of:

NOTE 1 A level-zero sub-header block conforms to the simple CBEFF BIR structure. Because a simple BIR could become part of a complex BIR, CBEFF patrons specifying simple BIR patron formats should consider whether the inheritance (see 7.3.7) of abstract values from higher levels of a complex BIR will be acceptable. If inheritance of some values will not be acceptable then the simple BIR patron format should support data elements and abstract values that will override inheritance of those values.

a) An SBH that shall have the abstract value ZERO encoded in its CBEFF_subheader_count data element and

b) a BDB,

c) and, optionally, a security block. If a patron format includes this security block to support integrity on this level-zero block, then the sub-header of this level-zero block or a higher level sub-header, but not the root header, shall support the abstract value INTEGRITY of the CBEFF data element CBEFF_BIR_integrity_options. The scope of this security block is only this one level-zero block.

NOTE 2 Even if a level-zero block inherits (see 7.3.7) its INTEGRITY abstract value from a higher level sub-header block, the scope of its security block is only the level-zero block. Also, note that 7.3.5 prevents inheritance of the ENCRYPTION abstract value, so the ENCRYPTION abstract value must be encoded in the level-zero SBH if the BDB is encrypted.

7.3.3 Root header and sub-header blocks shall support encodings of all abstract values of the data element CBEFF_subheader_count.

NOTE The abstract values of this CBEFF data element are integers in the range 0 to 255. The complex CBEFF BIR structure can support any number of levels, but the maximum number of sub-header blocks in one level is 255. If necessary, more than 255 items can be accommodated in a level by inserting a next-higher level sub-header block to start a new count.

7.3.4 The CBEFF data elements CBEFF_BDB_format_owner and CBEFF_BDB_format_type are mandatory in at least one SBH at or above the level of each BDB in a BIR. If the hierarchy of SBHs above a BDB includes either of these data elements at more than one level, then the value at the level closest to the BDB is interpreted as the value applicable to that BDB.

7.3.5 The CBEFF data element CBEFF_BDB_encryption_options shall be encoded in every level 0 SBH, and shall not be encoded in SBHs at other levels of the BIR.

NOTE This requirement reinforces the CBEFF goal to allow encryption only for BDBs, not for entire SBHs.

7.3.6 A CBEFF sub-header that is not a level-zero sub-header shall encode in CBEFF_subheader_count the abstract value corresponding to the number of sub-header blocks that follow in the next lower level.

7.3.7 The CBEFF patron format shall place the following requirements on the encoding of a BIR whose CBEFF patron format was specified using the complex (CBEFF) BIR structure:

a) By default, each data element of a lower level shall inherit the abstract value of its corresponding data element of the next higher level (but see 7.3.5).

b) If an encoding for a data element is present in a substructure, that encoding overrides its default value.

7.4 Defining a CBEFF patron format using the self-identifying simple CBEFF BIR structure

The requirements for specifying a self-identifying simple CBEFF BIR patron format are identical to the requirements for the simple CBEFF BIR structure as defined in 7.2, except for the following.

a) The first 4 bytes of the SBH shall encode the characters “SBIR” as ASCII binary representation in consecutive bytes (Hex bytes 53, 42, 49, and 52).

b) The first 2 fields of the SBH following the “SBIR” character string shall encode the CBEFF data elements CBEFF_BIR_self_id_owner and CBEFF_BIR_self_id_type.

c) The next field shall encode a patron-defined data element enabling determination of the BIR length.

7.5 Defining a CBEFF patron format using the multiple CBEFF BIR structure

The multiple CBEFF BIR structure provides an alternative for Patrons that have a requirement to specify a BIR structure that can include one or more BIRs, but find that the complex CBEFF BIR structure will not meet their needs.

A patron format that conforms to the multiple CBEFF BIR structure shall specify one or more BIR formats that support inclusion in a data structure that has one or more BIRs and that specifies data elements in SBHs or elsewhere that support navigation between the BIRs encoded in that data structure.

NOTE 1 This part of ISO/IEC 19785 does not define any specific requirements on the BIRs that are to be included in a multiple BIR structure. One type of multiple BIR structure might borrow the concept of the CBEFF root header from the complex CBEFF BIR structure (see 7.3), and navigation between the different BIRs could be accomplished by some type of linkage data elements within SBHs of one or more of the included BIRs. Alternatively, a Patron’s domain of use might be such that an index record (which might or might not be specified as a BIR’s SBH) would simply point to the locations within the domain where the included BIRs are to be found.

A patron format specification that conforms to the multiple CBEFF BIR structure shall include in its patron format conformance statement (see Annex A) affirmations that the specification supports access to every BIR that is assigned to an instantiation of the multiple BIR structure.

BIR1	[1]	[2]	BIR2	[3]	BIR3	[4]	[5]
SBH Pointer to BIR2	BDB [6]	SB [7]	SBH Pointer to BIR3	BDB [8]	SBH Pointer x00	BDB [9]	SB [10]

Figure 3 — First example of a BIR based on the multiple CBEFF BIR structure

NOTE 2 This informative example illustrates a possible multiple BIR structure in which the BIRs are linked "end to end" via pointers from one SBH to the next. Any existing or new patron format could be adapted to support this structure with the addition of the pointer data element (see 9.37). If it would be useful the "pointing" SBH could also identify the patron format of the "pointed to" BIR, along with other information about the next BIR that would help the application decide whether to examine that SBH for more than the pointer to a third BIR. Notice that in BIR3 the pointer value is zero, representing the encoding of the abstract value NO SUBSEQUENT BIR. If a fourth BIR were added, the only change needed in the prior BIRs would be to revise the pointer in BIR3's SBH.

Multiple BIR structure			
Root SBH			
Number of BIRs	3	[1]	
BIR1	Pointer 1	Biometric Type	BDB Validity period
BIR2	Pointer 2	Biometric Type	BDB Validity period
BIR3	Pointer 3	Biometric Type	BDB Validity period
[2]	[3]		
	BIR1 SBH	BDB	SB
	BIR2 SBH	BDB	SB
	BIR3 SBH	BDB	SB

Figure 4 — Second example of a BIR based on the multiple CBEFF BIR structure

Note 3 This informative example illustrates a possible multiple BIR structure in which a "root" SBH includes data elements that point directly to other BIRs in the structure; note that there is no BDB associated with the root SBH. This is similar to the complex CBEFF BIR structure, but simpler to construct and process. With appropriate data elements the root SBH could be updated as BIRs are added to or removed from the overall structure. The pointer data elements could be part of a replicated data structure in the root SBH that carries information about the specific BIR to which it points. For example, if the multi-BIR structure represented a single user each BIR in the total structure could contain one type of biometric data from that user (e.g., iris, finger, voice, etc.) and the application could use the descriptive data in the root SBH to decide which specific BIR to access and process.

8 Performing BIR transformations

Applications are permitted to transform BIRs from one patron format (a source BIR) into a new BIR (a target BIR) that uses either the same patron format or a different patron format. Such transformations shall be performed as follows.

8.1 Transformations of enumerated abstract values

CBEFF data elements (mandatory or optional) that have an enumerated list of abstract values shall be mapped as specified in a) and b), except where Clause 9 specifies a different requirement.

NOTE Clause 9 normally specifies a different requirement only when the abstract value to be encoded in the target BIR is provided as local input (not specified by CBEFF) to the transforming application, rather than depending on the abstract value in the source BIR.

a) If the target BIR patron format supports the abstract value in the source BIR, then the abstract value shall be mapped to the target BIR.

b) If the abstract value in the source BIR is not supported by the target BIR patron format, then the abstract value shall be mapped to the abstract value NO VALUE AVAILABLE for that CBEFF data element in the target BIR.

8.2 Transformations of non-enumerated data element values

For CBEFF data elements (mandatory or optional) whose abstract values are a range of character string, octet string, date or decimal values, data element value mappings shall be as specified by the definition of the data element in Clause 9.

9 CBEFF Data Elements

Definitions and abstract values for each of the CBEFF-defined data elements are specified in this clause.

NOTE The subclauses of 9 are ordered as follows: Mandatory data elements in alphabetical order by data element name (9.1 – 9.7), then optional data elements in alphabetical order by data element name (9.8 – 9.42), except that CBEFF_BDB_biometric_type precedes CBEFF_BDB_biometric_subtype because _type and _subtype comprise a hierarchical structure of information, so it is more natural to define _type before _subtype. Except for self-identifying BIRs, CBEFF imposes no requirement regarding the order of data elements in a patron format specification (see 7.1.10).

9.1 CBEFF_BDB_format_owner

9.1.1 Attributes

Inclusion: Mandatory

Abstract values: Integers 0 to 65535

Content: Encodings of this data element identify the standards body, working group, industry consortium, or other CBEFF biometric organization that has defined the format of the BDB associated with the SBH in which the encoding appears. CBEFF requires that organizations defining CBEFF BDB formats register with the Biometric Registration Authority to obtain a unique identifier that shall be encoded in this data element. This unique identifier is a 16-bit non-negative integer. The abstract values of this data element are the set of all possible values of this identifier, all of which are required to be supported by all patron formats.

NOTE The CBEFF biometric organization identifier used in the CBEFF_BDB_format_owner data element together with the BDB format identifier used in the CBEFF_BDB_format_type (see 9.2) uniquely identify the specific format of a BDB. The format of a BDB is "owned" by a biometric organization. The BDB format specification may be published (public) or unpublished (non-public). Its identifier may (but need not) be registered (see 9.2).

9.1.2 Transformation requirements

When transforming a source BIR to a target BIR, the abstract values of the CBEFF_BDB_format_owner and the CBEFF_BDB_format_type data elements shall be copied unless the BDB is also transformed, in which case the target BIR shall identify the target's BDB format owner and format type.

NOTE It is an implementation option whether to transform the BDB format.

9.2 CBEFF_BDB_format_type

NOTE This data element corresponds to the term defined in 4.1, "BDB format identifier".

9.2.1 Attributes

Inclusion: Mandatory

Abstract values: Integers 0 to 65535

Content: Encodings of this data element identify the specific BDB format specified by the CBEFF biometric organization recorded in the CBEFF_BDB_format_owner. This may be a standardized BDB format that has been registered and published by a CBEFF biometric organization such as a standards body or industry consortium, or it may be a non-standard, unpublished BDB format. The registration of the BDB format identifier is optional. Whether registered or not, the identifier is a 16-bit non-negative integer that is unambiguous within the CBEFF biometric organization identifier. The abstract values of this data element are the set of all possible values of this identifier, all of which are required to be supported.

9.2.2 Transformation requirements

See 9.1.2.

9.3 CBEFF_BDB_encryption_options

9.3.1 Attributes

Inclusion: Mandatory (but see 9.3.2)

Abstract values:

— No ENCRYPTION: the BDB is not encrypted

— ENCRYPTION: the BDB is encrypted

Content: Encodings of this data element specify whether the BDB is encrypted or not.

9.3.2 Requirements on patron format specifications

The following requirements apply.

a) CBEFF patron formats are required to support at least one of the abstract values.

NOTE If a patron format supports *only one* abstract value for this data element, it may encode that abstract value as a zero length field.

b) If a patron format supports ENCRYPTION then the CBEFF data elements CBEFF_SB_format_owner and CBEFF_SB_format_type shall be supported, unless all such information is pre-determined by the specification of the patron format.

c) This data element need not be supported in CBEFF patron formats where it is not applicable or where other means exist to express which security options are used.

d) In a complex BIR this data element shall only be supported in level-zero sub-header blocks.

9.3.3 Transformation requirements

When transforming a source BIR to a target BIR, the abstract value of this data element shall be copied unless the encrypted state of the BDB is modified, in which case the target BIR shall encode the target's BDB encryption state. If the target BDB's encryption state is ENCRYPTED, then the target BIR's SBH shall conform to 9.3.2 b).

NOTE It is an implementation option whether to transform the BDB encryption state.

9.4 CBEFF_BIR_integrity_options

9.4.1 Attributes

Inclusion: Mandatory

Abstract values:

— NO INTEGRITY: integrity is not applied to the BIR.

— INTEGRITY: integrity is applied to the BIR.

Content: Encodings of this data element specify whether integrity is applied to the BIR.

9.4.2 Requirements on patron format specifications

The following requirements apply.

a) CBEFF patron formats are required to support at least one of the abstract values.

NOTE If a patron format supports *only one* abstract value for this data element, it may encode this data element as a zero length field.

b) If a patron format supports the abstract value INTEGRITY, then the CBEFF data elements CBEFF_SB_format_owner and CBEFF_SB_format_type shall be supported, unless all such information is pre-determined by the specification of the patron format.

9.4.3 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the abstract value of this data element encoded in the target BIR shall specify the integrity option applied to the target BIR. Further, if the target BIR's integrity state is INTEGRITY, the target BIR's SBH shall conform to 9.4.2 b).

9.5 CBEFF_BIR_self_id_owner

9.5.1 Attributes

Inclusion: Mandatory in BIRs conforming to the self-identifying simple CBEFF BIR structure and shall not be included in a simple CBEFF BIR structure.

This data element shall not be included in a patron format unless CBEFF_BIR_self_id_type is also included (see 9.6).

Abstract values: integers 1 to 65535

Content: Encodings of this data element identify the CBEFF biometric organization that is the CBEFF patron responsible for the patron format of the current SBH. CBEFF requires that organizations register with the Biometric Registration Authority to obtain a unique identifier that shall be encoded in this data element. This unique identifier is a 16-bit positive integer. The abstract values of this data element are the set of all possible values of this identifier, all of which are required to be supported.

9.5.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the abstract value in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.6 CBEFF_BIR_self_id_type

9.6.1 Attributes

Inclusion: Mandatory in BIRs conforming to the self-identifying simple CBEFF BIR structure and shall not be included in a simple CBEFF BIR structure.

This data element shall not be included in a patron format unless CBEFF_BIR_self_id_owner is also included (see 9.5).

Abstract values: integers 1 to 65535

Content: Encodings of this data element specify the CBEFF patron format identifier of the current BIR. The CBEFF patron responsible for the patron format assigns the patron format identifier value and registers it with the Biometric Registration Authority. This unique identifier is a 16-bit positive integer.

The abstract values of this data element are the set of all possible values of this identifier, all of which are required to be supported.

9.6.2 Transformation requirements

See 9.34.2.

9.7 CBEFF_subheader_count

Inclusion:

— Mandatory in patron formats based on the complex CBEFF BIR structure (see 7.3)

— May be absent in patron formats based on the other CBEFF BIR structures (see 7.2, 7.4 or 7.5)

Abstract values: Integers 0 through 255

Content: Encodings of this data element specify the number of sub-header blocks (see 7.3.3) in the next level below the root header or current sub-header. In the lowest level of a complex BIR structure or in a simple BIR structure the abstract value of this data element shall be zero.

9.8 CBEFF_BDB_biometric_type

9.8.1 Attributes

Inclusion: Optional

Abstract values: see Table 1

Content: Encodings of this data element convey the type of biological or behavioural data stored in the BDB of a simple CBEFF BIR structure, or in the BDBs of level zero sub-header blocks in a complex CBEFF BIR structure.

Table 1 — Abstract values for BDB_biometric_type

Named abstract value	Typically has an associated subtype? (see 9.9)
NO VALUE AVAILABLE	No
MULTIPLE BIOMETRIC TYPES	No
DNA	No
EAR	Yes
FACE	No
FINGER	Yes
FOOT	Yes
GAIT	No
HAND GEOMETRY	Yes
IRIS	Yes
KEYSTROKE	No
LIP MOVEMENT	No
PRESENTATION ATTACK DATA	No
RETINA	Yes
SCENT	No
SIGNATURE-SIGN	No

Table 1 *(continued)*

Named abstract value	Typically has an associated subtype? (see 9.9)
VEIN	Yes
VOICE	No

CBEFF patrons are allowed to use any subset of these abstract values and to define additional abstract values as required by the intended domain of use. These additional abstract values may include arbitrary combinations of values, possibly represented by a bit-map, to support precise enumeration of individual types when MULTIPLE BIOMETRIC TYPES is encoded.

9.8.2 Transformation requirements

See 8.1.

NOTE If the source patron format uses a bit-map to represent a number of additional abstract values that are combinations of the above abstract values (see the last paragraph of 9.8.1), and the target patron format does not use such a bit-map, then the MULTIPLE BIOMETRIC TYPES abstract value shall be set in the target patron format.

9.9 CBEFF_BDB_biometric_subtype

9.9.1 Attributes

Inclusion: Optional

Abstract values: see Table 2.

Content: The abstract values of this data element are qualifiers that apply to abstract values of CBEFF_BDB_biometric_type.

Combinations of abstract values are permitted when the abstract value encoded in CBEFF_BDB_biometric_type represents a biometric technology that can create a BDB where multiple subtypes are supported, except that NO VALUE AVAILABLE shall not be used in combination with any other abstract value, and that RIGHT and LEFT may be used in combination with each other but shall not be used in combination with any other abstract value (note that LEFT THUMB is a single abstract value, it is not a combination of LEFT and THUMB).

EXAMPLE 1 If the patron format supports the BDB biometric type RETINA, then that patron format would be likely to (but need not) specify the use of the abstract values LEFT and RIGHT for BDB biometric subtype.

EXAMPLE 2 If a hypothetical iris biometric device can produce a single BDB that contains data for both of a subject's eyes, then the abstract values LEFT and RIGHT would be used in combination to describe that BDB.

Table 2 — Abstract values for CBEFF_BDB_biometric_subtype

Abstract values	Combination permitted with…
NO VALUE AVAILABLE	Combination not permitted
RIGHT	LEFT
LEFT	RIGHT
LEFT THUMB	Any except LEFT or RIGHT
LEFT POINTER FINGER	ditto
LEFT MIDDLE FINGER	ditto
LEFT RING FINGER	ditto
LEFT LITTLE FINGER	ditto
RIGHT THUMB	ditto
RIGHT POINTER FINGER	ditto
RIGHT MIDDLE FINGER	ditto
RIGHT RING FINGER	ditto
RIGHT LITTLE FINGER	ditto
LEFT PALM	ditto
LEFT BACK OF HAND	ditto
LEFT WRIST	ditto
RIGHT PALM	ditto
RIGHT BACK OF HAND	ditto
RIGHT WRIST	ditto
NOTE A BDB format specification determines which (if any) of these qualifiers apply to that BDB format.	

9.9.2 Transformation requirements

See 8.1.

9.10 CBEFF_BDB_capture_device_type_owner

9.10.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_capture_device_type is also included (see 9.11).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the registered biometric organization that owns the capture device that was used in the creation of the BDB (if any). The content of CBEFF_BDB_capture_device_owner shall be a biometric organization identifier (a 16 bit positive integer, assigned by the Biometric Registration Authority).

NOTE CBEFF has required the Biometric Registration Authority to not assign the value zero (Hex 0000) to any biometric organization. Patron format specifications may find it useful to use this value as the encoding for NO VALUE AVAILABLE.

9.10.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.11 CBEFF_BDB_capture_device_type

NOTE This data element corresponds to the term defined in 4.14, "capture device type identifier".

9.11.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_capture_device_type_owner is also included (see 9.10).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the capture device that was used in the creation of the BDB (if any). The capture device type identifier is a 16 bit positive integer assigned by the registered biometric organization that created or owns the capture device and is identified by the CBEFF_BDB_capture_device_type_owner data element.

9.11.2 Transformation Requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.12 CBEFF_BDB_challenge_response

9.12.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— Zero, one, or more octets of transparent data

Content: Encodings of this data element contain data to be used to present a challenge or prompt to the user who is attempting a biometric verification against the biometric template in the BDB. Patron format specifications may, but are not required to, permit the contents of this data element to be encrypted using encryption techniques specified by the patron format or in an associated SB.

EXAMPLE If the biometric type is voice for speaker recognition, this data element may be used to store the phrase the system is to ask the subject to utter, or it may store a pointer to a database that contains the phrase. Patron formats that include values of this data element other than NO VALUE AVAILABLE shall specify the contents of the transparent data.

9.12.2 Transformation requirements

The challenge-response data element (and its content) may be specific to the BDB's content. A transforming application shall copy the content directly from the source BIR to the target BIR unless the target's patron format supports only NO VALUE AVAILABLE.

NOTE Transformation to NO VALUE AVAILABLE may render the BDB unusable.

9.13 CBEFF_BDB_comparison_algorithm_owner

9.13.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_comparison_algorithm_type is also included (see 9.14).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the registered biometric organization that owns the comparison algorithm that was used in the creation of the BDB (if any). The content of CBEFF_BDB_comparison_algorithm_owner shall be a biometric organization identifier (a 16 bit positive integer, assigned by the Biometric Registration Authority).

NOTE CBEFF has required the Biometric Registration Authority to not assign the value zero (Hex 0000) to any biometric organization. Patron format specifications may find it useful to use this value as the encoding for NO VALUE AVAILABLE.

9.13.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.14 CBEFF_BDB_comparison_algorithm_type

NOTE This data element corresponds to the term defined in 4.24, "comparison algorithm identifier".

9.14.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_comparison_algorithm_owner is also included (see 9.13).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the comparison algorithm that was used in the creation of the BDB (if any). The comparison algorithm identifier is a 16 bit positive integer assigned by the registered biometric organization that created or owns the comparison algorithm and is identified by the CBEFF_BDB_comparison_algorithm_owner data element.

9.14.2 Transformation Requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.15 CBEFF_BDB_compression_algorithm_owner

9.15.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_compression_algorithm_type is also included (see 9.16).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the registered biometric organization that owns the compression algorithm that was used in the creation of the BDB (if any). The content of CBEFF_BDB_compression_algorithm_owner shall be a biometric organization identifier (a 16 bit positive integer, assigned by the Biometric Registration Authority).

NOTE CBEFF has required the Biometric Registration Authority to not assign the value zero (Hex 0000) to any biometric organization. Patron format specifications may find it useful to use this value as the encoding for NO VALUE AVAILABLE.

9.15.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.16 CBEFF_BDB_compression_algorithm_type

NOTE This data element corresponds to the term defined in 4.28, “compression algorithm identifier”.

9.16.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_compression_algorithm_owner is also included (see 9.15).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the compression algorithm that was used in the creation of the BDB (if any). The compression algorithm identifier is a 16 bit positive integer assigned by the registered biometric organization that created or owns the compression algorithm and is identified by the CBEFF_BDB_compression_algorithm_owner data element.

9.16.2 Transformation Requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.17 CBEFF_BDB_creation_date

9.17.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— 2000-01-01T00:00:00Z through 3000-12-31T23:59:59Z

Content: This data element specifies the UTC date and time instant (see ISO 8601) that the biometric data in the BDB was captured. CBEFF requires that patron format specifications support abstract values to a precision of one second for this data element.

NOTE 1 The ISO 8601 extended date-time format is used in CBEFF specifications of date-time abstract values.

NOTE 2 UTC is the abbreviation for Coordinated Universal Time as defined in ISO 8601. That standard defines the character "Z" as the designator for UTC in date and time representations.

NOTE 3 For practical reasons. CBEFF intends the UTC date-time instant to be interpreted as a reasonable approximation to the creation date; CBEFF does not require that the date-time instant be precisely recorded as an actual UTC instant to a precision of one second. Patron format specifications may impose a more stringent requirement for particular domains of use, noting likely application requirements.

NOTE 4 CBEFF patrons that require a date-time precision of other than one second may specify their own data element and abstract values.

NOTE 5 Patron format encodings may use a format other than the ISO 8601 extended date-time format (and in particular may use a binary format) for the abstract date-time values.

9.17.2 Transformation requirements

See 8.1.

NOTE If the target patron format defines abstract values with a different time granularity, then these are distinct from the CBEFF-defined abstract values. However, the target patron format specification may specify a mapping from abstract values of greater or lesser granularity to the abstract values that it provides. If no such mapping is specified, then NO VALUE AVAILABLE shall be used as the mapping.

9.18 CBEFF_BDB_feature_extraction_algorithm_owner

9.18.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_feature_extraction_algorithm_type is also included (see 9.19).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the registered biometric organization that owns the feature extraction algorithm that was used in the creation of the BDB (if any). The content of CBEFF_BDB_feature_extraction_algorithm_owner shall be a biometric organization identifier (a 16 bit positive integer, assigned by the Biometric Registration Authority).

NOTE CBEFF has required the Biometric Registration Authority to not assign the value zero (Hex 0000) to any biometric organization. Patron format specifications may find it useful to use this value as the encoding for NO VALUE AVAILABLE.

9.18.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.19 CBEFF_BDB_feature_extraction_algorithm_type

NOTE This data element corresponds to the term defined in 4.32, "feature extraction algorithm identifier".

9.19.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_feature_extraction_algorithm_owner is also included (see 9.18).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the feature extraction algorithm that was used in the creation of the BDB (if any). The feature extraction algorithm identifier is a 16 bit positive integer assigned by the registered biometric organization that created or owns the feature extraction algorithm and is identified by the CBEFF_BDB_feature_extraction_algorithm_owner data element.

9.19.2 Transformation Requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.20 CBEFF_BDB_index

9.20.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— An identifier.

Content: This data element carries the identifier of an object that is related to, but separate from, the BDB with which it is associated. Patron format specifications shall define the abstract values to be encoded herein. If this data element is included in a complex BIR patron format, the format shall specify the data element's interpretation at the different levels of the complex structure.

NOTE Typically, this data element would carry an index to a record in a database that corresponds to the person whose biometric data is in the BDB. Patron formats are permitted to define any similar content for this data element.

9.20.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the value encoded in this data element shall correspond to the situation of the target domain of use. The value depends on the domain of use of the target patron format and on information local to the transforming application, and may be NO VALUE AVAILABLE.

9.21 CBEFF_BDB_PAD_technique_vendor

9.21.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_PAD_technique is also included (see 9.22).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the registered biometric organization that owns the PAD technique that was used in the creation of the BDB (if any). The content of CBEFF_BDB_PAD_technique_vendor shall be a biometric organization identifier (a 16 bit positive integer, assigned by the Biometric Registration Authority).

NOTE CBEFF has required the Biometric Registration Authority to not assign the value zero (0000Hex) to any biometric organization. Patron format specifications may find it useful to use this value as the encoding for NO VALUE AVAILABLE.

9.21.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.22 CBEFF_BDB_PAD_technique

9.22.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_PAD_technique_vendor is also included (see 9.21).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the PAD technique that was used in the creation of the BDB (if any). The PAD technique identifier is a 16 bit positive integer assigned by the registered biometric organization identified by the CBEFF_BDB_PAD_technique_vendor data element.

9.22.2 Transformation Requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.23 CBEFF_BDB_processed_level

9.23.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— RAW (see 4.16, Captured biometric sample)

— INTERMEDIATE (see 4.34)

— PROCESSED (see 4.39)

Content: Encodings of this data element convey the processed state of the biometric samples or templates stored in the BDB (See ISO/IEC 19784-1).

9.23.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the abstract value in the target BIR shall convey the processed level of the target BDB. If the transforming application has not done any processing of the BDB, the value in the target CBEFF BIR shall be copied from the initial CBEFF BIR, or shall be NO VALUE AVAILABLE if the value to be copied is not supported.

9.24 CBEFF_BDB_product_owner

9.24.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_product_type is also included (see 9.25).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the registered biometric organization that owns the product (i.e., the Biometric Service Provider (BSP) or transforming application) that created the BDB. The content of CBEFF_BDB_product_owner shall be a biometric organization identifier (a 16 bit positive integer, assigned by the Biometric Registration Authority).

NOTE 1 The biometric organization identifier encoded in the optional data element CBEFF_BDB_product_owner (if present) may or may not be the same as that encoded in the mandatory data element CBEFF_BDB_format_owner.

NOTE 2 CBEFF has required the Biometric Registration Authority to not assign the value zero (Hex 0000) to any biometric organization. Patron format specifications may find it useful to use this value as the encoding for NO VALUE AVAILABLE.

9.24.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, if the transforming application modifies the BDB's content (for example, by changing its processed level from raw to intermediate), then CBEFF_BDB_product_owner in the target BIR shall identify the biometric organization that owns the transforming application itself, unless the transforming application is required to encode NO VALUE AVAILABLE in this target data element. If the transforming application does not modify the BDB, then the source BIR's abstract value shall be mapped into the target data element.

9.25 CBEFF_BDB_product_type

9.25.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_product_owner is also included (see 9.24).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the product (i.e., the Biometric Service Provider (BSP) or transforming application) that created the BDB. The product identifier is a 16 bit positive integer assigned by the registered biometric organization that created or owns the product and is identified by the CBEFF_BDB_product_owner data element.

9.25.2 Transformation Requirements

If the transforming application changes the value in CBEFF_BDB_product_owner, then this data element in the target BIR shall identify the transforming application itself or shall be NO VALUE AVAILABLE, otherwise the source BIR's value shall be mapped into the target BIR or shall be NO VALUE AVAILABLE.

9.26 CBEFF_BDB_purpose

9.26.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— VERIFY

— IDENTIFY

— ENROLL;

— ENROLL FOR VERIFICATION ONLY

— ENROLL FOR IDENTIFICATION ONLY

— AUDIT

Content: This data element specifies the intended use of the BDB (see ISO/IEC 19784, BioAPI and ISO/IEC 7816).

9.26.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the value in the target BIR shall convey the purpose of the target BDB (for example, a transforming application may process a raw BDB into a processed BDB that has one of the above abstract purposes). If the transforming application has not done such processing, the value in the target BIR shall be copied from the source BIR, or shall be NO VALUE AVAILABLE if not supported in the target BIR.

9.27 CBEFF_BDB_quality

9.27.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— QUALITY NOT SUPPORTED BY BDB CREATOR

— QUALITY SUPPORTED BY BDB CREATOR BUT NOT SET

— An integer quality value in the range 0 to 100 where 100 is the highest quality

Content: This data element specifies the quality of the biometric data in the BDB (see ISO/IEC 19784 BioAPI).

9.27.2 Transformation requirements

See 8.1.

9.28 CBEFF_BDB_quality_algorithm_owner

9.28.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_quality_algorithm_type is also included (see 9.29).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the registered biometric organization that owns the quality algorithm that was used in the creation of the BDB (if any). The content of CBEFF_BDB_quality_algorithm_owner shall be a biometric organization identifier (a 16 bit positive integer, assigned by the Biometric Registration Authority).

NOTE CBEFF has required the Biometric Registration Authority to not assign the value zero (Hex 0000) to any biometric organization. Patron format specifications may find it useful to use this value as the encoding for NO VALUE AVAILABLE.

9.28.2 Transformation requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.29 CBEFF_BDB_quality_algorithm_type

NOTE This data element corresponds to the term defined in 4.41, “quality algorithm identifier”.

9.29.1 Attributes

Inclusion: Optional – this data element shall not be included in a patron format unless CBEFF_BDB_quality_algorithm_owner is also included (see 9.28).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the quality algorithm that was used in the creation of the BDB (if any). The quality algorithm identifier is a 16 bit positive integer assigned by the registered biometric organization that created or owns the quality algorithm and is identified by the CBEFF_BDB_quality_algorithm_owner data element.

9.29.2 Transformation Requirements

When transforming a CBEFF BIR from an initial patron format to a target patron format, the encoding of this data element in the target BIR shall comply with the patron format requirements placed on the target BIR; this may be NO VALUE AVAILABLE.

9.30 CBEFF_BDB_validity_period

9.30.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— 2000-01-01 through 3000-12-31/2000-01-01 through 3000-12-31

Content: This data element conveys the time interval (not before through not after) when the BDB is valid. See 9.17 and its notes for CBEFF's requirements on time representations and other relevant considerations.

NOTE 1 The "/" character between two time representations indicates that the times specify the beginning and end of a time interval.

NOTE 2 CBEFF patrons that require a date-time precision of other than one day may specify their own data element and abstract values.

NOTE 3 Patron format encodings may use a format other than the extended date-time format (and in particular may use a binary format) for the abstract date-time values.

9.30.2 Transformation requirements

System requirements regarding BDB validity period may stem from either of two sources:

a) Administrative requirements may specify a validity period that, for example, corresponds to the interval during which a user is authorized for a privilege that is obtained when the BDB is successfully used for authentication. When that interval expires, the authorization may be renewed for the next interval with no change to the biometric template used for verification; or

b) Technical requirements related to biometric template aging may dictate an interval after which matching accuracy is not sufficiently reliable for the BDB to be used.

Patron format specifications that include this data element shall define transformation rules for this data element when used in a target BIR.

9.31 CBEFF_BIR_creation_date

9.31.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— 2000-01-01T00:00:00Z through 3000-12-31T23:59:59Z

Content: This data element specifies the UTC date and time instant (see ISO 8601) that the BIR was created by a BSP or a transforming application. CBEFF requires that patron format specifications