BS ISO/IEC 19785-3:2015

BSI Standards Publication

Information technology — Common Biometric Exchange Formats Framework

Part 3: Patron format specifications

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National foreword

This British Standard is the UK implementation of ISO/IEC 19785-3:2015. It supersedes BS ISO/IEC 19785-3:2007+A1:2010 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/44, Biometrics.

A list of organizations represented on this committee can be obtained on request to its secretary.

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ISO/IEC 19785-3

Second edition
2015-09-01

Information technology — Common Biometric Exchange Formats Framework —

Part 3: Patron format specifications

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

Partie 3: Spécifications de format d'usager

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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).

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

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

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

This second edition cancels and replaces the first edition (ISO/IEC 19785-3:2007), Clauses 13 and 15 of which have been merged into Clause 13 (XML patron format). Minor updates have been made throughout the document to reflect vocabulary harmonization and updated committee procedures.

It also incorporates the Amendment ISO/IEC 19785-3:2007/Amd 1:2010.

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

— *Part 1: Data element specifications*

— *Part 2: Procedures for the operation of the Biometric Registration Authority*

— *Part 3: Patron format specifications*

— *Part 4: Security block format specifications*

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Introduction

Biometric-based authentication systems and applications are expected to support multiple biometric devices and multiple biometric data formats. The Common Biometric Exchange Formats Framework (CBEFF) promotes interoperability of biometric-based application programs and systems developed by different vendors by facilitating biometric data interchange.

ISO/IEC 19785-1:2006 defines the following items that enable standardized biometric data interchange:

a) a 3-part standardized structure for biometric information records (BIRs) consisting of:

   1) standardized biometric headers (SBHs);

   2) biometric data blocks (BDBs, which can be standardized or proprietary);

   3) optional security blocks (SBs);

b) variations of the 3-part structure to support BIRs containing:

   1) only one SBH, one BDB, and possibly one SB (simple BIRs);

   2) more than one BDB along with the SBHs necessary to encode the BIR's structure and some number of SBs (complex BIRs);

c) more than 20 data elements and their associated abstract values that can be used in an SBH to describe attributes of a BDB within a BIR, as well as attributes of the BIR itself;

d) the concept of a CBEFF patron format (but ISO/IEC 19785-1:2006 does not itself define any patron formats), which is a detailed specification of the structure and content of a particular, standardized BIR;

e) the concept of a CBEFF patron, which is a recognized standards organization that has registered with the Biometric Registration Authority and declared its intention to define CBEFF patron format specifications;

f) the concept of the Biometric Registration Authority (RA), which is the mechanism by which unique identifiers are assigned to organizations (standards organizations, vendors, and others) that create BDB formats and CBEFF patron formats (ISO/IEC 19785-2:2006 defines the responsibilities and operations of the Biometric RA);

g) CBEFF data elements [see c) above] that support, within the SBH, the unique identifiers assigned by the Biometric RA for biometric organizations, BDB formats, biometric products, capture devices, feature extraction algorithms, comparison algorithms, quality algorithms, compression algorithms, patron formats, and SB formats.

Patron formats can be specified in other standards documents and registered in the CBEFF Registration Authority (see ISO/IEC 19785-2:2006), for example, there is a registered patron format specified in ISO/IEC 9834-1:2006. For a complete list of registered patron formats, consult the CBEFF Registration Authority web site.

This part of ISO/IEC 19785 specifies a number of CBEFF patron formats that are considered to be of general utility in a variety of domains of use. Additional SC 37 patron format specifications can be published as new clauses in future amendments to this part of ISO/IEC 19785, or in other SC 37 International Standards.

The CBEFF patron format type unambiguously identifies the CBEFF patron format within the scope of the CBEFF patron format owner. The CBEFF patron format type is unambiguous within the scope of an ASN.1 Object Identifier (see ISO/IEC 9834-1) that identifies the Biometric Registration Authority (see

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ISO/IEC 19785-2:2006). That ASN.1 Object Identifier (OID) is itself globally unambiguous within the scope of all ASN.1 Object Identifiers, which forms a widely-used global name-space.

NOTE ASN.1 Object Identifiers are used by ITU-T, ITU-R, the UPU, many ISO, and IEC Standards, to identify some IETF MIME types, and for many other purposes. (These acronyms have not been spelled out, as the precise identification of these organizations is not relevant to this International Standard.)

The combination of the Biometric Registration Authority OID, the CBEFF patron format owner, and the CBEFF patron format type forms a larger ASN.1 OID that provides an unambiguous identification of the CBEFF patron format. This part of ISO/IEC 19785 specifies, for each CBEFF patron format that it defines, the ASN.1 OID that unambiguously identifies that CBEFF patron format.

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Information technology — Common Biometric Exchange Formats Framework —

Part 3: Patron format specifications

1 Scope

This part of ISO/IEC 19785 specifies and publishes registered CBEFF patron formats (see ISO/IEC 19785-1) defined by the CBEFF patron ISO/IEC JTC 1/SC 37, and specifies their registered CBEFF patron format types (see ISO/IEC 19785-2) and resulting full ASN.1 Object Identifiers.

2 Conformance

Clauses 6 onwards of this part of ISO/IEC 19785 specify at the bit-level the set of bit-patterns (and their semantics) that can form a valid instance of the CBEFF patron format that is defined in that clause, together with the ASN.1 Object Identifier for that set of bit-patterns.

A bit-pattern identified by one of the ASN.1 Object Identifiers allocated in this part of ISO/IEC 19785 conforms to this specification if and only if it is one of the bit-patterns in the set identified by that ASN.1 Object Identifier.

If an implementation claims that it supports (and conforms to) a CBEFF patron format defined in this part of ISO/IEC 19785, then it shall either be:

a) capable of generating at least one of the set of bit patterns specified for that CBEFF patron format, and shall never generate bit patterns that are not part of the set, or

b) capable of decoding (determining the semantics of), or in any other way processing all the bit-patterns in the set of bit patterns specified for that CBEFF patron format.

NOTE If a decoding implementation is presented with a bit pattern that purports to be part of the set, but it is not, there is no requirement placed on the action taken by the implementation, but it is normally expected that the implementation will guard against denial of service or other security threats in such circumstances.

3 Normative references

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

ISO/IEC 7816-4, *Identification cards — Integrated circuit cards — Part 4: Organization, security and commands for interchange*

ISO/IEC 7816-6, *Identification cards — Integrated circuit cards — Part 6: Interindustry data elements for interchange*

ISO/IEC 7816-11, *Identification cards — Integrated circuit cards — Part 11: Personal verification through biometric methods*

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

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ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation — Part 1*

ISO/IEC 8825-1, *Information technology — ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER) — Part 1*

ISO/IEC 8825-4:2008, *Information technology — ASN.1 encoding rules: XML Encoding Rules (XER) — Part 4*

ISO/IEC 10646, *Information technology — Universal Coded Character Set (UCS)*

ISO/IEC 19785-1:2006, *Information technology — Common Biometric Exchange Formats Framework — Part 1: Data element specification*

ISO/IEC 19785-2, *Information technology — Common Biometric Exchange Formats Framework — Part 2: Procedures for the operation of the Biometric Registration Authority*

ISO/IEC 24787, *Information technology — Identification cards — On-card biometric comparison*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19785-1 and the following apply.

4.1
TLV encoding
common form of encoding (with many variants) in which every field in the encoding has an assigned type (or tag) that is unambiguous in some context, a length determinant, and a value part that can contain further TLV components, nested to any depth

5 Symbols and abbreviated terms

For the purposes of this document, the symbols and abbreviated terms given in ISO/IEC 19785-1:2006 and the following apply.

TLV Type (or Tag) Length and Value

6 ASN.1 type definitions for CBEFF data elements and abstract values

6.1 General

This clause specifies in 6.2 an ASN.1 module `CBEFF-DATA-ELEMENTS` that defines types (see ITU-T Rec. X.680 | ISO/IEC 8824-1) for each of the CBEFF data elements. These type definitions are fully aligned with the abstract values of CBEFF data elements specified in ISO/IEC 19785-1:2006 (conforming to CBEFF version “major(2) minor(0)”, and do not in themselves specify encodings of those abstract values. Encodings are determined by the patron formats specified in ASN.1 in this part of ISO/IEC 19785.

6.2 CBEFF data elements type definitions module

```
CBEFF-DATA-ELEMENTS
{iso standard 19785 modules(0) types-for-cbeff-data-elements(1)}
DEFINITIONS
AUTOMATIC TAGS ::=
BEGIN

BDBFormat ::= SEQUENCE {
   formatOwner   INTEGER (1..65535),
   formatType    INTEGER (1..65535) }

EncryptionOptions ::= BOOLEAN
```


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```
   -- NO ENCRYPTION = false, ENCRYPTION = true.

IntegrityOptions ::= BOOLEAN
   -- NO INTEGRITY = false, INTEGRITY = true.

SubheaderCount ::= INTEGER (0..255)
BiometricType ::= BIT STRING
   {noValueAvailable          (0),
   multipleBiometricTypes     (1),
   scent                      (2),
   dna                        (3),
   ear                        (4),
   face                       (5),
   finger                     (6),
   foot                       (7),
   handGeometry               (8),
   vein                       (9),
   iris                       (10),
   retina                     (11),
   voice                      (12),
   gait                       (13),
   keystroke                  (14),
   lipMovement                (15),
   signatureSign              (16),
   palm                       (17),
   backOfHand                 (18),
   wrist                      (19)
   } (SIZE (20), ...)

BiometricSubtype ::= CHOICE
   { any AnySubType,
    veinOnly VeinOnly}
   -- The abstract value noValueAvailable is encoded as
   -- the CHOICE value any:'0000000'
   AnySubType ::= BIT STRING
   {
   left                       (6),
   right                      (5),
   thumb                      (4),
   indexFinger                (3),
   middleFinger               (2),
   ringFinger                 (1),
   littleFinger               (0)}(SIZE (7))

   VeinOnly ::= BIT STRING
   {
   left                       (6),
   right                      (5),
   palm                       (4),
   backOfHand                 (3),
   wrist                      (2),
   reserved1                  (1),
   reserved2                  (0)} (SIZE (7))

ChallengeResponse ::= OCTET STRING
   -- A patron format that uses this type shall specify
   -- its encoding for noValueAvailable

BDBCreationDate ::= Date-Time
   -- A patron format that uses this type shall specify
   -- its encoding for noValueAvailable
BDBIndex ::= OCTET STRING (SIZE(16))
   -- A patron format that uses this type shall specify
   -- its encoding for noValueAvailable
ProcessedLevel ::= ENUMERATED
   {noValueAvailable,
   raw,
   intermediate,
   processed}
Product ::= SEQUENCE {
   productOwner INTEGER (1..65535) OPTIONAL,
```

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```
   productType INTEGER (1..65535) OPTIONAL}
Purpose ::= ENUMERATED
   {noValueAvailable,
   verify,
   identify,
   enroll,
   enrollVerify,
   enrollIdentify,
   audit
   }

Quality ::= INTEGER
   {qualityNotSupported (-2),
   qualityNotRecorded (-1),
   noValueAvailable (0)} (-2..100)
BDBValidityPeriod ::= SEQUENCE
   {notValidBefore Date-Time OPTIONAL,
   notValidAfter Date-Time OPTIONAL}

BIRCreationDate ::= Date-Time
   -- A patron format that uses this type shall specify
   -- its encoding for noValueAvailable
Creator ::= UTF8String
   -- A patron format that uses this type shall specify
   -- its encoding for noValueAvailable
BIRIndex ::= OCTET STRING (SIZE(16))
   -- A patron format that uses this type shall specify
   -- its encoding for noValueAvailable
PatronFormat ::= SEQUENCE {
   patronFormatOwner INTEGER (1..65535) OPTIONAL,
   patronFormatType INTEGER (1..65535) OPTIONAL}
Payload ::= OCTET STRING
   -- A patron format that uses this type shall specify
   -- its encoding for noValueAvailable
BIRValidityPeriod ::= SEQUENCE
   {notValidBefore Date-Time OPTIONAL,
   notValidAfter Date-Time OPTIONAL}

SBFormat ::= SEQUENCE {
   sbOwner INTEGER (1..65535) OPTIONAL,
   sbType INTEGER (1..65535) OPTIONAL}
Version ::= SEQUENCE {
   major   INTEGER {version1(1), version2(2)} (0..MAX),
   minor   INTEGER {version0(0)} (0..MAX)
   --noValueAvailable is encoded by {major 0, minor 0}
}
RegistryID ::= SEQUENCE {
   organization  INTEGER (0..MAX),
   type                 INTEGER (0..MAX)
}

BiometricDataBlock ::= OCTET STRING
SecurityBlock ::= OCTET STRING
Date-Time ::= TIME (SETTINGS
“Basic=Date-Time
Date=YMD
Year=Basic
Time=HMS
Midnight = Start
Local-or-UTC=Z”)

OneByte ::= INTEGER (0..255)
TwoByte ::= INTEGER (0..65535)
ThreeByte ::= INTEGER (0..16777215)
FourByte ::= INTEGER (0..4294967295)
OneBit ::= INTEGER (0..1)
TwoBit ::= INTEGER (0..3)
ThreeBit ::= INTEGER (0..7)
FourBit ::= INTEGER (0..15)
END
```


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7 Patron format specification: Minimum simple bit-oriented patron format (deprecated)

7.1 Patron

ISO/IEC JTC 1/SC 37

This patron format is considered deprecated. Therefore it shall not be used in new developments or deployments.

7.2 Patron format owner

257 (0101_{Hex}). The Biometric Registration Authority has allocated this identifier for ISO/IEC JTC 1/SC 37.

7.3 Patron format name

ISO/IEC JTC 1/SC 37 minimum simple bit-oriented patron format

7.4 Patron format type

1 (0001_{Hex}). This has been registered in accordance with ISO/IEC 19785-2.

7.5 ASN.1 object identifier for this patron format

```
{iso registration-authority cbeff(19785) biometric-organization(0) jtc1-sc37(257) patron-format(1) simple-bit-oriented(1)}
```

or, in XML value notation,

```
<OBJECT_IDENTIFIER>1.1.19785.0.257.1.1 </OBJECT_IDENTIFIER>
```

7.6 Domain of use

This patron format defined minimum length simple BIRs that may be of general utility in domains of use that wish to minimise data overhead in order to reduce storage or transfer bandwidth and processing costs at the expense of information content.

BIRs coded with this patron format shall be simple BIRs, not containing SB, and being able to accept loss of byte alignment.

As this patron format does not support the use of SB, CBEFF_BDB_encryption_options and CBEFF_BIR_integrity_options, are intrinsically considered set to, respectively, NO ENCRYPTION and NO INTEGRITY.

7.7 Version identifier

This patron format specification has a version identifier of (major 0, minor 0).

7.8 CBEFF version

This specification conforms to CBEFF version (major 2, minor 0).

7.9 General

This clause defines a minimum conforming patron format. The formal specification of the actual bits-on-the-line for this patron format is provided by a reference to the ASN.1 encoding rules.

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The `MinimumElementsBitOriented` patron format is formally defined as the ASN.1 PER-unaligned encoding rules applied to the `MinimumElementsBitOriented` type specified in 0.

An example of the encoding produced by an assignment of abstract values for this patron format, showing the size and encoding of each field of the SBH, is given in Table 1. The size of the SBH is **one octet** for BDB formats standardized by SC 37, but can be greater for other BDB formats. The BDB length encoding is one octet if the BDB encoding is less than 128 bytes, making the total size of the BIR 2 octets plus the length of the BDB.

Table 1 — Bit oriented minimum SBH (1 byte)

Format owner is SC 37? 0	Format type is <64? 0	Format type value
← 8 bits →		

7.10 Bit oriented patron format specification

Specification

```
CBEFF-MINIMUM-SUPPORT-BIT-ORIENTED
{iso standard 19785 modules(0)
minimumElementsWithDefaultsBitOriented(2)}
DEFINITIONS
AUTOMATIC TAGS ::=
BEGIN

IMPORTS BiometricDataBlock
   FROM CBEFF-DATA-ELEMENTS
   {iso standard 19785 modules(0) types-for-cbeff-data-elements(1)};
MinimumElementsBitOriented ::= SEQUENCE {

   /* This patron format contains only mandatory data elements and
   uses bit-level encoding for optimal use of encoding space.*/
   /* This patron format supports only the abstract values NO
   ENCRYPTION and NO INTEGRITY, which are encoded as zero length
   fields.*/
   format SEQUENCE {
          owner INTEGER (0.. 65535) DEFAULT 257,
              -- 257 is the biometric organization identifier of
              -- ISO/IEC JTC 1/SC 37
          type INTEGER (0..63, ..., 64 .. 65535)},
bdb              BiometricDataBlock (SIZE(0..127, ..., 128 .. MAX))}
END
```

8 Patron format specification: Minimum simple byte-oriented patron format (deprecated)

8.1 Patron

ISO/IEC JTC 1/SC 37

This patron format is considered deprecated. Therefore it shall not be used in new developments or deployments.

8.2 Patron format owner

`257` (0101_{Hex}). The Biometric Registration Authority has allocated this identifier for ISO/IEC JTC 1/SC 37.

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8.3 Patron format name

`ISO/IEC JTC 1/SC 37 minimum simple byte-oriented patron format.`

8.4 Patron format type

`2` (0002_{Hex}). This has been registered in accordance with ISO/IEC 19785-2.

8.5 ASN.1 object identifier for this patron format

```
{iso registration-authority cbeff(19785) biometric-organization(0) jtc1-
sc37(257) patron-format(1) simple-byte-oriented(2)}
```

or, in XML value notation,

```
<OBJECT_IDENTIFIER>1.1.19785.0.257.1.2 </OBJECT_IDENTIFIER>
```

8.6 Domain of use

This clause provides the definition of a minimum patron format for simple BIR structures that may be of general utility in domains of use that wish to minimise the overhead of the SBH in order to reduce storage or transfer bandwidth and processing costs at the expense of information content, and that require byte alignment, and do not require ENCRYPTION and INTEGRITY.

8.7 Version identifier

This patron format specification has a version identifier of (major 0, minor 0).

8.8 CBEFF version

This specification conforms to CBEFF version (major 2, minor 0).

8.9 General

An example of the encoding produced by an assignment of abstract values for this patron format, showing the size and encoding of each field of the SBH, is given in Table 2. The size of the SBH for this patron format is fixed at 4 octets.

Table 2 — Byte oriented minimum SBH

Format Owner (16 bits)	Format Type (16 bits)

9 Patron format specification: Fixed-length-fields, byte-oriented patron format using presence bit-map (deprecated)

9.1 Patron

ISO/IEC JTC 1/SC 37

This patron format is considered deprecated. Therefore it shall not be used in new developments or deployments.

9.2 Patron format owner

`257` (0101_{Hex}). The Biometric Registration Authority has allocated this identifier for ISO/IEC JTC 1/SC 37.

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9.3 Patron format name

ISO/IEC JTC 1/SC 37 Maximum simple patron format (byte oriented) using presence bit-map.

9.4 Patron format type

3 (0003_{Hex}). This has been registered in accordance with ISO/IEC 19785-2.

9.5 ASN.1 object identifier for this patron format

```
{iso registration-authority cbeff(19785) biometric-organization(0) jtc-sc37 (257) patron-format (1) presence-byte-oriented (3)}}
```

or, in XML value notation,

```
<OBJECT_IDENTIFIER>1.1.19785.0.257.1.3 </OBJECT_IDENTIFIER>
```

9.6 Domain of use

This patron format defines the structure of an interoperable BIR that allows the coding of as many fields as requested from the ones defined for the SBH, and wish to have a byte-oriented encoding to ease implementations.

9.7 Version identifier

This patron format specification has a version identifier of (major 0, minor 0).

9.8 CBEFF version

This specification conforms to CBEFF version (major 2, minor 0).

9.9 General

This patron format supports the 12 fixed length, optional CBEFF data elements and their abstract values that are permitted in a simple BIR format (thus excluding CBEFF_BIR_patron_format_owner and CBEFF_BIR_patron_format_type), plus CBEFF_subheader_count, plus the patron-format-defined field bdbLength. It contains an initial bit map that identifies the optional fields present in an encoded SBH. The omission of these fields either encodes NO VALUE AVAILABLE, or encodes a specific default value (specified in the patron format specification) for the CBEFF data element. The presence bit map adds two octets, so if all optional fields have the default values, the size of this SBH would be 6 octets. This patron format does not support ENCRYPTION or INTEGRITY, and thus does not support CBEFF_SB_format_owner and CBEFF_SB_format_type.

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9.10 Specification

CBEFF data element name	Field name	Length (octets)	Abstract values and Encodings[a]
n/a: patron-defined data element	present	2	
	bioType-p bioSubtype-p bdbCreation-p procLevel-p	1 bit 1 bit 1 bit 1 bit	PRESENT: b'1' or NOT PRESENT: b'0' for each
	product-p purpose-p quality-p bdbValidity-p	1 bit 1 bit 1 bit 1 bit	
	birCreation-p birValidity-p patronHdrVers-p vers-p	1 bit 1 bit 1 bit 1 bit	
	subHeadCt-p bdbLength-p reserved	1 bit 1 bit 2 bits	b'00'
	BDB-format	4	
CBEFF_BDB_format_owner	owner	2	Integer: 0...65535
CBEFF_BDB_format_type	type	2	Integer: 0...65535
CBEFF_BDB_encryption_options	n/a	0	NO ENCRYPTION
CBEFF_BDB_integrity_options	n/a	0	NO INTEGRITY
CBEFF_BDB_biometric_type	bioType	3	*This encoding is a 3 octet bitmap. NO VALUE AVAILABLE is encoded as all 0 bits. If MULTIPLE BIOMETRIC TYPES is set, other bits may also be set to enumerate the types contained in the BDB.* NO VALUE AVAILABLE: 000000_{Hex} MULTIPLE BIOMETRIC TYPES: 000001_{Hex} FACE: 000002_{Hex} VOICE: 000004_{Hex} FINGER: 000008_{Hex} IRIS: 000010_{Hex} RETINA: 000020_{Hex} HAND GEOMETRY: 000040_{Hex} SIGNATURE OR SIGN: 000080_{Hex} KEYSTROKE: 000100_{Hex} LIP MOVEMENT: 000200_{Hex} GAIT: 001000_{Hex} VEIN: 002000_{Hex}

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CBEFF data element name	Field name	Length (octets)	Abstract values and Encodings[a]
			DNA: 004000_{Hex} EAR: 008000_{Hex} FOOT: 010000_{Hex} SCENT: 020000_{Hex}
CBEFF_BDB_biometric_subtype	bioSubtype	1	*This encoding is a 1 octet bitmap.* *Combinations of abstract values are permitted (by ORing the encodings for those values) when the abstract value encoded in CBEFF_BDB_biometric_type represents a biometric technology that can create a BDB where multiple subtypes are supported.* NO VALUE AVAILABLE: b'0000 0000' LEFT: b'0000 0001' RIGHT: b'0000 0010' LEFT THUMB: b'0000 0101' LEFT INDEX FINGER: b'0000 1001' LEFT MIDDLE FINGER: b'0001 0001' LEFT RING FINGER: b'0010 0001' LEFT LITTLE FINGER: b'0100 0001' RIGHT THUMB: b'0000 0110' RIGHT INDEX FINGER: b'0000 1010' RIGHT MIDDLE FINGER: b'0001 0010' RIGHT RING FINGER: b'0010 0010' RIGHT LITTLE FINGER: b'0100 0010' LEFT PALM: b'1000 0101' LEFT BACK OF HAND: b'1000 1001' LEFT WRIST: b'1001 0001' RIGHT PALM: b'1000 0110' RIGHT BACK OF HAND: b'1000 1010' RIGHT WRIST: b'1001 0010'
CBEFF_BDB_creation_date	bdbCreation	7	NO VALUE AVAILABLE: seven 0 octets date/time value: fourteen BCD digits (YYYYMMDDHHMMSS)
CBEFF_BDB_processed_level	procLevel	1	NO VALUE AVAILABLE: 0 RAW: 1 INTERMEDIATE: 2 PROCESSED: 3 RESERVED: 4...15
	product	4	NO VALUE AVAILABLE: 0
CBEFF_BDB_product_owner	owner	2	Integer: 1...65535
CBEFF_BDB_product_type	identifier	2	Integer: 1...65535

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CBEFF data element name	Field name	Length (octets)	Abstract values and Encodings[a]
CBEFF_BDB_purpose	purpose	1	NO VALUE AVAILABLE: 0 VERIFY: 1 IDENTIFY: 2 ENROLL: 3 ENROLL FOR VERIFICATION ONLY: 4 ENROLL FOR IDENTIFICATION ONLY: 5 AUDIT: 6 RESERVED: 7...15 (shall not be encoded)
CBEFF_BDB_quality	quality	1	NO VALUE AVAILABLE: 0 QUALITY NOT SUPPORTED - BY BDB CREATOR: 255 QUALITY SUPPORTED BY BDB-CREATOR BUT NOT SET: 254 INTEGER VALUE: 0...100
CBEFF_BDB_validity_period	bdbValidity	8	NO VALUE AVAILABLE: eight 0 octets pair of dates (not before, not after): sixteen BCD digits (YYYYMMDDYYYYMMDD)
CBEFF_BIR_creation_date	birCreation	7	NO VALUE AVAILABLE: seven 0 octets date/time value: fourteen BCD digits (YYYYMMDDHHMMSS)
CBEFF_BIR_validity_period	birValidity	8	NO VALUE AVAILABLE: eight 0 octets pair of dates (not before, not after): sixteen BCD digits (YYYYMMDDYYYYMMDD)
CBEFF_patron_header_version	patronFmtVers	1	INTEGER: 0
CBEFF_version	vers	1	Major '2' and Minor '0': 20_{Hex}
CBEFF_subheader_count	subHeadCt	1	Integer: 0
n/a: patron-defined data element	bdbLength	4	Integer: 0...4294967295
BDB	bdb	See NOTE	See NOTE

NOTE The length, content and encoding of the BDB are not specified by CBEFF nor by this CBEFF-defined patron format specification.

[a] Encodings are specified as binary integers unless otherwise indicated.

10 Patron format specification: Fixed-length-fields, bit-oriented patron format using presence bit-map (deprecated)

10.1 Patron

ISO/IEC JTC 1/SC 37

This patron format is considered deprecated. Therefore it shall not be used in new developments or deployments.

10.2 Patron format owner

257 (0101_{Hex}). The Biometric Registration Authority has allocated this identifier for ISO/IEC JTC 1/SC 37.

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10.3 Patron format name

`ISO/IEC JTC 1/SC 37 fixed-length-fields, bit-oriented patron format using presence bit-map.`

10.4 Patron format type

4 (0004_{Hex}). This has been registered in accordance with ISO/IEC 19785-2.

10.5 ASN.1 object identifier for this patron format

```
{iso registration-authority cbeff(19785) biometric-organization(0) jtc1-
sc37(257) patron-format(1) bit-oriented(4)}
```

or, in XML value notation,

```
<OBJECT_IDENTIFIER>1.1.19785.0.257.1.4 </OBJECT_IDENTIFIER>
```

10.6 Domain of use

This patron format defines the structure of an interoperable BIR that allows the coding of as many fields as requested from the ones defined for the SBH.

10.7 Version identifier

This patron format specification has a version identifier of (major 0, minor 0).

10.8 CBEFF version

This specification conforms to CBEFF version (major 2, minor 0).

10.9 General

The `AllElementsWithDefaultsBitOriented` patron format uses fixed-width bit-wide fields that are just sufficient to encode the range of abstract values in version 2 of the CBEFF specification, with some reserved abstract values for future addition of abstract values to some CBEFF data elements. Formally, the fields of this patron format are defined by application of the ASN.1 unaligned packed encoding rules (PER-UNALIGNED). All fields in this patron format are assigned default values (including fields that CBEFF requires all patron formats to support) with their presence or absence indicated by an initial bit map. The size of the encoding is 6 octets if all data elements have the default value (usually `noValueAvailable`), or are absent.

10.10 Specification

```
CCBEFF-FULL-SUPPORT-WITH-DEFAULTS-BIT-ORIENTED
{iso standard 19785 modules(0) allElementsWithDefaultsBitOriented(4)}
DEFINITIONS
AUTOMATIC TAGS ::=
BEGIN

IMPORTS BDBFormat, EncryptionOptions, IntegrityOptions,
SubheaderCount, BiometricType, BiometricSubtype, ChallengeResponse,
BDBCreationDate, BDBIndex, ProcessedLevel, Product, Purpose, Quality,
BDBValidityPeriod, BIRCreationDate, Creator, BIRIndex, PatronFormat,
Payload, BIRValidityPeriod, Version, SBFormat, BiometricDataBlock,
OneByte, TwoByte, ThreeByte, FourByte, OneBit, TwoBit, ThreeBit,
FourBit
FROM CBEFF-DATA-ELEMENTS
{iso standard 19785 modules(0) types-for-cbeff-data-elements(1)};

AllElementsWithDefaultsBitOriented ::= SEQUENCE {
```


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```
    /* This patron format contains all data elements, but makes full
    use of
    default values to allow omission of fields. It encodes each CBEFF
    data element into a fixed-width bit field.
    A 14-bit bit map is present at the start of the
    encoding to determine which fields are present. */

    format BDBFormat,
    encryptOpts EncryptionOptions DEFAULT FALSE,
    integOpts IntegrityOptions DEFAULT FALSE,
    subHeaderCount SubheaderCount DEFAULT 0,
    bdbLength INTEGER (0..4294967295) DEFAULT 0,
    bioType BiometricType DEFAULT noValueAvailable,
    bioSubtype BiometricSubtype DEFAULT any,
    chaResp ChallengeResponse OPTIONAL,
    bdbCreation BDBCreationDate OPTIONAL,
    bdbIndex BDBIndex OPTIONAL,
    procLevel ProcessedLevel DEFAULT noValueAvailable,
    product Product DEFAULT { },
    purpose Purpose DEFAULT noValueAvailable,
    quality Quality DEFAULT noValueAvailable,
    bdbValidity BDBValidityPeriod,
    birCreation BIRCreationDate OPTIONAL,
    birCreator Creator OPTIONAL,
    birIndex BIRIndex OPTIONAL,
    patronFormat PatronFormat DEFAULT { },
    payload Payload OPTIONAL,
    birValidity BIRValidityPeriod,
    patronHdrVersion Version DEFAULT {header-major 0, header-minor 0},
    sbFormat SBFormat DEFAULT {},
    cbeffVers Version DEFAULT {cbeff-major 2, cbeff-minor 0},
    bdb BiometricDataBlock
}

END
```

11 Patron format specification: TLV-encoded patron format, for use with smartcards or other tokens

11.1 Patron

ISO/IEC JTC 1/SC 37

11.2 Patron format owner

257 (0101_{Hex}). The Biometric Registration Authority has allocated this identifier for ISO/IEC JTC 1/SC 37.

11.3 Patron format name

ISO/IEC JTC 1/SC 37 TLV-encoded patron format, for use with smartcards or other tokens.

11.4 Patron format type

5 (0005_{Hex}). This has been registered in accordance with ISO/IEC 19785-2.

11.5 ASN.1 object identifier for this patron format

{iso registration-authority cbeff(19785) biometric-organization(0) jtc1-sc37(257) patron-format(1) tlv-encoded(5)}

or, in XML value notation,

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```
<OBJECT_IDENTIFIER>1.1.19785.0.257.1.5 </OBJECT_IDENTIFIER>
```

11.6 Domain of Use

The domain of use is applications complying with ISO/IEC 7816-11. This patron format is applicable for both on-card and off-card biometric comparison.

11.7 Version identifier

This patron format specification has a version identifier of (major 1, minor 1).

11.8 CBEFF version

This specification conforms to CBEFF version (major 2, minor 0).

11.9 General

11.9.1 This clause specifies in 11.10:

a) the CBEFF patron format named "ISO/IEC JTC 1/SC 37 TLV-encoded patron format, for use with smart cards or other tokens" and

b) a TLV encoding for a number of CBEFF data elements (together with distinct TLV tags) that can be used by any TLV-encoded application that needs to make reference to such data elements.

NOTE The particular form of TLV encoding specified in this clause is that provided by the ASN.1 Distinguished Encoding Rules (see ISO/IEC 8825-1).

11.9.2 ISO/IEC 7816-4 and ISO/IEC 7816-11 define the necessary exchanges to support:

a) On-card biometric comparison

   1) Retrieval of information from a smartcard or other token prior to an external biometric verification process.

   2) Commands for performing a biometric verification on a smartcard.

3) Strategies for enrollment (recording of information on a smartcard or other token).

4) Security mechanisms for establishing a trusted channel between a smartcard and an external system.

b) Off-card biometric comparison

   1) Commands for retrieval of the biometric related data from a smartcard to be used in a service system, e.g. a cross border control system.

   2) Security mechanisms for the protection of the biometric related data.

11.9.3 This version of the CBEFF patron format named "ISO/IEC JTC 1/SC 37 TLV-encoded patron format, for use with smartcards or other tokens" is formally defined as the ASN.1 type `BiometricInformationTemplate` (see 11.10) encoded using the ASN.1 Distinguished Encoding Rules (see ISO/IEC 8825-1). A diagrammatic specification of this patron format is provided in 11.11.

NOTE The term Biometric Information Template is used in ISO/IEC 7816-11, together with the abbreviation BIT. This term corresponds to a (possibly partial) Biometric Information Record and is used in this clause where the relation with ISO/IEC 7816-11 is important.

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11.9.4 The components of the ASN.1 type `BiometricHeaderTemplate` (with their context-specific tags, see 11.10), encoded using the ASN.1 Basic Encoding Rules are also defined as Data Objects for use in ISO/IEC 7816-11.

NOTE The term Biometric Header Template is used in ISO/IEC 7816-11, together with the abbreviation BHT. This term and the abbreviation are synonymous with Standard Biometric Header and SBH, and are used in this clause where the relation with ISO/IEC 7816-11 is important.

11.9.5 The term Biometric Information Data Object is used in ISO/IEC 7816-11 to refer to the TLV-encoding of a specific ASN.1 type. Table 3 records the Biometric Information Data Objects that are defined in 11.10 for use in ISO/IEC 7816-11.

NOTE As ISO/IEC 7816-11 normally describes tags by their hex values, these are included here.

Table 3 — Biometric Information Data Objects with the Biometric Header Template Data Objects defined in 11.10

Biometric Information Data Object	ASN.1 type or component name (see 11.10)	Tag (hex)
Biometric Information Template	`BiometricInformationTemplate`	$7F60_{Hex}$
Group BIT	`GroupBIT`	$7F61_{Hex}$
BDB Reference Data	`bdbReferenceData`	$5F2E_{Hex}$
BDB Reference Data Template	`bdbReferenceDataTemplate`	$7F2E_{Hex}$
BIR Payload	`birPayLoad`	53_{Hex} or 73_{Hex}
For use only in Biometric Reference Data Template:		
BDB Reference Data with Standardised Format (Primitive)	`standardBDBReferenceData`	81_{Hex}
BDB Reference Data with Standardised Format (Constructed)	`standardBDBReferenceDataTemplate`	$A1_{Hex}$
BDB Reference Data with Proprietary Format (Primitive)	`proprietaryBDBReferenceData`	82_{Hex}
BDB Reference Data with Proprietary Format (Constructed)	`proprietaryBDBReferenceDataTemplate`	$A2_{Hex}$
For use only in Biometric Information Template:		
Biometric Header Template	`biometricHeaderTemplate`	$A1_{Hex}$
Algorithm Reference	`algorithmReference`	80_{Hex}
Reference Data Qualifier	`referenceDataQualifier`	83_{Hex}
For use only in Biometric Header Template:		
Patron Header Version	`patronHeaderVersion`	80_{Hex}
BDB Biometric Type	`bdbBiometricType`	81_{Hex}
BDB Biometric Subtype	`bdbBiometricSubType`	82_{Hex}
BDB Creation Date	`bdbCreationDate`	83_{Hex}
BIR Creator	`birCreator`	84_{Hex}
BDB Validity Period	`bdbValidityPeriod`	85_{Hex}
BDB PID	`bdbPID`	86_{Hex}
BDB Format Owner	`bdbFormatOwner`	87_{Hex}
BDB Format Type	`bdbFormatType`	88_{Hex}
BIR Index	`birIndex`	90_{Hex}
Comparison Algorithm Parameters	`comparisonAlgParameters`	91_{Hex} or $B1_{Hex}$

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11.9.6 CBEFF-compliance requires the NO VALUE AVAILABLE abstract value to be supported by this patron format for CBEFF data elements that are not fully supported. To meet this requirement, tags are assigned and reserved by this part of ISO/IEC 19785 in Table 4 for Data Objects appearing in the Biometric Header Template. These tag values shall not be assigned by any other tag authority to Data Objects that can appear in the Biometric Header Template. These Data Objects shall never appear in encodings of this version of this patron format, and their omission represents the NO VALUE AVAILABLE abstract value of the corresponding CBEFF data element.

NOTE Subsequent versions of this patron format may define these Data Objects to support the corresponding CBEFF data element.

Table 4 — Reserved tag values

ASN.1 tag value	Tag value	Corresponding CBEFF data element
[19]	93_{Hex}	CBEFF_BDB_challenge_response
[20]	94_{Hex}	CBEFF_BDB_index
[21]	95_{Hex}	CBEFF_BDB_processed_level
[22]	96_{Hex}	CBEFF_BDB_purpose
[23]	97_{Hex}	CBEFF_BDB_quality
[24]	98_{Hex}	CBEFF_BIR_creation_date
[25]	99_{Hex}	CBEFF_BIR_patron_format_owner
[26]	$9A_{Hex}$	CBEFF_BIR_patron_format_type
[27]	$9B_{Hex}$	CBEFF_BIR_validity_period
[28]	$9C_{Hex}$	CBEFF_version

11.10 ASN.1 specification

```
CBEFF-SMARTCARD-BIDO
-- The abbreviation BIDO is used for Biometric Information Data Object
{iso standard 19785 modules(0) types-for-smartcard(8)}
DEFINITIONS
IMPLICIT TAGS ::=

BEGIN

-- In all cases, omission of an optional component that represents a
-- CBEFF data element is the encoding of the NO VALUE AVAILABLE for
-- that data element.
PatronHeaderVersion ::= OCTET STRING (SIZE(2))
   -- CBEFF_patron_header_version
   -- The first octet encodes the major version number
   -- The second octet encodes the minor version number
BiometricType ::= OCTET STRING (SIZE(1..3))
   -- CBEFF_BDB_biometric_type
   -- The encoding of the abstract values in the value part of the
   -- TLV shall be the Recommended Encodings specified in Table 7
   -- Note that this is different from the encoding of this type in
   -- 9.10 and in other patron formats specified in this part of
   -- ISO/IEC 19785.
BiometricSubType ::= OCTET STRING (SIZE(1))
   -- CBEFF_BDB_biometric_subtype
   -- The encoding of the abstract values in the value part of the
   -- TLV shall be the Recommended Encodings specified in Table 8.
   -- Note that this is different from the encoding of this type in
   -- Table A.2 and in other patron formats specified in this part of
   -- ISO/IEC 19785.
BCDTime ::= OCTET STRING (SIZE(7))
   -- BCD encoded timestamp with format ‘ YYYYMMDDHHMMSS’
Creator ::= UTF8String
   -- CBEFF_BIR_creator
BCDDate ::= OCTET STRING (SIZE(4))
```


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```
   -- BCD encoded date with format 'YYYYMMDD'
BCDDatePeriod ::= OCTET STRING (SIZE(8))
   -- Two concatenated BCD encoded dates with format YYYYMMDDYYYYMMDD
ProductID ::= OCTET STRING (SIZE(4))
   -- CBEFF_BDB_product_owner in the first two octets
   -- CBEFF_BDB_product_type in the last two octets
FormatOwner ::= OCTET STRING (SIZE(2))
   -- CBEFF_BDB_format_owner
FormatType ::= OCTET STRING (SIZE(2))
   -- CBEFF_BDB_format_type
BIRIndex ::= OCTET STRING
   -- CBEFF_BIR_index
BiometricInformationTemplate ::= [APPLICATION 96] SET {
algorithmReference [0] OCTET STRING (SIZE(1)) OPTIONAL,
   -- A non-CBEFF data element – see ISO/IEC 24787
referenceDataQualifier [3] OCTET STRING (SIZE(1)) OPTIONAL,
   -- A non-CBEFF data element – see ISO/IEC 24787
biometricHeaderTemplate [1] BiometricHeaderTemplate,
bdbReferenceData [APPLICATION 46] EXTERNAL OPTIONAL,
   -- A CBEFF BDB, mandatory for off-card-comparison
birPayLoad [APPLICATION 19] OCTET STRING OPTIONAL
   -- CBEFF_BIR_payload, contents defined by ISO/IEC 24787
   }
GroupBIT ::= [APPLICATION 97] SET OF BiometricInformationTemplate
BiometricHeaderTemplate ::= SET {
   patronHeaderVersion     [0] PatronHeaderVersion
                  DEFAULT'0101'H,
   -- The absence of this Data Object represents NO VALUE AVAILABLE
   bdbBiometricType        [1] BiometricType OPTIONAL,
   bdbBiometricSubType     [2] BiometricSubType OPTIONAL,
   -- Required to be absent unless bdbBiometricType is present
   bdbCreationDate         [3] BCDTime OPTIONAL,
   -- CBEFF_BDB_creation_date
   birCreator              [4] Creator OPTIONAL,
   bdbValidityPeriod       [5] BCDDatePeriod OPTIONAL,
   bdbPID                  [6] ProductID OPTIONAL,
   bdbFormatOwner          [7] FormatOwner,
   bdbFormatType           [8] FormatType,
   birIndex                [16] BIRIndex OPTIONAL,
   comparisonAlgParameters [17] OCTET STRING OPTIONAL
   -- A non-CBEFF data element – see ISO/IEC 24787
   }

END
```

11.11 Tabular representations for information

11.11.1 The Biometric Information Template used for on-card biometric comparison

Table 5 shows the Biometric Information Template (BIT) used for on-card biometric comparison. The BIT has the following substructure:

a) Data Objects (with tags 80_{Hex} and 83_{Hex}) as defined in ISO/IEC 7816-11, containing values relevant for interindustry commands used for biometric verification as defined in ISO/IEC 7816-4;

b) Biometric Header Template (BHT) with tag $A1_{Hex}$ as defined in ISO/IEC 7816-11. The tag allocation authority for the Data Objects nested in the BHT is ISO/IEC JTC 1/SC 37 (default tag allocation authority);

NOTE The ASN.1 object identifier for this tag allocation authority is `{iso standard 19785 part(3) tag-allocation(1) clause-11(0)}`.

c) Data Objects for CBEFF data elements that are relevant for on-card biometric comparison;

d) Biometric Data Objects which are on-card biometric comparison specific and only defined in this clause (the biometric comparison algorithm parameters Data Object with tag 91_{Hex} or $B1_{Hex}$).

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