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Information technology — Common Biometric Exchange Formats Framework (CBEFF) —

Part 3: Patron format specifications

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

Partie 3: Spécifications de format d'usager

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Foreword

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

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 or www.iec.ch/members_experts/refdocs).

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

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This fifth edition cancels and replaces the fourth edition (ISO/IEC 19785-3:2025), of which it constitutes a minor revision.

The change is as follows: NOTE 2 in 11.6 and Reference [19] have been added.

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

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

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

   1) standardized biometric headers (SBHs);

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

   3) optional security blocks (SBs);

b) variations of the three-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 BDBs 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 can be applied to any variation of the three-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, presentation attack detection (PAD) mechanisms, patron formats (self-identifying or not) and SB formats.

In addition to the patron formats specified in this document, additional 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 19784-1. 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 can be published as new clauses in future amendments or editions of 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

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Object Identifier (see ISO/IEC 9834-1) that identifies the BRA (see ISO/IEC 19785-2). That ASN.1 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 can make use of the tag-oriented CBEFF version 4.0 patron formats, i.e. Clauses 16 and onwards.

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 can 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 (CBEFF) —

Part 3:
Patron format specifications

1 Scope

This document specifies 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 (see Annex A for rules on how patron formats are defined using CBEFF data elements).

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.

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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*

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ISO 8601-1, *Date and time — Representations for information interchange — Part 1: Basic rules*

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

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

ISO/IEC 19785-1:2020, *Information technology — Common Biometric Exchange Formats Framework — Part 1: Data element specification*

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, ISO/IEC 19785-1 and the following apply.

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

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

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

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.

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3.2
CBEFF patron format structure type
common biometric exchange formats framework 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
type, length and value encoding
tag, length and value 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 can 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.

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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
BHT	Biometric Header Template
BIDO	biometric information data object
CBEFF	Common Biometric Exchange Formats Framework
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[16] and in ISO/IEC 21778)
OID	object identifier
PAD	presentation attack detection
PFCS	patron format conformance statement
TLV	type, length and value
UTF-8	Unicode (or Universal Coded Character Set) Transformation Format – 8-bit
XML	Extensible Markup Language

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XSD XML Schema Definition

W3C World Wide Web Consortium

5 Conformance

This document specifies 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 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

Subclause 6.2 specifies an ASN.1 module **CBEFF-DATA-ELEMENTS** that defines types (see ITU-T Rec. X.680[20] 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. See Annex A for rules on how patron formats are defined using CBEFF data elements.

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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 6.2. Those patron formats do not use the definitions from any previous editions of this document, 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-5/en. The ASN.1 data element definitions listed in this subclause 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


/* 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):
*/
SubheaderCount ::= INTEGER (0..255)
```

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```
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
     {
     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),
```

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```
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),
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),
```

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