
**Information technology — Guide
to on-card biometric comparison
standards and applications**

*Technologies de l'information — Guide des normes et applications de
comparaison biométrique sur carte*

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

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

The committee responsible for this document is ISO/IEC JTC 1, *Information technology, SC 17, Cards and personal identification*.

Introduction

There are a large number of applications where the need of implementing jointly integrated circuit cards – ICC (i.e. smart cards) and biometrics can arise. In those cases, system designers and integrators have to be aware of the whole range of international standards and technical reports that may be applicable. All these potential reference documents have been developed by different standardization bodies and different subcommittees. For example, those standards dealing with ICCs are defined within ISO/IEC JTC 1/SC 17, while those dealing with biometrics are developed in ISO/IEC JTC 1/SC 37. Furthermore, when security aspects are to be considered, the works in ISO/IEC JTC 1/SC 27 have to be referenced.

In this context, the system designer and developer have in their hands a large number of documents, and on some occasions little information about which of them are really applicable to the application to be developed, and which alternatives can be faced.

This Technical Report provides a guide to those developers by enumerating and referring to those published standards and reports, relating them to the kind of application to be developed. When referring to different applications, these will be classified attending to the authentication needs of the application, not to the final sector where the application is to be deployed.

Interactions among standards cover different implementation levels, from data formats to be used to the application profiles, including application programming interfaces (APIs) and security mechanisms.

This Technical Report places special emphasis on providing recommendations and policies needed by developers to integrate applications related to on-card biometric comparison.

The structure of this Technical Report is as follows.

- [Clause 4](#) provides a first overview to the different decisions that have to be taken when developing an application that may involve the use of ICCs and biometrics.
- [Clauses 5](#) to [9](#) provide an overview to the different International Standards and Technical Reports that may be applicable to the application to be developed.
- [Clause 10](#) will provide examples of implementations that may be used by application designers and developers as guidelines.

Information technology — Guide to on-card biometric comparison standards and applications

1 Scope

This Technical Report summarizes how the international standards, recommendations and technical reports dealing with identification cards, biometrics and/or information security relate to each other with regard to the joint use of biometrics and integrated circuit cards. It also provides further recommendations and policies needed by developers to integrate applications related to on-card biometric comparison.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1

biometric probe

biometric query

biometric sample or biometric feature set input to an algorithm for use as the subject of biometric comparison to a biometric reference(s)

Note 1 to entry: The term comparison refers to comparison in the biometric sense.

Note 2 to entry: The subject/object labelling in a comparison might be arbitrary. In some comparisons a biometric reference might be used as the subject of the comparison with other biometric references or incoming samples used as the objects of the comparisons. For example, in a duplicate enrolment check a biometric reference will be used as the subject for comparison against all other biometric references in the database.

Note 3 to entry: Typically in a biometric comparison process, incoming biometric samples serve as the subject of comparison against objects stored as biometric references in a database.

[SOURCE: ISO/IEC 2382-37:2012]

Note 4 to entry: In the scope of ISO/IEC 7816-11, these two terms are used under the more generalized term of “biometric verification data”.

2.2

biometric reference

one or more stored biometric samples, biometric templates or biometric models attributed to a biometric data subject and used as the object of biometric comparison

EXAMPLE Face image stored digitally on a passport; Fingerprint minutiae template on a National ID card; Gaussian Mixture Model for speaker recognition, in a database.

Note 1 to entry: A biometric reference may be created with implicit or explicit use of auxiliary data, such as Universal Background Models.

Note 2 to entry: The subject/object labelling in a comparison might be arbitrary. In some comparisons a biometric reference might be used as the subject of the comparison with other biometric references or incoming samples used as the objects of the comparisons. For example, in a duplicate enrolment check a biometric reference will be used as the subject for comparison against all other biometric references in the database.

[SOURCE: ISO/IEC 2382-37:2012]

Note 3 to entry: In the scope of ISO/IEC 7816-11, this term is used under the more generalized term of “biometric reference data”.