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Information technology — Common Biometric Exchange Formats Framework —

Part 3: Patron format specifications

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

Partie 3: Spécifications de format d'usager

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Foreword

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

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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. In the IEC, see www.iec.ch/understanding-standards.

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

This fourth edition cancels and replaces the third edition (ISO/IEC 19785-3:2020), which has been technically revised.

The main changes are as follows:

— references previously listed as normative were moved to the bibliography, including ISO/IEC 19785-2, ISO/IEC 8825-1 and ISO/IEC 24787;

— element <sbX> is newly added to the XML-full patron format in Clause 13;

— vocabulary was updated and corrected;

— the ASN.1 definition for the patron format “TLV-encoded patron format for ICCs and other tokens (with explicit tag allocation authority)” and related information in Clause 19 was moved to a new informative Annex E;

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.

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 may 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 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 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, 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 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 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.

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 can use the explicit tag allocation authority alternative provided by the patron format included in Clause 19.

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. 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.

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 8601-1, *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, *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.

3.2
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

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 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

Subclause 6.2 specifies 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. See also Annex A for rules on how patron formats are defined using CBEFF data elements.

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-4/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

/* 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
     {
     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),
```