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 19785-3:2020. It supersedes BS ISO/IEC 19785-3:2015, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/44/-/2, Biometric technical interfaces.

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Part 3: Patron format specifications

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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).

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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 19785-3:2015), which has been technically revised.

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

— Vocabulary and technical updates and corrections.

— Specification of new CBEFF patron formats for BioAPI 2.0, Presentation Attack Detection (PAD), new TLV-encoded patron format for ICCs or other tokens (with explicit tag allocation authority), and Self-identifying Tag-oriented simple and complex BIRs.

— Inclusion of conformance requirements in Annex B and coding specifications for tagged patron formats, such as TLV, XML, and JSON in Annex C.

— Some technical comments and clarifications on the Clause 11 patron format are introduced within Annex D (however, for legacy reasons, the technical content of the TLV-encoded patron format for use with smartcards or other tokens [with implicit tag allocation authority] in Clause 11, is presented as it was originally published in ISO/IEC 19785-3:2007).

— The permitted values for CBEFF_BDB_biometric_type and CBEFF_BDB_biometric_subtype have been harmonized across all patron formats (except for Clause 11, which is preserved for legacy reasons), using the common CBEFF-DATA-ELEMENTS definitions in 6.2.

— The CBEFF_version for the patron formats has been increased to (major 4, minor 0) to support newly defined CBEFF_BDB_biometric_type values from ISO/IEC 19785-1 (including Body Photography, Friction Ridge, and Thermal).

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

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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 programmes and systems developed by different vendors by facilitating biometric data interchange.

ISO/IEC 19785-1 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 may be standardized or proprietary), and

   3) optional security blocks (SBs);

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

   1) only one SBH, at least one or more BDBs and possibly one SB (simple CBEFF BIRs),

   2) only one self-identifying SBH, at least one or more BDB and possibly one SB (self-identifying simple CBEFF BIRs), and

   3) more than one BDB along with some number of SBHs necessary to encode the BIR's structure and some number of SBs (complex CBEFF BIRs, multiple CBEFF BIRs).

c) a self-identifying concept, which may be applied to any variation of the 3-part structure for BIRs, using the 'SBIR' field as defined in ISO/IEC 19785-1;

d) more than 40 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;

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

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

g) the concept of the BRA, 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 defines the identification scheme for biometric objects and organizations registered by the BRA);

h) CBEFF data elements [see c) above] that support, within the SBH, the unique identifiers assigned by the BRA for biometric organizations, BDB formats, biometric products, capture devices, feature extraction algorithms, comparison algorithms, quality algorithms, compression algorithms, PAD mechanisms, patron formats (self-identifying or not), and SB formats.

Patron formats can be specified in other standards documents and registered with the BRA (see ISO/IEC 19785-2). For example, there is a registered patron format specified in ISO/IEC 19785-1. For a complete list of registered patron formats, consult the CBEFF Biometric Registration Authority website.

This document specifies a number of CBEFF patron formats that are considered to be of general utility in a variety of domains of use. Additional ISO/IEC JTC 1/SC 37 patron format specifications may be published as new clauses in future amendments to this document, or in other ISO/IEC JTC 1/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 BRA (see ISO/IEC 19785-2). Due to ASN.1

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Object Identifier (OID) is itself globally unambiguous within the scope of all ASN.1 OIDs, which forms a widely used global namespace.

NOTE ASN.1 OIDs are used by ITU-T, ITU-R, the UPU and 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 document.)

The combination of the BRA 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 document specifies, for each CBEFF patron format that it defines, the ASN.1 OID that unambiguously identifies that CBEFF patron format.

New implementations should make use of the tag-oriented CBEFF version 4.0 patron formats, i.e. Clauses 16 and onwards.

It is also important to note that, for legacy reasons, the technical content of patron format type 5, TLV-encoded patron format for use with smartcards or other tokens (with implicit tag allocation authority) in Clause 11, is presented as it was originally published in ISO/IEC 19785-3:2007 (with minor editorial updates and technical comments introduced in Annex D). New implementations should use the explicit tag allocation authority alternative provided by the patron format included in Clause 19.

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Information technology — Common Biometric Exchange Formats Framework —

Part 3: Patron format specifications

1 Scope

This document specifies and publishes registered Common Biometric Exchange Formats Framework (CBEFF) patron formats defined by the CBEFF patron ISO/IEC JTC 1/SC 37, and specifies their registered CBEFF patron format types (see ISO/IEC 19785-1) and resulting full ASN.1 OIDs.

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

ISO 8601 (all parts), *Data and time — Representations for information interchange*

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, *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, *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: Biometric registration authority*

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

ISO/IEC 30107-2, *Information technology — Biometric presentation attack detection — Part 2: Data formats*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 2382-37 and ISO/IEC 19785-1 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/

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3.1
biometric information template group
structure which allows two or more biometric information template instances to be nested

Note 1 to entry: The construction and use of biometric information template group Data Objects both for on-card and off-card biometric comparison are specified in ISO/IEC 7816-11.

3.2
Common Biometric Exchange Format Framework patron format structure type
CBEFF patron format structure type
indication of the CBEFF BIR structure used to define a given patron format, including whether the structure is self-identifying

Note 1 to entry: The possible structure types are defined in ISO/IEC 19785-1 and include:

— Simple CBEFF BIR;

— Complex CBEFF BIR;

— Multiple CBEFF BIR.

Note 2 to entry: ISO/IEC 19785-1 allows one or more BDBs to be included in the Simple CBEFF BIR structure type. However, unless otherwise indicated, all Simple CBEFF BIR structures defined in this document allow only a single BDB to be included.

3.3
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 a certain context, a length determinant, and a value part that may contain further TLV components, nested to any depth

4 Symbols and abbreviated terms

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

APDU	application protocol data unit, as defined in ISO/IEC 7816-4
ASN.1	Abstract Syntax Notation One
BER-TLV	Basic Encoding Rules – Tag Length Value
DO	data object, as defined in ISO/IEC 7816-4
ICC	integrated circuit card, as defined in ISO/IEC 7816-4
JSON	JavaScript Object Notation (as specified in RFC 8259 and in ISO/IEC 21778)
OID	object identifier
PAD	presentation attack detection
TLV	type (or tag), length, and value
UTF-8	Unicode (or Universal Coded Character Set) Tranformation Format – 8-bit
XML	eXtensible Markup Language
XSD	XML Schema Definition
W3C	World Wide Web Consortium

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5 Conformance

Clauses 6 onwards of this document specify the encoding (semantics) that can form a valid instance of the CBEFF patron format that is defined in each clause, together with the ASN.1 OID.

If an implementation claims that it supports and conforms to a CBEFF patron format defined in this document, then it shall either be:

a) capable of generating at least one of the encodings specified for that CBEFF patron format, or

b) capable of decoding (determining the semantics of) or processing in any other way encoding specified for that CBEFF patron format.

Annex B of this document specifies a patron format conformance statement (PFCS) for each patron format defined in this document.

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 and 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 (conforming to CBEFF version "major(4) 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 document.

All patron formats listed within this document that import definitions from the CBEFF-DATA-ELEMENTS {iso(1) standard(0) cbeff(19785) modules(0) types-for-cbeff-data-elements(1)} ASN.1 module utilize the definitions from subclause 6.2. Those patron formats do not use the definitions from any previous standard versions, even if the patron formats were initially defined in CBEFF version(s) before 4.0.

Any technical changes to a patron format, including updates to supported CBEFF data elements or abstract values, will result in a new major patron format version (this includes any technical changes made by using definitions from 6.2). However, if the technical structure of the format or abstract values have not changed, then no major version change will occur.

6.2 CBEFF data elements type definitions module

The following ASN.1 module can be retrieved from https://standards.iso.org/iso-iec/19785/-3/ed-3/en. The ASN.1 data element definitions listed in this section form a library, which can be referenced by any patron format using the ASN.1 IMPORT method.

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

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```
/* The following elements do not need an individual definition, as they
 are either basic data types (BDBCreationDate vs DATE-TIME),
 or equal to other defined data types (e.g. Product vs. RegistryID):
*/
  NO ENCRYPTION = false
  ENCRYPTION = true.
  NO INTEGRITY = false, INTEGRITY = true.
  SubheaderCount ::= INTEGER (0..255)
  BDBCreationDate ::= DATE-TIME
      -- A patron format that uses this type shall specify
      -- its encoding for noValueAvailable
  BDBValidityPeriod ::= ValidityPeriod
  BIRCreationDate ::= DATE-TIME
    -- A patron format that uses this type shall specify
    -- its encoding for noValueAvailable
  Product ::= RegistryID
  PatronFormat ::= RegistryID
  BIRValidityPeriod ::= ValidityPeriod
  BiometricDataBlock ::= OCTET STRING
  SBFormat ::= RegistryID
```

```
EncryptionOptions ::= BOOLEAN
   -- NO ENCRYPTION = false, ENCRYPTION = true.

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

BiometricType ::= INTEGER
   {
   noValueAvailable                  (0),
   multipleBiometricTypes            (1),
   face                              (2),
   voice                             (4),
   finger                            (8),
   iris                              (16),
   retina                            (32),
   handGeometry                      (64),
   signatureSign                     (128),
   keystroke                         (256),
   lipMovement                       (512),
   gait                              (4096),
   vein                              (8192),
   dna                               (16384),
   ear                               (32768),
   foot                              (65536),
   scent                             (131072),
   bodyPhotography                   (262144),
   frictionRidge                     (524288),
   thermal                           (1048576),
   presentationAttackData            (2097152),
   } (0..16777215)
   -- To include multiple biometric types in one instance of the
   -- BiometricType field, use the bitwise OR of each of the values.
   -- For example, for a BDB that will contain face and fingerprint
   -- use BiometricType = multipleBiometricTypes + face + finger (11)

BiometricSubtype ::= INTEGER
   {
```


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```
noValueAvailable                (0),
left                            (1),
right                           (2),
thumb                           (4),
leftThumb                       (5),
rightThumb                      (6),
index                           (8),
leftIndex                       (9),
rightIndex                      (10),
middle                          (16),
leftMiddle                      (17),
rightMiddle                     (18),
ring                            (32),
leftRing                        (33),
rightRing                       (34),
little                          (64),
leftLittle                      (65),
rightLittle                     (66),
palm                            (132),
leftPalm                        (133),
rightPalm                       (134),
backOfHand                      (136),
leftBackOfHand                  (137),
rightBackOfHand                 (138),
wrist                           (144),
leftWrist                       (145),
rightWrist                      (146),

-- The following values are valid combinations
-- of biometric subtypes within a single byte field. The
-- values are the bitwise OR of other biometric subtype values.

leftAndRight                    (3),
bothThumbs                      (7),
bothIndex                       (11),
thumbIndex                      (12),
leftThumbIndex                  (13),
rightThumbIndex                 (14),
bothThumbIndex                  (15),
bothMiddle                      (19),
thumbMiddle                     (20),
leftThumbMiddle                 (21),
rightThumbMiddle                (22),
bothThumbMiddle                 (23),
indexMiddle                     (24),
leftIndexMiddle                 (25),
rightIndexMiddle                (26),
bothIndexMiddle                 (27),
thumbIndexMiddle                (28),
leftThumbIndexMiddle            (29),
rightThumbIndexMiddle           (30),
bothThumbIndexMiddle            (31),
bothRing                        (35),
thumbRing                       (36),
leftThumbRing                   (37),
rightThumbRing                  (38),
bothThumbRing                   (39),
ringIndex                       (40),
leftRingIndex                   (41),
rightRingIndex                  (42),
bothRingIndex                   (43),
thumbIndexRing                  (44),
leftThumbIndexRing              (45),
rightThumbIndexRing             (46),
bothThumbIndexRing              (47),
middleRing                      (48),
leftMiddleRing                  (49),
rightMiddleRing                 (50),
bothMiddleRing                  (51),
thumbMiddleRing                 (52),
leftThumbMiddleRing             (53),
```

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```
rightThumbMiddleRing            (54),
bothThumbMiddleRing             (55),
indexMiddleRing                 (56),
leftIndexMiddleRing             (57),
rightIndexMiddleRing            (58),
bothIndexMiddleRing             (59),
thumbIndexMiddleRing            (60),
leftThumbIndexMiddleRing        (61),
rightThumbIndexMiddleRing       (62),
bothThumbIndexMiddleRing        (63),
bothLittle                      (67),
thumbLittle                     (68),
leftThumbLittle                 (69),
rightThumbLittle                (70),
bothThumbLittle                 (71),
indexLittle                     (72),
leftIndexLittle                 (73),
rightIndexLittle                (74),
bothIndexLittle                 (75),
thumbIndexLittle                (76),
leftThumbIndexLittle            (77),
rightThumbIndexLittle           (78),
bothThumbIndexLittle            (79),
middleLittle                    (80),
leftMiddleLittle                (81),
rightMiddleLittle               (82),
bothMiddleLittle                (83),
thumbMiddleLittle               (84),
leftThumbMiddleLittle           (85),
rightThumbMiddleLittle          (86),
bothThumbMiddleLittle           (87),
indexMiddleLittle               (88),
leftIndexMiddleLittle           (89),
rightIndexMiddleLittle          (90),
bothIndexMiddleLittle           (91),
thumbIndexMiddleLittle          (92),
leftThumbIndexMiddleLittle      (93),
rightThumbIndexMiddleLittle     (94),
bothThumbIndexMiddleLittle      (95),
ringLittle                      (96),
leftRingLittle                  (97),
rightRingLittle                 (98),
bothRingLittle                  (99),
thumbRingLittle                 (100),
leftThumbRingLittle             (101),
rightThumbRingLittle            (102),
bothThumbRingLittle             (103),
indexRingLittle                 (104),
leftIndexRingLittle             (105),
rightIndexRingLittle            (106),
bothIndexRingLittle             (107),
thumbIndexRingLittle            (108),
leftThumbIndexRingLittle        (109),
rightThumbIndexRingLittle       (110),
bothThumbIndexRingLittle        (111),
middleRingLittle                (112),
leftMiddleRingLittle            (113),
rightMiddleRingLittle           (114),
bothMiddleRingLittle            (115),
thumbMiddleRingLittle           (116),
leftThumbMiddleRingLittle       (117),
rightThumbMiddleRingLittle      (118),
bothThumbMiddleRingLittle       (119),
indexMiddleRingLittle           (120),  -- four finger "slap"
leftIndexMiddleRingLittle       (121),
rightIndexMiddleRingLittle      (122),
bothIndexMiddleRingLittle       (123),
allFingers                      (124),
leftAllFingers                  (125),
rightAllFingers                 (126),
bothAllFingers                  (127),  -- tenprint
```


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```
   bothPalms                        (135),
   bothBackOfHand                   (139),
   palmBackOfHand                   (140),
   leftPalmBackOfHand               (141),
   rightPalmBackOfHand              (142),
   bothPalmBackOfHand               (143),
   bothWrist                        (147),
   palmWrist                        (148),
   leftPalmWrist                    (149),
   rightPalmWrist                   (150),
   bothPalmWrist                    (151),
   backOfHandWrist                  (152),
   leftBackOfHandWrist              (153),
   rightBackOfHandWrist             (154),
   bothBackOfHandWrist              (155),
   palmBackOfHandWrist              (156),
   leftPalmBackOfHandWrist          (157),
   rightPalmBackOfHandWrist         (158),
   bothPalmBackOfHandWrist          (159)
   } (0 .. 255)
   -- For implementations that include multiple biometric subtypes
   -- in a single BiometricSubtype byte field, only those combinations
   -- listed above are defined. To specify combinations not defined
   -- above, multiple instances of the BiometricSubtype field are needed

ChallengeResponse ::= OCTET STRING (SIZE(0..65535))
     -- A patron format that uses this type shall specify
     -- its encoding for noValueAvailable

BDBIndex ::= OCTET STRING (SIZE(0..65535))
     -- A patron format that uses this type shall specify
     -- its encoding for noValueAvailable

ProcessedLevel ::= ENUMERATED
   {
   noValueAvailable  (0),
   raw               (1),
   intermediate      (2),
   processed         (3)
   }

Purpose ::= ENUMERATED
   {
   noValueAvailable  (0),
   verify            (1),
   identify          (2),
   enrol             (3),
   enrolVerify       (4),
   enrolIdentify     (5),
   audit             (6)
   }

QualityNotSupported::=  INTEGER (254)
NoValueAvailable::=     INTEGER (255)
Quality::= INTEGER (0..100 | QualityNotSupported | NoValueAvailable )

ConstructedQuality::= SEQUENCE
   {
   organization    [0]   INTEGER (0..65535),
   id              [1]   INTEGER (0..65535),
   score           [2]   Quality
   }

BDBFormat ::= SEQUENCE
   {
   organization      INTEGER (0..65535),
   id                INTEGER (0..65535)
   }

RegistryID ::= SEQUENCE
   {
```

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```
    organization      INTEGER (1..65535),
    id                INTEGER (1..65535)
      -- id is a model number or an algorithm identifier, or anything
      -- identifying a product line, but never a serial number
    }

  Creator ::= UTF8String
      -- A patron format that uses this type shall specify
      -- its encoding for noValueAvailable

  BIRIndex ::= OCTET STRING (SIZE(0..65535))
      -- A patron format that uses this type shall specify
      -- its encoding for noValueAvailable

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

  ValidityPeriod ::= SEQUENCE
    {
    notValidBefore     DATE-TIME OPTIONAL,
    notValidAfter      DATE-TIME OPTIONAL
    }

  Version ::= SEQUENCE
    {
    major       INTEGER (0..255),
    minor       INTEGER (0..255)
    --noValueAvailable is encoded by {major 0, minor 0}
    }

END
```

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

7.1 Patron

ISO/IEC JTC 1/SC 37

NOTE This patron format is deprecated.

7.2 Patron format owner

`257 (0101Hex)`. The BRA has allocated this identifier for ISO/IEC JTC 1/SC 37.

7.3 Patron format name

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

7.4 Patron format type

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

7.5 ASN.1 OID for this patron format

```
{iso(1) registration-authority(1) 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>
```


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7.6 Domain of use

This patron format has been deprecated due to a lack of adoption and technical issues with the definition of the patron format (it is not clear how to specify the BDB format owner or the BDB format type).

This patron format defines minimum length simple BIRs that may be of general utility in domains of use that wish to minimize 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.

Only a single BDB is permitted for each BIR of this patron format.

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

Patron Format Structure Type: Simple CBEFF BIR without self-identification.

Clause 7 defines a minimum simple bit-oriented 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.

The simple bit-oriented patron format is formally defined as the unaligned variant of the ASN.1 packed encoding rules (ASN.1 PER) defined in ISO/IEC 8825-2, applied to the `MinimumElementsBitOriented` type specified in 7.10.

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 ISO/IEC JTC 1/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.

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Table 1 — Minimal simple bit-oriented SBH for ISO/IEC JTC 1/SC 37 BDB format (1 byte)

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

7.10 ASN.1 Specification

The following ASN.1 module can be retrieved from http://standards.iso.org/iso-iec/19785/-3/ed-3/en.

```
CBEFF-SIMPLE-BIT-ORIENTED
{ iso(1) standard(0) cbeff(19785) modules(0)
minimumElementsWithDefaultsBitOriented(2)}
DEFINITIONS
AUTOMATIC TAGS ::=
BEGIN

IMPORTS BiometricDataBlock
      FROM CBEFF-DATA-ELEMENTS

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: Simple byte-oriented patron format

8.1 Patron

ISO/IEC JTC 1/SC 37.

8.2 Patron format owner

`257 (0101Hex)`. The BRA has allocated this identifier for ISO/IEC JTC 1/SC 37.

8.3 Patron format name

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

8.4 Patron format type

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

8.5 ASN.1 OID for this patron format

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


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or, in XML value notation,

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

8.6 Domain of use

Clause 8 provides the definition of a minimum byte-oriented 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. Only a single BDB is permitted for each BIR of this patron format.

8.7 Version identifier

This patron format does not include a version identifier and the version is considered to be (major 0, minor 0). Therefore, this patron format cannot be updated in the future.

8.8 CBEFF version

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

8.9 General

Patron Format Structure Type: Simple CBEFF BIR without self-identification.

Formally, the fields of this patron format are defined by application of the unaligned variant of the ASN.1 packed encoding rules defined in ISO/IEC 8825-2 to the presence bit-oriented patron format type specified in 8.10.

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 — Simple byte-oriented SBH

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

8.10 Patron format specification

An instance of a BIR shall contain the fields specified in Table 3, in exactly the same order and with no gaps between the fields. This patron format contains only mandatory data elements and uses byte-level encoding. This patron format supports only the abstract values NO ENCRYPTION and NO INTEGRITY, which are encoded as zero length fields.

Table 3 — Specification of simple byte-oriented patron format

CBEFF data element name	Field name	Length	Abstract values	Encoding
CBEFF_BDB_format_owner	Format owner	2 bytes	integer 1...65535	1...65535
CBEFF_BDB_format_type	Format type	2 bytes	integer 1...65535	1...65535
BDB	bdb	variable	See NOTE	See NOTE
NOTE The BDB format is not specified by this patron format specification.				

The following ASN.1 module can be retrieved from http://standards.iso.org/iso-iec/19785/-3/ed-3/en.

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8.11 ASN.1 Specification

```
CBEFF-SIMPLE-BYTE-ORIENTED
{iso(1) standard(0) cbeff(19785) modules(0)
minimumElementsWithDefaultsByteOriented(3)}
DEFINITIONS
AUTOMATIC TAGS ::=
BEGIN

IMPORTS BiometricDataBlock
      FROM CBEFF-DATA-ELEMENTS

MinimumElementsByteOriented ::= SEQUENCE {

      /* This patron format contains only mandatory data elements
      and uses byte-level encoding.*/

      /* This patron format supports only the abstract values
      NO ENCRYPTION and NO INTEGRITY, which are encoded as zero
      length fields.*/

      format   SEQUENCE {
         owner INTEGER (1..65535) DEFAULT 257,
          -- 257 is the biometric organization identifier of
          -- ISO/IEC JTC 1/SC 37
         type     INTEGER (1..63, ..., 64 .. 65535)},
         bdb      BiometricDataBlock (SIZE(0..127, ..., 128 .. MAX))}

END
```

9 Patron format specification: Presence byte-oriented patron format

9.1 Patron

ISO/IEC JTC 1/SC 37.

9.2 Patron format owner

`257 (0101Hex)`. The BRA has allocated this identifier for ISO/IEC JTC 1/SC 37.

9.3 Patron format name

`ISO/IEC JTC 1/SC 37 presence byte oriented patron format.`

9.4 Patron format type

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

9.5 ASN.1 OID for this patron format

```
{iso(1) registration-authority(1) 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 those defined for the SBH and has a byte-oriented encoding to ease implementations. Only a single BDB is permitted for each BIR of this patron format.

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9.7 Version identifier

This patron format specification has a version identifier of 1.

9.8 CBEFF version

This specification conforms to CBEFF version (major 4, minor 0) onwards.

9.9 General

Patron Format Structure Type: Simple CBEFF BIR without self-identification

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.

9.10 Specification

Table 4 — Specification for presence byte-oriented patron format

CBEFF data element name	Field name	Length (octets)	Abstract values and encodings[a]
n/a: patron-defined data element	present	2	
	bioType-p	1 bit	PRESENT: b'1' or
	bioSubtype-p	1 bit	NOT PRESENT: b'0'
	bdbCreation-p	1 bit	for each
	procLevel-p	1 bit	
	product-p	1 bit	
	purpose-p	1 bit	
	quality-p	1 bit	
	bdbValidity-p	1 bit	
	birCreation-p	1 bit	
	birValidity-p	1 bit	
	patronHdrVers-p	1 bit	
	vers-p	1 bit	
	subHeadCt-p	1 bit	
	bdbLength-p	1 bit	
	reserved	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

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

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

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Table 4 *(continued)*

CBEFF data element name	Field name	Length (octets)	Abstract values and encodings[a]
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.* Values can be found in 6.2 under the BiometricType ASN.1 definition
CBEFF_BDB_biometric_subtype	bioSubtype	1	*This encoding is a 1 octet bitmap.* Values can be found in 6.2 under the BiometricSubtype ASN.1 definition
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
CBEFF_BDB_product_owner CBEFF_BDB_product_type	product owner identifier	4 2 2	Field not present corresponds to "NO VALUE AVAILABLE" Integer: 1...65535 Integer: 1...65535
CBEFF_BDB_purpose	purpose	1	NO VALUE AVAILABLE: 0 VERIFY: 1 IDENTIFY: 2 ENROL: 3 ENROL FOR VERIFICATION ONLY: 4 ENROL 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	patronHdrVers	1	INTEGER: 0
CBEFF_version	vers	1	Major '4' and Minor '0': 40_{Hex}
CBEFF_subheader_count	subHeadCt	1	Integer: 0

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

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

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Table 4 *(continued)*

CBEFF data element name	Field name	Length (octets)	Abstract values and encodings[a]
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 defined by CBEFF nor by this CBEFF-defined patron format specification.

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

9.11 ASN.1 Specification

The following ASN.1 module can be retrieved from http://standards.iso.org/iso-iec/19785/-3/ed-3/en.

```
    CBEFF-PRESENCE-BYTE-ORIENTED
    { iso(1) standard(0) cbeff(19785) modules(0) presence-byte-oriented(5)}
    DEFINITIONS
    AUTOMATIC TAGS ::=
    BEGIN

    IMPORTS BDBFormat, SubheaderCount, BiometricType, BiometricSubtype,
    BDBCreationDate, ProcessedLevel, Product, Purpose, Quality,
    BDBValidityPeriod, BIRCreationDate, BIRValidityPeriod, Version,
    BiometricDataBlock
    FROM CBEFF-DATA-ELEMENTS

    PresenceByteOriented ::= SEQUENCE {

/* This patron format contains all data elements but makes full use of default values to
allow omission of fields. A bit map is present at the start of the encoding to determine
which fields are present. */

    format BDBFormat,

    fieldPresence SEQUENCE {
        bioType BOOLEAN,
        bioSubtype BOOLEAN,
        bdbCreation BOOLEAN,
        procLevel BOOLEAN,
        bdbProduct BOOLEAN,
        bdbPurpose BOOLEAN,
        bdbQuality BOOLEAN,
        bdbValidity BOOLEAN,
        birCreation BOOLEAN,
        birValidity BOOLEAN,
        patronHdrVersion BOOLEAN,
        cbeffVers BOOLEAN,
        subHeaderCount BOOLEAN,
        bdbLength BOOLEAN,
        },

        bdbFormat BDBFormat,
        bioType BiometricType DEFAULT noValueAvailable,
        bioSubtype BiometricSubtype DEFAULT noValueAvailable,
        bdbCreation BDBCreationDate OPTIONAL,
        procLevel ProcessedLevel DEFAULT noValueAvailable,
        bdbProduct Product OPTIONAL,
        bdbPurpose Purpose DEFAULT noValueAvailable,
        bdbQuality Quality DEFAULT noValueAvailable,
        bdbValidity BDBValidityPeriod OPTIONAL,
        birCreation BIRCreationDate OPTIONAL,
        birValidity BIRValidityPeriod OPTIONAL,
        patronHdrVersion Version INTEGER (0..255) DEFAULT 1,
        cbeffVers Version DEFAULT {cbeff-major 4, cbeff-minor 0},
        subHeaderCount SubheaderCount DEFAULT 0,
        bdbLength INTEGER (0..4294967295) DEFAULT 0,
```

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```
        bdb BiometricDataBlock
    }

END
```

10 Patron format specification: Presence bit-oriented patron format

10.1 Patron

ISO/IEC JTC 1/SC 37.

10.2 Patron format owner

257 (0101Hex). The BRA has allocated this identifier for ISO/IEC JTC 1/SC 37.

10.3 Patron format name

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

10.4 Patron format type

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

10.5 ASN.1 OID for this patron format

```
{iso(1) registration-authority(1) 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. Only a single BDB is permitted for each BIR of this patron format.

10.7 Version identifier

This patron format specification has a version identifier of (major 1, minor 0).

10.8 CBEFF version

This specification conforms to CBEFF version (major 4, minor 0) onwards.

10.9 General

Patron Format Structure Type: Simple CBEFF BIR without self-identification.

This patron format was updated from the previous version to include field presence (bit map) and security block fields that were missing in the previous version.

The presence bit-oriented 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 unaligned variant of the ASN.1 packed encoding rules defined in ISO/IEC 8825-2 to the presence bit-oriented patron format type specified in 10.10. The

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presence or absence of all optional fields is indicated by a presence field bit-map, but default values are used for omitted fields.

10.10 ASN.1 Specification

The following ASN.1 module can be retrieved from https://standards.iso.org/iso-iec/19785/-3/ed-3/en.

```
CBEFF-PRESENCE-BIT-ORIENTED
{iso(1) standard(0) cbeff(19785) modules(0)
allElementsWithDefaultsBitOriented(4)}
DEFINITIONS
AUTOMATIC TAGS ::=
BEGIN

IMPORTS BDBFormat, EncryptionOptions, IntegrityOptions,
SubheaderCount, BiometricType, BiometricSubtype, ChallengeResponse,
BDBCreationDate, BDBIndex, ProcessedLevel, Product, Purpose, Quality,
ValidityPeriod, BIRCreationDate, Creator, BIRIndex, PatronFormat,
Payload, Version, SBFormat, BiometricDataBlock
FROM CBEFF-DATA-ELEMENTS

AllElementsWithDefaultsBitOriented ::= SEQUENCE {

/* 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 bit map is present at the start of the encoding to determine which fields are present.
*/

format BDBFormat,

fieldPresence SEQUENCE {
    encryptOpts BOOLEAN,
    integOpts BOOLEAN,
    subHeaderCount BOOLEAN,
    bdbLength BOOLEAN,
    bioType BOOLEAN,
    bioSubtype BOOLEAN,
    chaResp BOOLEAN,
    bdbCreation BOOLEAN,
    bdbIndex BOOLEAN,
    procLevel BOOLEAN,
    product BOOLEAN,
    purpose BOOLEAN,
    quality BOOLEAN,
    bdbValidity BOOLEAN,
    birCreation BOOLEAN,
    birCreator BOOLEAN,
    birIndex BOOLEAN,
    patronFormat BOOLEAN,
    payload BOOLEAN,
    birValidity BOOLEAN,
    patronHdrVersion BOOLEAN,
    sbFormat BOOLEAN,
    cbeffVers BOOLEAN,
    sb OCTET STRING BOOLEAN
    },


    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 noValueAvailable,
    chaResp ChallengeResponse OPTIONAL,
    bdbCreation BDBCreationDate OPTIONAL,
    bdbIndex BDBIndex OPTIONAL,
    procLevel ProcessedLevel DEFAULT noValueAvailable,
    product Product OPTIONAL,
    purpose Purpose DEFAULT noValueAvailable,
```

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```
        quality Quality DEFAULT noValueAvailable,
        bdbValidity ValidityPeriod,
        birCreation BIRCreationDate OPTIONAL,
        birCreator Creator OPTIONAL,
        birIndex BIRIndex OPTIONAL,
        patronFormat PatronFormat OPTIONAL,
        payload Payload OPTIONAL,
        birValidity ValidityPeriod,
        patronHdrVersion Version DEFAULT {header-major 1, header-minor 0},
        sbFormat SBFormat OPTIONAL,
        cbeffVers Version DEFAULT {cbeff-major 4, cbeff-minor 0},
        bdb BiometricDataBlock,
        sb OCTET STRING (SIZE(0..4294967295)) OPTIONAL
    }

    END
```

11 Patron format specification: TLV-encoded patron format, for use with smartcards or other tokens (with implicit tag allocation authority)

11.1 Patron

ISO/IEC JTC 1/SC 37.

11.2 Patron format owner

`257 (0101Hex)`. The BRA 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 (0005Hex)`. This has been registered in accordance with ISO/IEC 19785-2.

11.5 ASN.1 OID for this patron format

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

or, in XML value notation,

`1.1.19785.0.257.1.5`

11.6 Domain of Use

The domain of use is applications complying with ISO/IEC 7816-11 when implicit tag allocation authority is considered. This patron format is applicable for both on-card and off-card biometric comparison and it is maintained for legacy reasons.

For the recent applications complying with ISO/IEC 7816-11, the explicit tag allocation specification shall be followed, and in such a case, the patron format to be used shall be the one defined in Clause 19.

For any other kind of application that would like to use TLV coding, patron formats defined in Clauses 16 and 17 shall be used.

NOTE For legacy reasons the technical content of this clause is unchanged since Edition 1 (ISO/IEC 19785-3:2007). Also, in order to maintain the validity of other widely implemented documents referencing this patron format, it will be preserved in Clause 11 in this and all future versions of this document. Since technical and major editorial changes cannot be made to this patron format, Annex D (informative) provides additional clarifying information that may be helpful to the reader.

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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 Patron Format Structure Type: Complex CBEFF BIR without self-identification

NOTE This patron format structure type is considered to be Complex CBEFF BIR, because multiple Simple BIRs (Biometric Information Template DOs) that encapsulate BDB information (BDB Reference Data, BDB Reference Data Template DOs) with its own SBHs (Biometric Header Template DOs) can be included into the Biometric Information Template Group DO.

11.9.2 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";

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 Basic Encoding Rules (see ISO/IEC 8825-1).

11.9.3 ISO/IEC 7816-4 and ISO/IEC 7816-11 define the necessary APDU 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.

11.9.4 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 Basic 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. 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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11.9.5 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 abbreviated term are synonymous with Standard Biometric Header and SBH, and are used in this clause where the relation with ISO/IEC 7816-11 is important.

11.9.6 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 5 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 5 — 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
Biometric Information Template	`BiometricInformationTemplate`	$7F60_{Hex}$
Biometric Information Template Group	`GroupBIT`	$7F61_{Hex}$
BDB Reference Data	`bdbReferenceData`	$5F2E_{Hex}$
BDB Reference Data Template	`bdbReferenceDataTemplate`	$7F2E_{Hex}$
BIR Payload (primitive / constructed)	`birPayLoad`	53_{Hex} / 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 (implicit tag allocation):		
Patron Header Version (as primitive)	`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 (as primitive)	`bdbValidityPeriod`	85_{Hex}
BDB PID (as primitive)	`bdbPID`	86_{Hex}
BDB Format Owner	`bdbFormatOwner`	87_{Hex}
BDB Format Type	`bdbFormatType`	88_{Hex}
BIR Index	`birIndex`	90_{Hex}

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Table 5 *(continued)*

Biometric Information Data Object	ASN.1 type or component name (see 11.10)	Tag
Comparison Algorithm Parameters (primitive / constructed)	`comparisonAlgParameters`	91_{Hex} / $B1_{Hex}$

11.9.7 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 document in Table 6 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 can define these Data Objects to support the corresponding CBEFF data element.

Table 6 — Reserved tag values (implicit tag allocation)

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 (as primitive)
`[28]`	$9C_{Hex}$	CBEFF_version (as primitive)

11.10 ASN.1 specification

The ASN.1 module given in 11.10 can be retrieved from https://standards.iso.org/iso-iec/19785/-3/ed-3/en.

```
CBEFF-SMARTCARD-BIDO
-- The abbreviation BIDO is used for Biometric Information Data Object
{iso(1) standard(0) cbeff(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 11.5.
        -- Note that this is different from the encoding of this type in
```

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```
        -- clause 29.10 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 11.6.
        -- 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))
        -- 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 7816-11
        referenceDataQualifier [3] OCTET STRING (SIZE(1)) OPTIONAL,
        -- A non-CBEFF data element - see ISO/IEC 7816-11
        biometricHeaderTemplate [1] BiometricHeaderTemplate,
        bdbReferenceData [APPLICATION 46] EXTERNAL OPTIONAL,
        -- A CBEFF BDB, mandatory for off-card-matching
        birPayLoad [APPLICATION 19] OCTET STRING OPTIONAL
        -- CBEFF_BIR_payload, contents defined by ISO/IEC 7816-11
        }

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,
        matchingAlgParameters [17] OCTET STRING OPTIONAL
        -- A non-CBEFF data element - see ISO/IEC 7816-11
        }
END
```


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11.11 Tabular representations for information

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

Table 7 shows the Biometric Information Template used for on-card biometric comparison. The Biometric Information Template 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 OID for this tag allocation authority is `{iso(1) standard(1) cbeff(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 are defined in this clause (the biometric comparison algorithm parameters Data Object with tag 91_{Hex} or $B1_{Hex}$).

Table 7 — The Biometric Information Template used for on-card biometric comparison (with implicit tag allocation authority)

Tag	Length	Value					Presence
$7F60_{Hex}$	Var.	Biometric Information Template					
		Tag	**Length**	**Value**			
		80_{Hex}	1	Algorithm reference for use in the VERIFY / EXT. AUTHENTICATE / MANAGE SE command as defined in ISO/IEC 7816-4			Optional
		83_{Hex}	1	Reference data qualifier for use in the VERIFY / EXT. AUTHENTICATE / MANAGE SE command as defined in ISO/IEC 7816-4			Optional
		$A1_{Hex}$	Var.	Biometric Header Template (BHT) Tag allocation authority: ISO/IEC JTC 1/SC 37			Mandatory
				Tag	**Length**	**Value**	
				80_{Hex}	2	CBEFF_patron_header_version (default 0101_{Hex})	Mandatory (if absent, the default value applies)
				90_{Hex}	Var.	CBEFF_BIR_index, unique identifier used for referencing this biometric data set in an application context outside the card	Optional
				81_{Hex}	1-3	CBEFF_BDB_biometric_type, see Table 9.	Optional
				82_{Hex}	1	CBEFF_BDB_biometric_subtype, see Table 10.	Optional, use with biometric type only
				83_{Hex}	7	CBEFF_BDB_creation_date, creation date and time of biometric reference data: fourteen BCD digits (YYYYMMDDHHMMSS)	Optional
				84_{Hex}	Var.	CBEFF_BIR_creator	Optional
				85_{Hex}	8	CBEFF_BDB_validity_period, a pair of dates (not before, not after): sixteen BCD digits (YYYYMMDDYYYYMMDD)	Optional

NOTE 1 In Table 7 the biometric data block as defined in ISO/IEC 19785-1 is not present, since the biometric reference data are stored separately in the card and not in this Biometric Information Template. The biometric verification data (format owner and format type indicated in the Data Objects with tag '87' and '88') have to be presented to the card using e.g. a ISO/IEC 7816 VERIFY command.

NOTE 2 In Table 7 no payload is present, since usually access to a payload, if used by the application, is granted after successful completion of the biometric verification. The payload may be retrieved using ISO/IEC 7816 interindustry access commands like GET DATA or READ BINARY.

NOTE 3 The outside world uses format owner / format type for identifying the required structure for the verification data. The matching algorithm in the card, which is able to process the verification data according to format owner / format type, is addressed by the algorithm reference, if the algorithm reference Data Object is present.

NOTE 4 The biometric comparison algorithm Data Object provides any special parameters of an on-card biometric comparison algorithm implementation, e.g. maximum number of minutiae expected in the biometric verification data. The content of this Data Object is defined by the BDB format owner (see e.g. ISO/IEC 19794-2).

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Table 7 *(continued)*

Tag	Length	Value					Presence
				86_{Hex}	4	CBEFF_BDB_product_owner, CBEFF_BDB_product_type. Concatenation of product owner and product type, identifying the product that created the biometric reference data	Optional
				87_{Hex}	2	CBEFF_BDB_format_owner, format owner of the biometric verification data, value assigned by the biometrics registration authority, see NOTE 1 and NOTE 3	Mandatory
				88_{Hex}	2	CBEFF_BDB_format_type, format type of biometric verification data, specified by format owner, see NOTE 1 and NOTE 3	Mandatory
				91_{Hex} / $B1_{Hex}$	Var.	Biometric comparison algorithm parameters (primitive / constructed), see NOTE 4	Optional

NOTE 1 In Table 7 the biometric data block as defined in ISO/IEC 19785-1 is not present, since the biometric reference data are stored separately in the card and not in this Biometric Information Template. The biometric verification data (format owner and format type indicated in the Data Objects with tag '87' and '88') have to be presented to the card using e.g. a ISO/IEC 7816 VERIFY command.

NOTE 2 In Table 7 no payload is present, since usually access to a payload, if used by the application, is granted after successful completion of the biometric verification. The payload may be retrieved using ISO/IEC 7816 interindustry access commands like GET DATA or READ BINARY.

NOTE 3 The outside world uses format owner / format type for identifying the required structure for the verification data. The matching algorithm in the card, which is able to process the verification data according to format owner / format type, is addressed by the algorithm reference, if the algorithm reference Data Object is present.

NOTE 4 The biometric comparison algorithm Data Object provides any special parameters of an on-card biometric comparison algorithm implementation, e.g. maximum number of minutiae expected in the biometric verification data. The content of this Data Object is defined by the BDB format owner (see e.g. ISO/IEC 19794-2).

The use of the Biometric Information Template shown in Table 7, which is intended to be retrieved prior to a biometric user verification, and the verification process itself with the related interindustry commands and their security requirements, are specified in ISO/IEC 7816-11 for the case of implicit tag allocation.

11.11.2 The Biometric Information Template used for off-card biometric comparison

Table 8 shows the Biometric Information Template used for off-card biometric comparison. The Biometric Information Template has the following substructure:

a) 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 OID for this tag allocation authority is `{iso(1) standard(1) cbeff(19785) part(3) tag-allocation(1) clause-11(0)}`.

b) Biometric Data Objects for CBEFF data elements that are relevant for off-card biometric comparison;

c) A biometric reference Data Object (primitive or constructed) with tags as defined in ISO/IEC 7816-11, representing the CBEFF Biometric Data Block (BDB);

d) Payload as the content of an optional Data Object with tag 53_{Hex} or 73_{Hex} as defined in ISO/IEC 7816-6.

The use of the data structure shown in Table 8 is not restricted to smartcards. The data structure may also be used in other types of cards, e.g. magnetic stripe cards, optical memory cards or cards with 2-dimensional barcodes.

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Table 8 — The Biometric Information Template used for off-card biometric comparison (with implicit tag allocation authority)

Tag	Length	Value					Presence
$7F60_{Hex}$	var.	Biometric Information Template					
		Tag	Length	Value			
		$A1_{Hex}$	var.	Biometric Header Template (BHT) Tag allocation authority: ISO/IEC JTC 1/SC 37			Mandatory
				Tag	**Length**	**Value**	
				80_{Hex}	2	CBEFF_patron_header_version (default '0101')	Mandatory (if absent, the default value applies)
				81_{Hex}	1-3	CBEFF_BDB_biometric_type, see Table 9.	Optional
				82_{Hex}	1	CBEFF_BDB_biometric_subtype, see Table 10.	Optional, use together with biometric type only
				83_{Hex}	7	CBEFF_BDB_creation_date, creation date and time of biometric reference data: fourteen BCD digits (YYYYMMDDHHMMSS)	Optional
				84_{Hex}	var.	CBEFF_BIR_creator	Optional
				85_{Hex}	8	CBEFF_BDB_validity_period, a pair of dates (not before, not after): sixteen BCD digits (YYYYMMDDYYYYMMDD)	Optional
				86_{Hex}	4	CBEFF_BDB_product owner, CBEFF_BDB_product_type. Concatenation of product owner and product type, identifying the product that created the biometric reference data	Optional
				87_{Hex}	2	CBEFF_BDB_format_owner, format owner of the biometric reference data, value assigned by the biometrics registration authority	Mandatory
				88_{Hex}	2	CBEFF_BDB_format_type, format type of biometric reference data, specified by format owner	Mandatory
				90_{Hex}	var.	CBEFF_BIR_index, unique identifier used for referencing this biometric data set in an application context outside the card	Optional
		$5F2E_{Hex}$ / $7F2E_{Hex}$	var.	CBEFF BDB, biometric reference data (primitive / constructed); see note			Mandatory
		53_{Hex} / 73_{Hex}	var.	CBEFF_BIR_payload, optional data for payload (primitive / constructed)			Optional

NOTE The structure of the biometric reference data in the case of constructed allows the integration of a biometric challenge for user prompting (e.g. a phrase to be spoken) and a concatenation of biometric data with standardized and proprietary structure. The respective Data Objects are specified in ISO/IEC 7816-11.

11.12 The Biometric Information Template Group Data Object

Several Biometric Information Templates may be nested in a Biometric Information Template Group (tag $7F61_{Hex}$ as defined in ISO/IEC 7816-11). The construction and use of Biometric Information Template Group Data Objects both for on-card and off-card biometric comparison are specified in ISO/IEC 7816-11.

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11.13 Abstract values and encodings for biometric type and subtype

Table 9 — CBEFF_BDB_biometric_type abstract values and encodings

Abstract value name	Value encoding	Subtype applies
NO VALUE AVAILABLE	000000_{Hex}	
MULTIPLE BIOMETRIC TYPES	01_{Hex}	
FACE	02_{Hex}	
VOICE	04_{Hex}	
FINGER	08_{Hex}	x
IRIS	10_{Hex}	x
RETINA	20_{Hex}	x
HAND GEOMETRY	40_{Hex}	x
SIGNATURE/SIGN	80_{Hex}	
KEYSTROKE	0100_{Hex}	
LIP MOVEMENT	0200_{Hex}	
THERMAL FACE	0400_{Hex}	
THERMAL HAND	0800_{Hex}	
GAIT	1000_{Hex}	
BODY ODOR	2000_{Hex}	
DNA	4000_{Hex}	
EAR	8000_{Hex}	x
FINGER GEOMETRY	010000_{Hex}	
PALM GEOMETRY	020000_{Hex}	
VEIN PATTERN	040000_{Hex}	
FOOT PRINT	080000_{Hex}	
NOTE Only the least significant bytes (omitting leading zeros) can become part of the Biometric Header Template.		

Table 10 — CBEFF_BDB_biometric_subtype abstract values and encodings

b8 b7 b6 b5 b4 b3 b2 b1	Biometric Subtype
0 0 0 0 0 0 0 0	NO INFORMATION GIVEN
0 1	RIGHT
1 0	LEFT
0 0 0	NO MEANING
0 0 1	THUMB
0 1 0	INDEX FINGER
0 1 1	MIDDLE FINGER
1 0 0	RING FINGER
1 0 1	LITTLE FINGER
1	ALWAYS SET
x x	RESERVED FOR FUTURE USE
NOTE This optional field denotes which sample of the biometric type is to be presented (e.g. right index finger). This field is only useful in conjunction with the field CBEFF_BDB_biometric_type in cases denoted in Table 9.	

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11.14 Patron format conformance statement

11.14.1 Identifying information

Required information	Patron format reference
Patron name	See 11.1
Patron identifier	See 11.2
Patron format name	See 11.3
Patron format identifier	See 11.4
Patron format ASN.1 OID	See 11.5
Domain of use description	See 11.6
Patron format version	See 11.7
CBEFF version	See 11.8

11.14.2 CBEFF-defined data elements and abstract values

CBEFF data element name	Mandatory/ optional	Patron format field name	Abstract values specified?	Encodings specified?
CBEFF_patron_header_version	Mandatory	CBEFF_patron_header_version	Yes	Yes
CBEFF_BIR_index	Optional	CBEFF_BIR_index	Yes	Yes
CBEFF_BDB_biometric_type	Optional	CBEFF_BDB_biometric_type	Yes	Yes
CBEFF_BDB_biometric_subtype	Optional	CBEFF_BDB_biometric_subtype	Yes	Yes
CBEFF_BDB_creation_date	Optional	CBEFF_BDB_creation_date	Yes	Yes
CBEFF_BIR_creator	Optional	CBEFF_BIR_creator	Yes	Yes
CBEFF_BDB_validity_period	Optional	CBEFF_BDB_validity_period	Yes	Yes
CBEFF_BDB_product_owner	Optional	CBEFF_BDB_product_owner	Yes	Yes
CBEFF_BDB_product_type	Optional	CBEFF_BDB_product_type	Yes	Yes
CBEFF_BDB_format_owner	Mandatory	CBEFF_BDB_format_owner	Yes	Yes
CBEFF_BDB_format_type	Mandatory	CBEFF_BDB_format_type	Yes	Yes
CBEFF_BIR_payload	Optional	CBEFF_BIR_payload	Yes	Yes
BDB (on-card biometric comparison)	n/a	See Note 1 of Table 7	n/a	n/a
BDB (off-card biometric comparison)	Mandatory	BDB	n/a	n/a

11.14.3 Patron-defined data elements and abstract values

Patron format data element	Mandatory/ optional	Patron format field name	Abstract values specified?	Encodings specified?
Algorithm reference	Optional	Same	Yes	Yes
Reference data qualifier	Optional	Same	Yes	Yes
Biometric comparison algorithm parameters	Optional	Same	Yes	Yes

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12 Patron format specification: Complex patron format

12.1 Patron

ISO/IEC JTC 1/SC 37.

12.2 Patron format owner

`257 (0101Hex)`. The BRA has allocated this identifier for ISO/IEC JTC 1/SC 37.

12.3 Patron format name

`ISO/IEC JTC 1/SC 37 complex patron format.`

12.4 Patron format type

`6 (0006Hex)`. This has been registered in accordance with ISO/IEC 19785-2.

12.5 ASN.1 OID for this patron format

```
{iso(1) registration-authority(1) cbeff(19785) biometric-organization(0) jtc1-sc37(257)
patron-format(1) complex(6)}
```

or, in XML value notation,

```
<OBJECT_IDENTIFIER>1.1.19785.0.257.1.6</OBJECT_IDENTIFIER>
```

12.6 Domain of use

This clause provides a definition of a patron format that may be of general utility to applications that need to carry one or more BIRs (of either the same or different patron formats) in a single complex BIR structure, with explicit identification of the patron format(s) being used.

12.7 Version identifier

This patron format specification has a version identifier of 2.

NOTE The patron format version was increased from 1 to 2 because the QUALITY NOT SUPPORTED BY BDB CREATOR and QUALITY SUPPORTED BY BDB CREATOR BUT NOT SET values were modified. Additionally, the CBEFF_biometric_type and CBEFF_biometric_subtype values were changed.

12.8 CBEFF version

This specification conforms to CBEFF version (major 4, minor 0) onwards.

12.9 General

12.9.1 Patron Format Structure Type: Complex CBEFF BIR without self-identification

12.9.2 This patron format supports all the mandatory and optional data elements specified in ISO/IEC 19785-1 except the following ones: capture device owner and identifier, feature extraction algorithm owner and identifier, biometric comparison algorithm owner and identifier, quality algorithm owner and identifier, compression algorithm owner and identifier and PAD mechanism vendor and identifier. It can support either a simple BIR or a complex BIR structure where each intermediate node or leaf of the structure is itself a BIR (called a "child BIR") and can be represented in any patron format.

12.9.3 The patron format of each child BIR is explicitly identified in its parent by a pair: patron format owner / patron format type, and can be either this patron format (in which case the child BIR may itself

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have children), or a different patron format (in which case the child BIR is considered a leaf of this patron format although it may be a complex BIR in its own regard).

12.9.4 Most fields in this patron format are optional. The presence of each optional field is encoded as a single bit of a 24-bit field ("fieldPresence") at the beginning of the format, which has one bit for each optional field defined in the patron format. The bit value '1' in a given position of that field means that the corresponding field is present in the BIR instance.

12.9.5 All character strings and octet strings are preceded by a length prefix, which can be one, two, or four octets long, as specified for each field.

12.9.6 All integer values, including lengths, are encoded in big-endian order.

12.9.7 Dates and date intervals are encoded as character strings in a way conforming to the ISO 8601 series.

12.9.8 An instance of a BIR or child BIR contains either a BDB or one or more BIR children, but never contains both.

12.10 Specification

An instance of a BIR shall contain the fields specified below, in exactly the same order and with no gaps between the fields.

Table 11 — Specifications for complex patron format

CBEFF data element name	Field name	Length and optionality[a]	Abstract values and encodings[b]
The following fields shall occur at most once			
CBEFF_patron_header_version	patronHeaderVersion	1, mandatory	2
CBEFF_version	cbeffVersion	1, mandatory	Major '4' and Minor '0': 40_{Hex} (64)

[a] The date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted.

Examples: 20050103, 20050106T11, 20050106T1230, and 20050106T145504.

[b] Each date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted. The two dates shall be separated by a SOLIDUS ("/") character, and shall have the same number of digits.

Examples: 20050103/20060103, 20050106T11/20050306T11, and 20050106T113300/20050306T113259.

[c] A BIR consists of either: 1) an SBH, BDB, optional SB, and numChildren value of zero, or 2) an SBH, no BDB, and numChildren value greater than zero.

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Table 11 *(continued)*

CBEFF data element name	Field name	Length and optionality[a]	Abstract values and encodings[b]
not a standard CBEFF data element	fieldPresence	3, mandatory	A 24-bit field containing one bit for each optional field in the patron format. The bit value '1' means that the corresponding field is present in the BIR instance. Bit position (1=most significant, 24=least significant) and corresponding optional field: 1 bdbFormat Owner & Type 2 bdbEncryption 3 bdbBiometricType 4 bdbBiometricSubtype 5 bdbChallengeResponse 6 bdbCreationDate 7 bdbIndex 8 bdbProcessedLevel 9 bdbProduct Owner & Type 10 bdbPurpose 11 bdbQuality 12 bdbValidityPeriod 13 birCreationDate 14 birCreator 15 birIndex 16 birPayload 17 birValidityPeriod 18 sbFormat Owner & Type 19 bdb 20 sb 21..24 not used (shall be '0')
CBEFF_BDB_format_owner	bdbFormatOwner	2, mandatory if a BDB is present, optional if a BDB is not present	0..65535
CBEFF_BDB_format_type	bdbFormatType	2, mandatory if a BDB is present, optional if a BDB is not present	0..65535
CBEFF_BDB_encryption_options	bdbEncryption	1; mandatory if a BDB is present, otherwise required to be absent	NO ENCRYPTION: 0 ENCRYPTION: 1
CBEFF_BIR_integrity_options	birIntegrity	1, mandatory	NO INTEGRITY: 0 INTEGRITY: 1

[a] The date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted.

Examples: 20050103, 20050106T11, 20050106T1230, and 20050106T145504.

[b] Each date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted. The two dates shall be separated by a SOLIDUS ("/") character, and shall have the same number of digits.

Examples: 20050103/20060103, 20050106T11/20050306T11, and 20050106T113300/20050306T113259.

[c] A BIR consists of either: 1) an SBH, BDB, optional SB, and numChildren value of zero, or 2) an SBH, no BDB, and numChildren value greater than zero.

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Table 11 *(continued)*

CBEFF data element name	Field name	Length and optionality[a]	Abstract values and encodings[b]
CBEFF_BDB_biometric_type	bdbBiometricType	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.* Values can be found in 6.2 under the BiometricType ASN.1 definition
CBEFF_BDB_biometric_subtype	bdbBiometricSubtype	1	*This encoding is a 1 octet bitmap.* Values can be found in 6.2 under the BiometricSubtype ASN.1 definition
CBEFF_BDB_challenge_response	bdbChallengeResponse	2 + 0..65535	Variable-length octet string, preceded by a 16-bit integer field containing the length (octets)
CBEFF_BDB_creation_date	bdbCreationDate	1 + 8..15	Variable-length ASCII character string, preceded by an 8-bit integer field containing the length (characters) The string shall represent a date (or date and a time of the day)[c]
CBEFF_BDB_index	bdbIndex	2 + 0..65535	Variable-length octet string, preceded by a 16-bit integer field containing the length (octets) Shall not appear in any BIR in which numChildren is not 00_{Hex}
CBEFF_BDB_processed_level	bdbProcessedLevel	1	RAW: 1 INTERMEDIATE: 2 PROCESSED: 3
CBEFF_BDB_product_owner	bdbProductOwner	2	1..65535; field not present corresponds to "NO VALUE AVAILABLE"
CBEFF_BDB_product_type	bdbProductType	2	1..65535; field not present corresponds to "NO VALUE AVAILABLE"
CBEFF_BDB_purpose	bdbPurpose	1	VERIFY: 1 IDENTIFY: 2 ENROL: 3 ENROL FOR VERIFICATION ONLY: 4 ENROL FOR IDENTIFICATION ONLY: 5 AUDIT: 6
CBEFF_BDB_quality	bdbQuality	1	QUALITY NOT SUPPORTED BY BDB CREATOR: 254 QUALITY SUPPORTED BY BDB CREATOR BUT NOT SET: 255 INTEGER VALUE: 0 – 100
CBEFF_BDB_validity_period	bdbValidityPeriod	1 + 17..31	Variable-length ASCII character string, preceded by an 8-bit integer field containing the length (characters) The string shall represent an interval of two dates (or date and time of the day)[d]

[a] The date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted.

Examples: 20050103, 20050106T11, 20050106T1230, and 20050106T145504.

[b] Each date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted. The two dates shall be separated by a SOLIDUS ("/") character, and shall have the same number of digits.

Examples: 20050103/20060103, 20050106T11/20050306T11, and 20050106T113300/20050306T113259.

[c] A BIR consists of either: 1) an SBH, BDB, optional SB, and numChildren value of zero, or 2) an SBH, no BDB, and numChildren value greater than zero.

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Table 11 *(continued)*

CBEFF data element name	Field name	Length and optionality[a]	Abstract values and encodings[b]
CBEFF_BIR_creation_date	birCreationDate	1 + 8..15	Variable-length ASCII character string, preceded by an 8-bit integer field containing the length (characters) The string shall represent a date (or date and a time of the day)[c]
CBEFF_BIR_creator	birCreator	2 + 0..65535	Variable-length ISO/IEC 10646 character string, encoded in UTF-8, and preceded by a 16-bit integer field containing the length of the UTF-8 encoding (octets)
CBEFF_BIR_index	birIndex	2 + 0..65535	Variable-length octet string, preceded by a 16-bit integer field containing the length (octets) Shall not inherit its value from any other level BIR
CBEFF_BIR_payload	birPayload	2 + 0..65535	Variable-length octet string, preceded by a 16-bit integer field containing the length (octets) Shall not inherit its value from any other level BIR
CBEFF_BIR_validity_period	birValidityPeriod	1 + 17..31	Variable-length ASCII character string, preceded by an 8-bit integer field containing the length (characters) The string shall represent an interval of two dates (or date and time of the day)[b]
CBEFF_SB_format_owner	sbFormatOwner	2	1..65535
CBEFF_SB_format_type	sbFormatType	2	1..65535
BDB	bdb	4 + 0..4294967295	Variable-length octet string, preceded by a 32-bit integer field containing the length (octets) If this field is present in a BIR instance (as indicated in bit 19 of the field *fieldPresence*), then no child BIRs shall be included (*numChildren* shall have the value 0). Otherwise, at least one child BIR shall be included (*numChildren* shall have a value greater than 0) NOTE The content and encoding of the BDB are not specified by CBEFF nor by this patron format specification
CBEFF_subheader_count	numChildren	1, mandatory	0..255
The following 3 fields shall occur as a group as many times as specified in the field numChildren (0..255)			
CBEFF_BIR_patron_format_owner	childBirPatronFormatOwner	2, mandatory if no BDB is present, otherwise required to be absent	1..65535
CBEFF_BIR_patron_format_type	childBirPatronFormatType	2, mandatory if no BDB is present, otherwise required to be absent	1..65535

[a] The date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted.

Examples: 20050103, 20050106T11, 20050106T1230, and 20050106T145504.

[b] Each date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted. The two dates shall be separated by a SOLIDUS ("/") character, and shall have the same number of digits.

Examples: 20050103/20060103, 20050106T11/20050306T11, and 20050106T113300/20050306T113259.

[c] A BIR consists of either: 1) an SBH, BDB, optional SB, and numChildren value of zero, or 2) an SBH, no BDB, and numChildren value greater than zero.

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Table 11 *(continued)*

CBEFF data element name	Field name	Length and optionality[a]	Abstract values and encodings[b]
not a standard CBEFF data element	childBir	4 + 0..4294967295, mandatory if no BDB is present, otherwise required to be absent	Variable-length octet string, preceded by a 32-bit integer field containing the length (octets)[e]
The following field shall occur at most once			
SB	sb	4 + 0..4294967295	Variable-length octet string, preceded by a 32-bit integer field containing the length (octets).

[a] The date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted.

Examples: 20050103, 20050106T11, 20050106T1230, and 20050106T145504.

[b] Each date shall be represented in the ISO 8601 series basic format YYYYMMDDTHHMMSS, where the last 2, the last 4, or the last 7 characters may be omitted. The two dates shall be separated by a SOLIDUS ("/") character, and shall have the same number of digits.

Examples: 20050103/20060103, 20050106T11/20050306T11, and 20050106T113300/20050306T113259.

[c] A BIR consists of either: 1) an SBH, BDB, optional SB, and numChildren value of zero, or 2) an SBH, no BDB, and numChildren value greater than zero.

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12.11 Illustrative examples

Table 12 — Simple BIR (one BDB)

Field name	Length	Abstract value	Encoding
patronHeaderVersion	1	2	02_{Hex}
cbeffVersion	1	Major 4, Minor 0	40_{Hex}
fieldPresence	3	bdbFormatOwner and Type bdbEncryption bdbBiometricType bdbQuality bdb	$E02020_{Hex}$
bdbFormatOwner	2	ISO/IEC JTC 1/SC 37	257 (0101_{Hex})
bdbFormatType	2	Face image	0008_{Hex}
bdbEncryption	1	NO ENCRYPTION	00_{Hex}
birIntegrity	1	NO INTEGRITY	00_{Hex}
bdbBiometricType	3	FACE-IMAGE	400000_{Hex}
bdbQuality	1	75/100	$4B_{Hex}$
bdb	4 + 4096	octet string	00001000_{Hex} + 4096 octets
numChildren	1	zero	00_{Hex}

Table 13 — Complex BIR fields and abstract values corresponding to ISO/IEC 19785-1, Figure 2

1. patronHeaderVersion = 2 *(beginning of the root header BIR)*
2. cbeffVersion = 4:0
3. fieldPresence = sbFormatOwner/Type
4. birIntegrity = INTEGRITY *(integrity is applied to the entire complex BIR via the SB on line 90)*
5. sbFormatOwner = *a security vendor*
6. sbFormatType = *that vendor's security block format* *(see the final SB on line 90)*
7. numChildren = 2
8. childBirPatronFormatOwner = SC 37
9. childBirPatronFormatType = 6 (*this format*)
10. ► *(denotes the beginning of the next BIR)*
11. patronHeaderVersion = 2
12. cbeffVersion = 4:0
13. fieldPresence = bdbBiometricType
14. birIntegrity = NO INTEGRITY
15. bdbBiometricType = FINGER *(the next 3 BIRs inherit this value)*
16. numChildren = 3
17. childBirPatronFormatOwner = SC 37
18. childBirPatronFormatType = 6 (this format)
19. ►
20. patronHeaderVersion = 2
21. cbeffVersion = 4:0
22. fieldPresence = bdbFormatOwner/Type; bdbEncryption; bdbBiometricSubtype; bdb

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Table 13 *(continued)*

23.	bdbFormatOwner = SC 37
24.	bdbFormatType = *a standardized BDB format*
25.	bdbEncryption = NO ENCRYPTION
26.	birIntegrity = NO INTEGRITY
27.	bdbBiometricSubtype = LEFT INDEX FINGER
28.	bdb
29.	numChildren=0
30.	☛
31.	patronHeaderVersion = 2
32.	cbeffVersion = 4:0
33.	fieldPresence = bdbFormatOwner/Type; bdbEncryption; bdbBiometricSubtype; bdb
34.	bdbFormatOwner = *vendor ABC*
35.	bdbFormatType = *non standard BDB format A*
36.	bdbEncryption = NO ENCRYPTION
37.	birIntegrity = NO INTEGRITY
38.	bdbBiometricSubtype = LEFT MIDDLE FINGER
39.	bdb
40.	numChildren=0
41.	☛
42.	patronHeaderVersion = 2
43.	cbeffVersion = 4:0
44.	fieldPresence = bdbFormatOwner/Type; bdbEncryption; bdbBiometricSubtype; bdb
45.	bdbFormatOwner = *vendor XYZ*
46.	bdbFormatType = *non standard BDB format B*
47.	bdbEncryption = NO ENCRYPTION
48.	birIntegrity = NO INTEGRITY
49.	bdbBiometricSubtype = LEFT RING FINGER
50.	bdb
51.	numChildren=0
52.	☛
53.	patronHeaderVersion = 2
54.	cbeffVersion = 4:0
55.	fieldPresence = bdbBiometricType
56.	birIntegrity = NO INTEGRITY
57.	bdbBiometricType = IRIS *(the next 2 BIRs inherit this type)*
58.	numChildren = 2
59.	childBirPatronFormatOwner = SC 37
60.	childBirPatronFormatType = 6 (*this format*)
61.	☛
62.	patronHeaderVersion = 2
63.	cbeffVersion = 4:0
64.	fieldPresence = bdbFormatOwner/Type; bdbEncryption; bdbBiometricSubtype; sbFormatOwner/Type; bdb; sb

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Table 13 *(continued)*

65.	bdbFormatOwner = SC 37	
66.	bdbFormatType = *an iris format*	
67.	bdbEncryption = ENCRYPTION	
68.	birIntegrity = NO INTEGRITY	
69.	bdbBiometricSubtype = LEFT	
70.	sbFormatOwner = *an encryption vendor*	
71.	sbFormatType = *a security block format*	*(see SB on line 74)*
72.	bdb	
73.	numChildren=0	
74.	sb	*(see SB format identifier on lines 70-71)*
75.	☛	
76.	patronHeaderVersion = 2	
77.	cbeffVersion = 4:0	
78.	fieldPresence = bdbFormatOwner/Type; bdbEncryption; bdbBiometricSubtype; sbFormatOwner/Type; bdb; sb	
79.	bdbFormatOwner = *vendor PQR*	
80.	bdbFormatType = *vendor's format C*	
81.	bdbEncryption = ENCRYPTION	
82.	birIntegrity = NO INTEGRITY	
83.	bdbBiometricSubtype = RIGHT	
84.	sbFormatOwner = *an encryption vendor*	
85.	sbFormatType = *a security block format*	*(see SB on line 88)*
86.	bdb	
87.	numChildren=0	
88.	sb	*(see SB format identifier on lines 84-85)*
89.	☛	
90.	sb	*(see SB format identifier in root header on line 6)*

Table 14 — BIR wrapped in an enveloping BIR

Field name	Length	Abstract value	Encoding
patronHeaderVersion	1	2	02_{Hex}
cbeffVersion	1	Major 4, Minor 0	40_{Hex}
fieldPresence	3	all optional fields absent in the enveloping BIR	000000_{Hex}
birIntegrity	1	NO INTEGRITY	00_{Hex}
numChildren	1	one child *(the enveloped BIR)*	01_{Hex}
childBirPatronFormatOwner)	2	patron format owner of the enveloped BIR	*Variable*
childBirPatronFormatType	2	patron format type of the enveloped BIR	*Variable*
childBir (length of the child BIR)	4	length of the enveloped BIR	*Variable*
childBir (octets of the child BIR	*variable*	octets of the enveloped BIR	*Variable*

Table 14 shows how the Complex patron format specified in this clause can be used as a simple envelope around a BIR of an arbitrary patron format in order to provide identification of its format and specify its length. When using the Complex patron format in this way, the portion of the enveloping BIR preceding

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the enveloped BIR can be thought of as a fixed-length prefix to the enveloped BIR. Since all the optional fields of the enveloping BIR are absent, the length of the prefix is only 15 octets, given by:

a) 7 octets with the fixed values 01200000000001_{Hex}; plus

b) 4 octets containing the patron format owner and type of the enveloped BIR; plus

c) 4 octets containing the length of the enveloped BIR.

12.12 ASN.1 definition (provided for illustrative purposes only)

The following ASN.1 specification provides an abstract description of the patron format and can be retrieved from https://standards.iso.org/iso-iec/19785/-3/ed-3/en. This ASN.1 specification may be useful to some readers of this document, but it is not intended to provide an alternative specification of the encodings of this patron format.

```
CBEFF-COMPLEX-PATRON-FORMAT
{ iso(1) standard(0) cbeff(19785) modules(0) complex-BIR(6)}
DEFINITIONS
AUTOMATIC TAGS ::=
BEGIN

IMPORTS BiometricType, BiometricSubtype, Product
FROM CBEFF-DATA-ELEMENTS

BIR ::= SEQUENCE {
    patronHeaderVersion INTEGER(0..255),
    cbeffVersion INTEGER(0..255),

    fieldPresence SEQUENCE {
    bdbFormat BOOLEAN,
    bdbEncryption BOOLEAN,
    bdbBiometricType BOOLEAN,
    bdbBiometricSubtype BOOLEAN,
    bdbChallengeResponse BOOLEAN,
    bdbCreationDate BOOLEAN,
    bdbIndex BOOLEAN,
    bdbProcessedLevel BOOLEAN,
    bdbProduct BOOLEAN,
    bdbPurpose BOOLEAN,
    bdbQuality BOOLEAN,
    bdbValidityPeriod BOOLEAN,
    birCreationDate BOOLEAN,
    birCreator BOOLEAN,
    birIndex BOOLEAN,
    birValidityPeriod BOOLEAN,
    sbFormat BOOLEAN,
    bdb BOOLEAN,
    children BOOLEAN,
    sb BOOLEAN
    },

    bdbFormat SEQUENCE {
        bdbFormatOwner INTEGER(0..65535),
        bdbFormatType INTEGER(0..65535)
    } OPTIONAL,

    bdbEncryption INTEGER(0..255) OPTIONAL,
    birIntegrity INTEGER(0..255),
    bdbBiometricType BiometricType DEFAULT noValueAvailable,
    bdbBiometricSubtype BiometricSubtype DEFAULT noValueAvailable,
    bdbChallengeResponse OCTET STRING (SIZE(0..65535)) OPTIONAL,
    bdbCreationDate OCTET STRING (SIZE(8..15)) OPTIONAL,
    bdbIndex OCTET STRING (SIZE(0..65535)) OPTIONAL,
    bdbProcessedLevel INTEGER(0..255) OPTIONAL,

    bdbProduct Product OPTIONAL,
    bdbPurpose INTEGER(0..255) OPTIONAL,
```

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