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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: Spécification des éléments de données

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see http://patents.iec.ch).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 37, *Biometrics*.

This third edition cancels and replaces the second edition (ISO/IEC 19785-1:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

— The self-identifying concept is now permitted to be applied to any of the CBEFF BIR patron formats defined in this document.

— Clarification of presentation attack detection (PAD) terminology has been made.

— Revisions have been made to move a large portion of Clause 6 (Biometric Identifiers) to ISO/IEC 19785-2 since the biometric identifiers are used by the Biometric Registration Authority (BRA).

— Previous versions of this document were published by the US National Institute of Standards and Technology (an agency of the government of the United States of America) and the Biometric Consortium Working Group. The last official non-ISO/IEC release of this document was designated Version 1.1, the first version of this document (ISO/IEC 19785-1:2006) was designated Version 2.0, and the ISO/IEC 19785-1:2015 version was designated Version 3.0. This version of the document is designated Version 4.0 to distinguish the versions of CBEFF products in the marketplace. Version 4.0 is backward compatible with Version 3.0, but the data element names related to PAD have changed.

A list of all parts in the ISO/IEC 19785 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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 BIR is a data structure containing biometric data and descriptive data elements in accordance with the requirements specified in this document. BIRs are typically stored in a database or transmitted between systems or parts of systems. A BIR always has at least two parts: a standard biometric header (SBH) and at least one biometric data block (BDB) that contains the biometric data. 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 shall be an integral number of octets. As an example of a BDB format, see the ISO/IEC 19794 series and ISO/IEC 39794 series of documents which specify standardized BDB formats for several biometric types. BIRs are typically stored in a database or transmitted between systems or parts of systems.

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 BIRs. This document defines these data elements.

CBEFF requires that a Biometric Registration Authority (BRA) exists to assign unique identifiers to biometric organizations, BDB formats, SB formats and other CBEFF entities; to publish the identifiers where appropriate; and to ensure that no conflicts occur between identifiers.

A CBEFF biometric organization is any organization, public or private, that requests and receives a biometric organization identifier from the BRA. 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.

A CBEFF patron format is a full specification of encodings for a particular domain of use and developed by a CBEFF patron. A CBEFF patron format implements some or all of the abstract values of the CBEFF data elements defined in this document (possibly with additional abstract values determined by the CBEFF patron) and supports one or more BDBs containing biometric data. 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. As new technologies evolve, the need for new encoding rules (or support of more or different CBEFF data elements) may require new CBEFF patron formats for a given domain of use.

CBEFF also defines the concept of a CBEFF 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 BRA. A BDB format owner can be a public standards organization (that would 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 unique BDB format identifier. The combination of the BDB format identifier and the format owner's biometric organization identifier unambiguously identifies the BDB format. A BDB format identifier and the corresponding format may, but need not, be registered with the BRA.

CBEFF also defines the concepts of a CBEFF biometric product owner, as well as owners or vendors for the following specific product types: capture device, feature extraction algorithm, comparison algorithm, quality algorithm, compression algorithm and presentation attack detection (PAD) mechanism. 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 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 to which categories those entities may belong.

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, biometric transforming applications, and 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 can, but need not, be registered with the BRA. Similarly, biometric product owners of specialized biometric products (such as capture devices, feature extraction algorithms, comparison algorithms, quality algorithms, compression algorithms, or PAD mechanisms) assign identifiers (such as capture device type identifiers, feature extraction algorithm identifiers, etc.) to one or more specialized biometric products. Such biometric product owners may be more specifically referred to by using the name of the specialized biometric product (for example capture device owners and feature extraction algorithm owners).

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

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

This document specifies a simple CBEFF BIR structure, a complex CBEFF BIR structure, and a multiple CBEFF BIR structure (which allows BIR formats with one or more sub-BIRs) and gives the requirements for the specification of a CBEFF patron format based on these abstract data structures.

This document also specifies a self-identifying concept that can be applied to all CBEFF BIR structures so that the patron format can be identified during processing of the SBH without prior knowledge of the patron format type.

This document also specifies transformations of BIRs from one CBEFF patron format into a different CBEFF patron format.

Clause 5 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 for patrons 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 document and in ISO/IEC 19785-3.

ISO/IEC 19785-2 describes the universal identification scheme used by the BRA (which is identified on the webpage https://www.iso.org/maintenance_agencies.html). Procedural information for the BRA is included on the ISO website (https://committee.iso.org/files/live/sites/jtc1sc37/files/ABOUT/Procedural_Information_BRA.pdf). ISO/IEC 19785-3 specifies several patron formats for which ISO/

IEC JTC 1/SC 37 is the CBEFF patron. ISO/IEC 19785-4 specifies several SB formats for which ISO/IEC JTC 1/SC 37 is the CBEFF patron.

Information technology — Common Biometric Exchange Formats Framework —

Part 1:
Data element specification

1 Scope

This document defines:

— structures and data elements for biometric information records (BIRs);

— the concept of a domain of use to establish the applicability of a standard or specification that conforms with CBEFF requirements;

— the concept of a CBEFF patron format, which is a published BIR format specification that complies with CBEFF requirements, specified by a CBEFF patron;

— the abstract values and associated semantics of a set of CBEFF data elements to be used in the definition of CBEFF patron formats;

This document describes methods to define CBEFF patron formats using CBEFF data elements to specify the structure of BIRs, including the standard biometric headers (SBHs).

This document also provides the means for identification of BDB formats in a BIR, but the standardization and interoperability of BDB formats is not within the scope of this document. This document provides a security block (SB) as a means for BIRs to carry information about the encryption of a BDB in the BIR and about integrity mechanisms applied to the BIR itself. The structure and content of SBs is not within the scope of this document. Further, the specification of encryption mechanisms for BDBs and of integrity mechanisms for BIRs is not within the scope of this document.

This document specifies transformations from one CBEFF patron format to a different CBEFF patron format.

The following are not within the scope of this document:

— the encoding of the abstract values of CBEFF data elements to be used in the specification of CBEFF patron formats; and

— protection of the privacy of individuals from inappropriate dissemination and use of biometric data.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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*

ISO/IEC 10646, *Information technology — Universal coded character set (UCS)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
biometric data block format identifier
BDB format identifier
unique (within a biometric organization) identifier of a format for a biometric data block (BDB), where that format has been fully defined by a *Common Biometric Exchange Format Framework (CBEFF) biometric organization* (3.15) called the *BDB format owner* (3.3)

Note 1 to entry: The BDB format identifier value is NO VALUE AVAILABLE when the BDB does not conform to a defined format.

3.2
biometric data block format
BDB format
format of a biometric data block (BDB) defined by a *Common Biometric Exchange Format Framework (CBEFF) biometric organization* (3.15)

Note 1 to entry: The BDB format value is NO VALUE AVAILABLE when the BDB does not conform to a defined format.

3.3
biometric data block format owner
BDB format owner
Common Biometric Exchange Format Framework (CBEFF) biometric organization (3.15) that defines a *BDB format* (3.2) and assigns to it a *BDB format identifier* (3.1)

Note 1 to entry: The BDB format owner value is NO VALUE AVAILABLE when the BDB does not conform to a defined format.

3.4
biometric data block
BDB
block of data containing biometric information which may or may not conform to a defined format

Note 1 to entry: The BDB is normally opaque to the processing of a *standard biometric header (SBH)* (3.51) and is not required to be self-delimiting.

3.5
biometric information record
BIR
data structure containing one or more *biometric data blocks (BDBs)* (3.4) together with information identifying the BDB formats, and possibly further information, i.e. whether a BDB is encrypted or the BIR is signed

3.6
biometric object
an entity or concept related to the field of biometrics that fits a category definition as established by an international standard and that may be registered by the BRA

Note 1 to entry: Examples of biometric object categories include, but are not limited to, *biometric data blocks (BDBs)* (3.4), *biometric products* (3.7), and *security blocks (SBs)* (3.43). Some international standards which define types of biometric objects include ISO/IEC 19784-1, ISO/IEC 19785-3, all parts of ISO/IEC 19794 and ISO/IEC 39794.

Note 2 to entry: Biometric objects can, but need not, be registered by the BRA. For example, BDBs that do not conform to a defined format are not registered by the BRA.

3.7
biometric product
software or hardware product or a combination of software and hardware, which is assigned a *biometric product identifier* (3.8) by a *Common Biometric Exchange Format Framework (CBEFF) biometric organization* (3.15) called the *biometric product owner* (3.9) of the biometric product

3.8
biometric product identifier
identifier assigned to a *biometric product* (3.7) that unambiguously identifies the biometric product within the biometric products that have been assigned an identifier by a *biometric product owner* (3.9)

3.9
biometric product owner
Common Biometric Exchange Format Framework (CBEFF) biometric organization (3.15) that assigns *biometric product identifiers* (3.8) to *biometric products* (3.7)

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

3.10
Biometric Registration Authority
BRA
registration authority (3.42) that facilitates the globally unambiguous identification of *biometric objects* (3.6) and biometric organizations by maintaining and publishing a register of unique ASN.1 object identifiers

Note 1 to entry: The BRA is managed separately from ISO/IEC JTC 1.

Note 2 to entry: The BRA is responsible for managing the application process for assignment and registration of identifiers, including the assurance of identifier uniqueness.

3.11
biometric transformation
transformation of a *biometric information record (BIR)* (3.5) 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 *biometric data block (BDB)* (3.4). See 9.23 and 9.26.

3.12
capture device type
hardware product or a combination of software and hardware which is assigned a *capture device type identifier* (3.13) by a *Common Biometric Exchange Format Framework (CBEFF) biometric organization* (3.15)

3.13
capture device type identifier
identifier assigned to a capture device by a *capture device type owner* (3.14) that unambiguously (given the capture device type owner) identifies the capture device

3.14
capture device type owner
Common Biometric Exchange Format Framework (CBEFF) biometric organization (3.15) that assigns *capture device type identifiers* (3.13) to capture devices

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

3.15
Common Biometric Exchange Format Framework biometric organization
CBEFF biometric organization
any organization, public or private, that requests and receives a biometric organization identifier from the *Biometric Registration Authority* (3.10)

Note 1 to entry: A CBEFF biometric organization can define biometric data block (BDB) formats (3.2), assign *BDB format identifiers* (3.1) to them, assign *biometric product identifiers* (3.8) to *biometric products* (3.7), assign capture device identifiers to capture devices, assign *feature extraction algorithm identifiers* (3.33) to *feature extraction algorithms* (3.32), assign *comparison algorithm identifiers* (3.25) to *comparison algorithms* (3.24), assign *quality algorithm identifiers* (3.40) to *quality algorithms* (3.39), assign *compression algorithm identifiers* (3.29) to *compression algorithms* (3.28), assign *presentation attack detection (PAD) mechanism identifiers* (3.37) to *PAD mechanisms* (3.36), and define *security block (SB) formats* (3.44) and assign SB format identifiers to them. If the organization is also accepted as a CBEFF patron, it can also define CBEFF patron formats.

3.16
Common Biometric Exchange Format Framework biometric organization identifier
CBEFF biometric organization identifier
unique identifier assigned to a *CBEFF biometric organization* (3.15) when it registers with the *Biometric Registration Authority* (3.10)

3.17
Common Biometric Exchange Format Framework patron
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* (3.10) as a CBEFF patron, and that can therefore specify one or more *CBEFF patron formats* (3.18)

3.18
Common Biometric Exchange Format Framework patron format
CBEFF patron format
format for a *biometric information record (BIR)* (3.5) that is fully defined by a *CBEFF patron* (3.22)

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

3.19
Common Biometric Exchange Format Framework patron format identifier
CBEFF patron format identifier
identifier for a *CBEFF patron format* (3.18) that is unambiguous within the context of a *CBEFF patron identifier* (3.21)

3.20
Common Biometric Exchange Format Framework patron format structure type
CBEFF patron format structure type
CBEFF BIR structure types that may be used to define a *CBEFF patron format* (3.18)

Note 1 to entry: The possible structure types are *Simple CBEFF BIR* (3.48), *Complex CBEFF BIR* (3.27) and *Multiple CBEFF BIR* (3.35) (any of which may be self-identifying).

3.21
Common Biometric Exchange Format Framework patron identifier
CBEFF patron identifier
CBEFF biometric organization identifier (3.16) of a *CBEFF patron* (3.17)

3.22
Common Biometric Exchange Format Framework root header
CBEFF root header
CBEFF standard biometric header (3.51) that precedes all other standard biometric headers in a *complex CBEFF BIR structure* (3.27) or a *multiple CBEFF BIR structure* (3.35) and which does not have *a biometric data block (BDB)* (3.4) associated with it

3.23
Common Biometric Exchange Format Framework sub-header
CBEFF sub-header
CBEFF standard biometric header (3.51) in a *complex CBEFF BIR structure* (3.27) that follows the *CBEFF root header* (3.22) and that either immediately precedes a *biometric data block (BDB)* (3.4) or is followed by further CBEFF sub-headers

Note 1 to entry: See 7.3.

3.24
comparison algorithm
algorithm which measures the similarity or dissimilarity between biometric references (or between a biometric reference and a biometric probe), and which may be assigned a *comparison algorithm identifier* (3.25) by a *CBEFF biometric organization* (3.15)

3.25
comparison algorithm identifier
identifier assigned to a *comparison algorithm* (3.24) that unambiguously identifies the algorithm, given the *comparison algorithm owner* (3.26)

3.26
comparison algorithm owner
Common Biometric Exchange Format Framework (CBEFF) biometric organization (3.15) that assigns *comparison algorithm identifiers* (3.25) to *comparison algorithms* (3.24)

Note 1 to entry: The organization may or may not be the intellectual property owner of the *comparison algorithms* (3.24).

3.27
complex Common Biometric Exchange Format Framework biometric information record structure
complex CBEFF BIR structure
structure for a CBEFF BIR that can contain multiple *biometric data blocks (BDBs)* (3.4), each having its own *standard biometric header (SBH)* (3.51), plus additional SBHs that express the relationships among the BDBs

Note 1 to entry: See 7.3.

3.28
compression algorithm
algorithm which performs compression of a biometric sample or biometric template and may be assigned a *compression algorithm identifier* (3.29) by a *Common Biometric Exchange Format Framework (CBEFF) biometric organization* (3.15)

3.29
compression algorithm identifier
identifier assigned to a *compression algorithm* (3.28) that unambiguously identifies the algorithm, given the *compression algorithm owner* (3.30)

3.30
compression algorithm owner
Common Biometric Exchange Format Framework (CBEFF) biometric organization (3.15) that assigns *compression algorithm identifiers* (3.29) to *compression algorithms* (3.28)

Note 1 to entry: The organization may or may not be the intellectual property owner of the *compression algorithms* (3.28).

3.31
domain of use
application space defined by a *Common Biometric Exchange Format Framework (CBEFF) patron* (3.17) where a *CBEFF patron format* (3.18) specified by that patron is intended to be used

3.32
feature extraction algorithm
algorithm which is assigned a feature extraction algorithm identifier by a *Common Biometric Exchange Format Framework (CBEFF) biometric organization* (3.15)

3.33
feature extraction algorithm identifier
identifier assigned to a *feature extraction algorithm* (3.32) that unambiguously (given the *feature extraction algorithm owner* [3.34]) identifies the algorithm

3.34
feature extraction algorithm owner
Common Biometric Exchange Format Framework (CBEFF) biometric organization (3.15) that assigns *feature extraction algorithm identifiers* (3.33) to *feature extraction algorithms* (3.32)

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

3.35
multiple Common Biometric Exchange Format Framework biometric information record structure
multiple CBEFF BIR structure
structure for a CBEFF BIR that can contain one or more BIRs and that is not a complex CBEFF BIR (see 3.27)

3.36
presentation attack detection mechanism
PAD mechanism
mechanism for the automated detection of presentation attacks, that is assigned a *PAD mechanism identifier* (3.37) by a *Common Biometric Exchange Format Framework (CBEFF) biometric organization* (3.15)

3.37
presentation attack detection mechanism identifier
PAD mechanism identifier
identifier assigned to a *PAD mechanism* (3.36) that unambiguously identifies the mechanism when given the *PAD mechanism vendor* (3.38)

3.38
presentation attack detection mechanism vendor
PAD mechanism vendor
Common Biometric Exchange Format Framework (CBEFF) biometric organization (3.15) that assigns *PAD mechanism identifiers* (3.37) to *PAD mechanisms* (3.36)

3.39
quality algorithm
algorithm that assesses the quality of a biometric sample and may be assigned a *quality algorithm identifier* (3.40) by a *CBEFF biometric organization* (3.15)

3.40
quality algorithm identifier
identifier assigned to a *quality algorithm* (3.39) that unambiguously identifies the algorithm, given the *quality algorithm owner* (3.41)

3.41
quality algorithm owner
Common Biometric Exchange Format Framework (CBEFF) biometric organization (3.15) that assigns *quality algorithm identifiers* (3.40) to *quality algorithms* (3.39)

Note 1 to entry: The organization may or may not be the intellectual property owner of the *quality algorithms* (3.39).

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

3.42
registration authority
RA
entity appointed by ISO to fulfil the registration services in a registration authority standard

Note 1 to entry: See also *Biometric Registration Authority* (3.10).

3.43
security block
SB
block of data with a defined format that contains information concerning the encryption of biometric data blocks (BDBs) in a *biometric information record (BIR)* (3.5) and the integrity of the BIR

3.44
security block format
format of a *security block* (3.43) defined by a *Common Biometric Exchange Format Framework (CBEFF) biometric organization* (3.15)

3.45
security block format identifier
unique (within a biometric organization) identifier of a format for a *security block* (3.43), where that format has been fully defined by a *Common Biometric Exchange Format Framework (CBEFF) biometric organization* (3.15), called the *security block format owner* (3.46)

3.46
security block format owner
Common Biometric Exchange Format Framework (CBEFF) biometric organization (3.15) that defines a *security block format* (3.44) and assigns to it a *security block format identifier* (3.45)

3.47
self-identifying Common Biometric Exchange Format Framework biometric information record structure
self-identifying CBEFF BIR structure
structure for a CBEFF BIR that includes the character string "SBIR" and the data elements CBEFF_BIR_self_id_owner and CBEFF_BIR_self_id_type in the SBH to allow determination of the patron format type by reading the contents of the header without prior knowledge of the *CBEFF patron format* (3.18)

Note 1 to entry: See 7.5, 9.5 and 9.6.

3.48
simple Common Biometric Exchange Format Framework biometric information record structure
simple CBEFF BIR structure
structure for a CBEFF BIR that contains precisely one *standard biometric header (SBH)* (3.51) and one or more *biometric data blocks (BDBs)* (3.4)

Note 1 to entry: See 7.2.

3.49
source biometric information record
source BIR
Common Biometric Exchange Format Framework *biometric information record* (3.5) (CBEFF BIR) that is the input to a transforming application

3.50
specialized biometric product
biometric product (3.7) which is in one of the categories: capture device, *feature extraction algorithm* (3.32), *comparison algorithm* (3.24), *quality algorithm* (3.39), *compression algorithm* (3.28), or *PAD mechanism* (3.36)

Note 1 to entry: A specialized biometric product can be registered both as a specialized biometric product of the appropriate category and as a (general) biometric product.

3.51
standard biometric header
SBH
part of a Common Biometric Exchange Format Framework (CBEFF) compliant *biometric information record (BIR)* (3.5) structure that provides encodings for abstract values of CBEFF data elements and enables an application to obtain knowledge about the format of the *biometric data blocks (BDBs)* (3.4) 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.

3.52
target biometric information record
target BIR
Common Biometric Exchange Format Framework *biometric information record* (3.5) (CBEFF BIR) that is the output BIR of a transforming application

4 Abbreviated terms

BDB	biometric data block
BIR	biometric information record
BRA	biometric registration authority
BSP	biometric service provider
CBEFF	common biometric exchange formats framework
MAC	message authentication code
PAD	presentation attack detection
PFCS	patron format conformance statement
SB	security block
SBH	standard biometric header
UTC	Coordinated Universal Time (see the ISO 8601 series)

5 Conformance

5.1 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 (multiple CBEFF BIR structure), any of which may be self-identifying as described in 7.5; and

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 BRA,

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 CBEFF patron format structure type,

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

11) 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.

5.2 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.

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

6 Biometric identifiers

Biometric systems are expected to support multiple biometric devices, multiple biometric data formats, and multiple algorithms for feature extraction, comparison, quality assessment, compression, and PAD, possibly each from a different vendor. Unambiguous identification of biometric organisations, formats, and products, including specialized products like capture devices, feature extraction algorithms, comparison algorithms, quality algorithms, compression algorithms, and PAD mechanisms, supports the interoperability of biometric components developed by different vendors.

The identification scheme used for registering biometric identifiers with the BRA is addressed by ISO/IEC 19785-2. These procedures ensure the unambiguous assignment of biometric identifiers and their publication to facilitate use by biometric applications. Details regarding the current BRA are included at https://www.iso.org/maintenance_agencies.html.

7 Biometric information record (BIR) structures

7.1 General

7.1.1 CBEFF allows the specification of CBEFF patron formats based on several CBEFF patron format structure types including the simple CBEFF BIR structure (see 7.2), the complex CBEFF BIR structure (see 7.3), or the multiple CBEFF BIR structure (see 7.4). Each of the BIR structures may be self-identifying by implementing the requirements in 7.5. CBEFF patrons should select the patron format structure type that best meets the requirements of their domain of use.

NOTE The ability for BIR structures other than simple CBEFF BIR to be self-identifying is new to this version of this document.

7.1.2 CBEFF patron formats may, but need not, be registered and have their patron-assigned identifiers published by the BRA. 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. The previous CBEFF (Version 3.0) added the concept of the self-identifying BIR structure. CBEFF Version 4.0 (this version) extends the concept of the self-identifying BIR to all BIR structures.

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 BRA.

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 BRA.

7.1.7 Another goal of CBEFF is to enable the unique identification of specialized biometric products (capture device types, feature extraction algorithms, comparison algorithms, quality algorithms, compression algorithms, and PAD mechanisms) that were used to produce a BDB, possibly at different stages of its lifecycle. The combination of specialized biometric product owner identifier (a biometric organization identifier) and the specialized biometric product identifier (such as a capture device type identifier) meets this objective. A CBEFF biometric organization can assign an identifier to a specialized biometric product, which may (but need not) be produced or specified by that organization. The biometric product 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 owner of that specialized biometric product. The pair of owner and product identifiers thus uniquely identifies the biometric product. The owner may, but need not, register the specialized biometric product identifier with the BRA. Referencing an unregistered identifier is not permitted. The provisions in this subclause (7.1.7) also apply to any specialized biometric products.

7.1.8 For mandatory CBEFF data elements, the abstract value NO VALUE AVAILABLE shall only be used if specified as a valid abstract value by this document. Otherwise, NO VALUE AVAILABLE may not be added by patron format specifications to avoid inclusion of mandatory data elements.

7.1.9 CBEFF defines certain data elements in Clause 9 to be "optional." This means that a patron format may 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 7.5).

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 BDB without having to examine the contents of the BDB itself. The data elements encoded in unencrypted SBH enable this determination to be made. 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 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:

a) shall be encrypted using specified encryption algorithms, specified dynamically in the SB or statically in the BIR specification;

b) shall not be encrypted;

c) may be optionally encrypted using specified encryption algorithms or using any identified (dynamically or statically) encryption algorithms.

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 document 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

7.2.1 General

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 7.2.2). The SBH shall be followed by a field that contains one or more BDBs (see 7.2.3). The BDBs may be followed by a

security block (SB) (see 7.2.4) in some or in all instances of the BIR, as specified by the CBEFF patron format. Figure 1 illustrates such a BIR. Each section of the BIR is defined in the following sub-clauses.

SBH	One or more BDBs	SB (optional)

Figure 1 — Simple BIR structure

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. In some instances, the formats of the BDBs include information that would otherwise be duplicated in each SBH.

NOTE A similar result could be achieved if each BDB had its own SBH and the resulting BIRs were collected in a complex BIR structure or multi-BIR structure, but CBEFF supports the application designer making the implementation decision based on the specific situation.

A patron format that supports more than one BDB associated with an SBH shall provide the means of locating each BDB, the means 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 document 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.

7.2.2 Standard biometric header (SBH)

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

7.2.2.2 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. 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.

7.2.2.3 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)

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.

7.2.3 The biometric data block (BDB)

The BDB is a block of data that contains one or more biometric samples, features, 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.

The BDB format may be vendor-specific, defined by a standard or other technical document, or not conform to any given format. A standards body, consortium, vendor, or other biometric organization who created the BDB format may register with the BRA to obtain a CBEFF biometric organization

identifier (providing the CBEFF_BDB_format_owner value) and may assign a BDB format identifier (forming the CBEFF_BDB_format_type value) to the BDB.

EXAMPLE A BDB that complies with the ISO/IEC 19794 or ISO/IEC 39794 series of standards. Alternatively, a BDB that contains a biometric sample that does not conform to any specific standard.

7.2.4 Security block (SB)

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

7.2.4.2 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 The complex CBEFF BIR structure allows a CBEFF patron to 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. While the simple CBEFF BIR structure also allows multiple BDBs, it does not allow multiple SBH within the same BIR.

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.

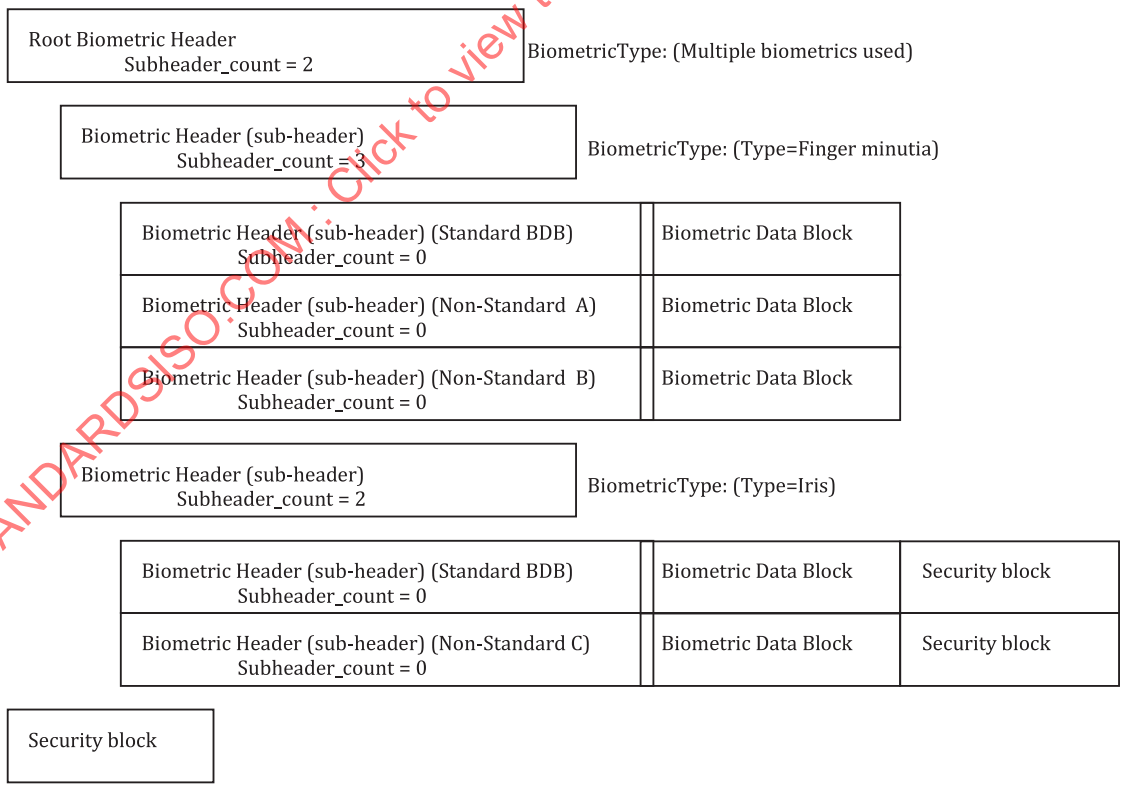

Figure 2 — Example of a patron format based on the complex CBEFF BIR structure

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);

b) followed by either:

   1) one or more sub-header blocks, or

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

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

The CBEFF data element CBEFF_BDB_encryption_options shall not be supported in a root header (see 7.3.7).

7.3.3 A sub-header block that is not level-zero shall consist of an initial single CBEFF sub-header (an SBH) followed by either:

a) one or more level-zero sub-header blocks, or

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

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

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

b) a BDB; and

c) (optionally) a SB. If a patron format includes this SB 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 SB is only this one level-zero block.

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 7.3.9) 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.

Even if a level-zero block inherits (see 7.3.9) its INTEGRITY abstract value from a higher level sub-header block, the scope of its SB is only the level-zero block. Inheritance of the ENCRYPTION abstract value is not permitted (see 7.3.7), so the ENCRYPTION abstract value shall be encoded in the level-zero SBH if the BDB is encrypted.

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

7.3.6 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.

7.3.7 The CBEFF data element CBEFF_BDB_encryption_options shall be encoded in every level-zero 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.

7.3.8 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.

7.3.9 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 7.3.7).

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 multiple CBEFF BIR structure

The multiple CBEFF BIR structure provides an alternative to the complex CBEFF BIR structure for CBEFF patrons that have a requirement to specify a BIR structure that can include one or more BIRs. The multiple CBEFF BIR structure provides the patron with the ability to define their own structure for organizing and navigating linked BIRs. This may be useful if the hierarchical structure of the complex CBEFF BIR structure does not meet the CBEFF patron's requirements for their domain of use.

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 This document 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 (optionally specified as a BIR's SBH) would simply point to the locations within the domain where the included BIRs are found.

A patron format specification that conforms to the multiple CBEFF BIR structure shall include in its patron format conformance statement (as per 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	BDB	SB	SBH	BDB	SBH	BDB	SB
Pointer to BIR2	[6]	[7]	Pointer to BIR3	[8]	Pointer x00	[9]	[10]

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

EXAMPLE 1 This example illustrates a possible multiple CBEFF 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 can 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 can 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

EXAMPLE 2 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 (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 can be updated as BIRs are added to or removed from the overall structure. The pointer data elements can 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 represents a single user, each BIR in the total structure can contain one type of biometric data from that user (e.g., iris, finger, voice) and the application can use the descriptive data in the root SBH to decide which specific BIR to access and process.

7.5 Applying the self-identifying concept to a CBEFF patron format structure

The self-identifying concept may be applied to any CBEFF BIR patron format structure defined in 7.2 through 7.4 by adhering to the following additional requirements:

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) If knowledge of the BIR length is required to process the patron format structure, then the next field shall encode a patron-defined data element enabling determination of the BIR length. However, if the BIR length is not required or is inherent in the encoding (for example in tagged data formats like TLV an XML) then the patron format is not required to define a BIR length field.

8 Performing BIR transformations

8.1 General

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.

8.2 Transformations of enumerated abstract values

Mandatory or optional CBEFF data elements 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 1 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.

NOTE 2 If the data element is not supported, then the value is lost in the transformation, unless the patron format defines specific instructions to handle such a case. See also Annex A for information on patron format conformance statements, which can be used to identify incompatible formats and avoid loss from transformations.

8.3 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

9.1 General

Definitions and abstract values for each of the CBEFF-defined data elements are specified in this clause. The subclauses of Clause 9 are ordered as follows:

a) mandatory data elements in alphabetical order by data element name (9.2 to 9.8);

b) optional data elements in alphabetical order by data element name (9.9 to 9.43), 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).

9.2 CBEFF_BDB_format_owner

9.2.1 Attributes

Inclusion: Mandatory

Abstract values:

— integer 0 (NO VALUE AVAILABLE)

— integers 1 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 BRA 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. The CBEFF_BDB_format_owner value shall be set to NO VALUE AVAILABLE only when the BDB does not conform to a defined format (and therefore has no owner), and otherwise shall be an integer from 1 to 65535.

ISO/IEC 19785-2 requires that the BRA shall not assign the value zero to any biometric organization which is reserved to encode NO VALUE AVAILABLE.

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 9.3) uniquely identify the specific format of a BDB.

9.2.2 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.

9.3 CBEFF_BDB_format_type

9.3.1 General

This data element corresponds to the term defined in 3.1, "BDB format identifier".

9.3.2 Attributes

Inclusion: Mandatory

Abstract values:

— integer 0 (NO VALUE AVAILABLE)

— integers 1 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. The CBEFF_BDB_format_type value shall be set to NO VALUE AVAILABLE only when the BDB does not conform to a defined format, and otherwise shall be an integer from 1 to 65535.

9.3.3 Transformation requirements

See 9.2.2.

9.4 CBEFF_BDB_encryption_options

9.4.1 Attributes

Inclusion: Mandatory (but see 9.4.2)

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.

9.4.2 Requirements on patron format specifications

The following requirements apply.

a) CBEFF patron formats are required to support at least one of the abstract values. If a patron format supports only one abstract value for this data element, it may encode that abstract value as a zero-length field since the value can be implied.

   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.

   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.

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

9.4.3 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 9.4.2.

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

9.5 CBEFF_BIR_integrity_options

9.5.1 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.

9.5.2 Requirements on patron format specifications

The following requirements apply.

a) CBEFF patron formats are required to support at least one of the abstract values. If a patron format supports only one abstract value for this data element, it may encode this data element as a zero-length field since the value can be implied.

   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.

9.5.3 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 9.5.2.

9.6 CBEFF_BIR_self_id_owner

9.6.1 Attributes

Inclusion: Mandatory in BIRs applying the self-identifying concept and shall not be included otherwise.

This data element shall not be included in a patron format unless CBEFF_BIR_self_id_type is also included (see 9.7).

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 BRA 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.

9.6.2 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. If the target BIR is not self-identifying, this data element will not be included.

9.7 CBEFF_BIR_self_id_type

9.7.1 Attributes

Inclusion: Mandatory in BIRs applying the self-identifying concept and shall not be included otherwise.

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

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 BRA. 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.

9.7.2 Transformation requirements

See 9.6.2

9.8 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 or 7.4)

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.

9.9 CBEFF_BDB_biometric_type

9.9.1 Attributes

Inclusion: Optional

Abstract values: see Table 1

Content: Encodings of this data element convey the type of biological and 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 9.10)
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
VEIN	Yes
VOICE	No
BODY PHOTOGRAPHY	No
FRICTION RIDGE	Yes
THERMAL	Yes

NOTE BODY PHOTOGRAPHY, FRICTION RIDGE, and THERMAL are new to this version.

CBEFF patrons are permitted 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.

9.9.2 Transformation requirements

See 8.2.

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 9.9.1), 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.

9.10 CBEFF_BDB_biometric_subtype

9.10.1 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 CBEFF_BDB_biometric_subtype 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. When multiple CBEFF_BDB_biomeric_type values are present, CBEFF_BDB_biometric_subtype should only be included when the relationship to the biometric type is not ambiguous.

Qualified and unqualified abstract CBEFF_BDB_biometric_subtype values are specified. For example, LEFT INDEX and RIGHT INDEX are qualified and INDEX is not qualified. Unqualified values are useful when the implementer does not know the precise origin of the BDB data.

EXAMPLE 1 For a patron format that supports the BDB biometric type RETINA, the implementor includes the abstract value LEFT for the BDB biometric subtype to indicate that the left RETINA is present.

EXAMPLE 2 For an iris biometric device that can produce a single BDB containing data for both eyes of a subject, a BIR includes the biometric subtype abstract values LEFT and RIGHT to indicate that iris samples for both eyes are contained in the BDB.

EXAMPLE 3 For a collection of friction ridge data in a multiple CBEFF BIR structure, the biometric type is FRICTION RIDGE and the biometric subtype abstract values are PALM and WRIST to indicate the types of friction ridge data present.

Table 2 — Abstract values for CBEFF_BDB_biometric_subtype

Abstract values
NO VALUE AVAILABLE
RIGHT
LEFT
LEFT THUMB
LEFT INDEX FINGER
LEFT MIDDLE FINGER
LEFT RING FINGER
LEFT LITTLE FINGER
RIGHT THUMB
RIGHT INDEX FINGER
RIGHT MIDDLE FINGER
RIGHT RING FINGER
RIGHT LITTLE FINGER
LEFT PALM
LEFT BACK OF HAND
LEFT WRIST
RIGHT PALM
RIGHT BACK OF HAND
RIGHT WRIST
THUMB
INDEX FINGER
MIDDLE FINGER
RING FINGER
LITTLE FINGER
PALM
BACK OF HAND
WRIST

CBEFF patron formats are permitted 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. CBEFF patron formats are permitted to define valid combinations of the abstract values as required by the intended domain of use.

A BDB format specification determines which (if any) of these CBEFF_BDB_biometric_subtype values apply to that BDB format. However, certain combinations of values for CBEFF_BDB_biometric_type and CBEFF_BDB_biometric_subtype are typically supported, as indicated by an 'X' in Table 3.

Table 3 — Typical CBEFF_BDB_biometric_subtype values supported

	CBEFF_BDB_biometric_type values								
CBEFF_BDB_biometric_subtype values	FINGER	IRIS	RETINA	HAND-GEOMETRY	VEIN	EAR	FOOT	FRICTION RIDGE	THERMAL
LEFT	X	X	X	X	X	X	X	X	X
RIGHT	X	X	X	X	X	X	X	X	X
THUMB	X				X			X	X
LEFT THUMB	X				X			X	X
RIGHT THUMB	X				X			X	X
INDEX FINGER	X				X			X	X
LEFT INDEX FINGER	X				X			X	X
RIGHT INDEX FINGER	X				X			X	X
MIDDLE FINGER	X				X			X	X
LEFT MIDDLE FINGER	X				X			X	X
RIGHT MIDDLE FINGER	X				X			X	X
RING FINGER	X				X			X	X
LEFT RING FINGER	X				X			X	X
RIGHT RING FINGER	X				X			X	X
LITTLE FINGER	X				X			X	X
LEFT LITTLE FINGER	X				X			X	X
RIGHT LITTLE FINGER	X				X			X	X
PALM					X			X	X
LEFT PALM					X			X	X
RIGHT PALM					X			X	X
BACK OF HAND					X			X	X
LEFT BACK OF HAND					X			X	X
RIGHT BACK OF HAND					X			X	X
WRIST					X			X	X
LEFT WRIST					X			X	X
RIGHT WRIST					X			X	X

NOTE CBEFF_BDB_biometric_types abstract values not shown in this table typically do not support biometric subtypes (as indicated by the "Typically has an associated subtype?" value in Table 1). For example, SCENT and DNA are not shown because they are not capable of supporting any CBEFF_BDB_biometric_subtype abstract values.

9.10.2 Transformation requirements

See 8.2.

9.11 CBEFF_BDB_capture_device_type_owner

9.11.1 Attributes

Inclusion: Optional — this data element shall not be included in a patron format unless CBEFF_BDB_capture_device_type is also included (see 9.12).

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 BRA). ISO/IEC 19785-2 requires the BRA to not assign the value zero (Hex 0000) to any biometric organization.

However, patron format specifications are permitted to use this value as the encoding for NO VALUE AVAILABLE.

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_capture_device_type

9.12.1 General

This data element corresponds to the term defined in 3.13, "capture device type identifier".

9.12.2 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 9.11).

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.

9.12.3 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.

9.13 CBEFF_BDB_challenge_response

9.13.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— Zero or more octets of 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 mechanisms specified by the patron format or in an associated SB. Patron formats that include values of this data element other than NO VALUE AVAILABLE shall specify the contents of the data.

EXAMPLE If the biometric type is voice for speaker recognition, this data element can be used to store the phrase the subject will be prompted to speak, or it may store a pointer to a database that contains the phrase. 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 can render the BDB unusable.

9.14 CBEFF_BDB_comparison_algorithm_owner

9.14.1 Attributes

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

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 BRA). ISO/IEC 19785-2 requires the BRA to not assign the value zero (Hex 0000) to any biometric organization. However, patron format specifications are permitted to use this value as the encoding for NO VALUE AVAILABLE.

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_comparison_algorithm_type

9.15.1 Attributes

This data element corresponds to the term defined in 3.25, “comparison algorithm identifier”.

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

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.

9.15.2 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_owner

9.16.1 Attributes

Inclusion: Optional — this data element shall not be included in a patron format unless CBEFF_BDB_compression_algorithm_type is also included (see 9.17).

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 BRA). ISO/IEC 19785-2 requires the BRA to not assign the value zero (Hex 0000) to any biometric organization. However, patron format specifications are permitted to use this value as the encoding for NO VALUE AVAILABLE.

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_compression_algorithm_type

9.17.1 General

This data element corresponds to the term defined in 3.29, "compression algorithm identifier".

9.17.2 Attributes

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

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.

9.17.3 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.

9.18 CBEFF_BDB_creation_date

9.18.1 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 the ISO 8601 series) 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.

The UTC date-time instant represents a reasonable approximation to the creation date; CBEFF does not require that the date-time instant be recorded to a precision of one second. Patron format specifications may impose a more stringent requirement for particular domains of use, noting likely application requirements. CBEFF patrons that require a date-time precision of other than one second may specify their own data element and abstract values. Patron format encodings may use a format other than the ISO 8601 series extended date-time format (and in particular may use a binary format) for the abstract date-time values.

NOTE 1 The ISO 8601 series 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 the ISO 8601 series. That series defines the character "Z" as the designator for UTC in date and time representations.

9.18.2 Transformation requirements

See 8.2.

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.

9.19 CBEFF_BDB_feature_extraction_algorithm_owner

9.19.1 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 9.20).

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 BRA). ISO/IEC 19785-2 requires the BRA to not assign the value zero (Hex 0000) to any biometric organization. However, patron format specifications are permitted to use this value as the encoding for NO VALUE AVAILABLE.

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_feature_extraction_algorithm_type

9.20.1 General

This data element corresponds to the term defined in 3.33, "feature extraction algorithm identifier".

9.20.2 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 9.19).

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.

9.20.3 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.

9.21 CBEFF_BDB_index

9.21.1 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.

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.

9.21.2 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.

9.22 CBEFF_BDB_PAD_mechanism_vendor

9.22.1 Attributes

Inclusion: Optional — this data element shall not be included in a patron format unless CBEFF_BDB_PAD_mechanism is also included (see 9.23).

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

Content: This data element identifies the registered biometric organization that owns the PAD mechanism that was used in the creation of the BDB (if any). The content of CBEFF_BDB_PAD_mechanism_vendor shall be a biometric organization identifier (a 16-bit positive integer, assigned by the BRA). ISO/IEC 19785-2 requires the BRA to not assign the value zero (Hex 0000) to any biometric organization. However, patron format specifications are permitted to use this value as the encoding for NO VALUE AVAILABLE.

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_PAD_mechanism

9.23.1 Attributes

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

Abstract values:

— NO VALUE AVAILABLE

— integers 1 to 65535

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

9.23.2 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.

9.24 CBEFF_BDB_processed_level

9.24.1 Attributes

Inclusion: Optional

Abstract values:

— NO VALUE AVAILABLE

— RAW (see ISO/IEC 2382-37, captured biometric sample)

— INTERMEDIATE (see ISO/IEC 2382-37, intermediate biometric sample)

— PROCESSED (see ISO/IEC 2382-37, processed biometric sample)

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).

9.24.2 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.

9.25 CBEFF_BDB_product_owner

9.25.1 Attributes

Inclusion: Optional — this data element shall not be included in a patron format unless CBEFF_BDB_product_type is also included (see 9.26).

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 BRA). ISO/IEC 19785-2 requires the BRA to not assign the value zero (Hex 0000) to any biometric organization. However, patron format specifications are permitted to use this value as the encoding for NO VALUE AVAILABLE. 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.

9.25.2 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.

9.26 CBEFF_BDB_product_type

9.26.1 Attributes

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

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.

9.26.2 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.

9.27 CBEFF_BDB_purpose

9.27.1 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 the ISO/IEC 7816 series).

9.27.2 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.

9.28 CBEFF_BDB_quality

9.28.1 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).

9.28.2 Transformation requirements

See 8.2.

9.29 CBEFF_BDB_quality_algorithm_owner

9.29.1 Attributes

Inclusion: Optional — this data element shall not be included in a patron format unless CBEFF_BDB_quality_algorithm_type is also included (see 9.30).

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 BRA). ISO/IEC 19785-2 requires the BRA to not assign the value zero (Hex 0000) to any biometric organization. However, patron format specifications are permitted to use this value as the encoding for NO VALUE AVAILABLE.

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_quality_algorithm_type

9.30.1 General

This data element corresponds to the term defined in 3.40, “quality algorithm identifier”.

9.30.2 Attributes

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

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.

9.30.3 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.

9.31 CBEFF_BDB_validity_period

9.31.1 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 when the BDB is valid. The "/" character between time representations indicates that the times specify the beginning and end of a time interval. See 9.18 for CBEFF's requirements on time representations and other relevant considerations.

CBEFF patrons that require more precise time intervals (e.g. hourly) may specify their own data element and abstract values. Such abstract date-time values are not required to use the ISO 8601 series extended date-time format (and in particular may use a binary format).

9.31.2 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.

9.32 CBEFF_BIR_creation_date

9.32.1 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 series) that the BIR was created by a BSP or a transforming application. CBEFF requires that patron format specifications support abstract values to a precision of one second for this data element. See 9.18 and its notes for CBEFF's requirements on time representations and other relevant considerations.

