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# Information technology — Common Biometric Exchange Formats Framework —

## Part 1: Data element specification

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

*Partie 1: Spécification des éléments de données*



Reference number  
ISO/IEC 19785-1:2020(E)

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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](http://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](http://www.iso.org/patents)) or the IEC list of patent declarations received (see <http://patents.iec.ch>).

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

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

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

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

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

- The self-identifying concept is now permitted to be applied to any of the CBEFF BIR patron formats defined in this document.
- Clarification of presentation attack detection (PAD) terminology has been made.
- Revisions have been made to move a large portion of [Clause 6](#) (Biometric Identifiers) to ISO/IEC 19785-2 since the biometric identifiers are used by the Biometric Registration Authority (BRA).
- Previous versions of this document were published by the US National Institute of Standards and Technology (an agency of the government of the United States of America) and the Biometric Consortium Working Group. The last official non-ISO/IEC release of this document was designated Version 1.1, the first version of this document (ISO/IEC 19785-1:2006) was designated Version 2.0, and the ISO/IEC 19785-1:2015 version was designated Version 3.0. This version of the document is designated Version 4.0 to distinguish the versions of CBEFF products in the marketplace. Version 4.0 is backward compatible with Version 3.0, but the data element names related to PAD have changed.

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

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

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## Introduction

The Common Biometric Exchange Formats Framework (CBEFF) promotes interoperability of biometric-based applications and systems by specifying standard structures for biometric information records (BIRs) and a set of abstract data elements and values that can be used to create the header part of a CBEFF-compliant BIR.

A BIR is a data structure containing biometric data and descriptive data elements in accordance with the requirements specified in this document. BIRs are typically stored in a database or transmitted between systems or parts of systems. A BIR always has at least two parts: a standard biometric header (SBH) and at least one biometric data block (BDB) that contains the biometric data. It may also have a third part called the security block (SB). CBEFF places no requirements on the content and encoding of a BDB except that its length shall be an integral number of octets. As an example of a BDB format, see the ISO/IEC 19794 series and ISO/IEC 39794 series of documents which specify standardized BDB formats for several biometric types. BIRs are typically stored in a database or transmitted between systems or parts of systems.

The primary purpose of CBEFF is to define abstract data elements (data elements with a set of defined abstract values with their semantics) that are expected to be of general utility as parts of the SBH in BIRs. This document defines these data elements.

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

A CBEFF biometric organization is any organization, public or private, that requests and receives a biometric organization identifier from the BRA. A CBEFF patron is an organization (registered as a biometric organization) that specifies, or intends to specify, one or more CBEFF patron formats in an open and public manner. Only public standards organizations such as a standards body, working group, or industry consortium, can register as CBEFF patrons (other CBEFF biometric organizations are not CBEFF patrons). A CBEFF patron obtains a biometric organization identifier from the Biometric Registration Authority but has privileges beyond those of ordinary CBEFF biometric organizations: it can define, register and publish one or more CBEFF patron formats.

A CBEFF patron format is a full specification of encodings for a particular domain of use and developed by a CBEFF patron. A CBEFF patron format implements some or all of the abstract values of the CBEFF data elements defined in this document (possibly with additional abstract values determined by the CBEFF patron) and supports one or more BDBs containing biometric data. The biometric organization identifier of a CBEFF patron can (but need not) be encoded in BIRs conforming to the patron formats defined by that CBEFF patron. As new technologies evolve, the need for new encoding rules (or support of more or different CBEFF data elements) may require new CBEFF patron formats for a given domain of use.

CBEFF also defines the concept of a CBEFF BDB format owner. A CBEFF BDB format owner is an organization (registered as a CBEFF biometric organization) that specifies one or more BDB format specifications. A BDB format owner obtains a CBEFF biometric organization identifier from the BRA. A BDB format owner can be a public standards organization (that would also qualify as a CBEFF patron) or any organization that has a need to define its own vendor-specific BDB formats, whether they are to be published or not.

A CBEFF BDB format owner defines one or more BDB formats and assigns a unique BDB format identifier. The combination of the BDB format identifier and the format owner's biometric organization identifier unambiguously identifies the BDB format. A BDB format identifier and the corresponding format may, but need not, be registered with the BRA.

CBEFF also defines the concepts of a CBEFF biometric product owner, as well as owners or vendors for the following specific product types: capture device, feature extraction algorithm, comparison algorithm, quality algorithm, compression algorithm and presentation attack detection (PAD) mechanism. A CBEFF biometric product owner is an organization (registered as a CBEFF biometric organization) that assigns a biometric product identifier to a biometric product. A biometric product

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owner can be a public standards organization such as a standards body, working group, or industry consortium (such an organization would also qualify as a CBEFF patron), or any organization, such as a vendor or integrator, that has a need to assign biometric product identifiers to biometric products. A given organization can be the owner of one or more entities in one or more of these categories (also including BDB formats and SB formats as additional categories), with no restrictions on the number of entities owned by the organization or to which categories those entities may belong.

A CBEFF biometric product owner assigns biometric product identifiers to one or more biometric products. The identified products can be hardware or software products or a combination of hardware and software. Examples of biometric products are biometric service providers (BSPs) as defined by ISO/IEC 19784-1, biometric transforming applications, and specific product types mentioned in the previous paragraph. A biometric product identifier unambiguously identifies a biometric product within those that have been assigned an identifier by the biometric product owner. A biometric product identifier can, but need not, be registered with the BRA. Similarly, biometric product owners of specialized biometric products (such as capture devices, feature extraction algorithms, comparison algorithms, quality algorithms, compression algorithms, or PAD mechanisms) assign identifiers (such as capture device type identifiers, feature extraction algorithm identifiers, etc.) to one or more specialized biometric products. Such biometric product owners may be more specifically referred to by using the name of the specialized biometric product (for example capture device owners and feature extraction algorithm owners).

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

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

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

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

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

[Clause 5](#) specifies the conformance requirements for CBEFF patrons that define CBEFF patron formats. It also specifies the conformance requirements for biometric transforming applications and for implementations claiming conformance to a specific patron format.

[Clause 9](#) specifies the CBEFF-defined abstract data elements and the transformation requirements for each data element. CBEFF permits CBEFF patrons to specify additional abstract data elements.

[Annex A](#) is normative. It defines a patron format conformance statement for patrons to complete and publish as part of their patron format specifications as assurance that the format fully complies with CBEFF requirements.

[Annex B](#) is informative. It explains the naming conventions used for data elements and abstract values specified in this document and in ISO/IEC 19785-3.

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



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