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# Information technology — Guidance for biometric enrolment

*Technologies de l'information — Directives pour l'inscription biométrique*

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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 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 the following URL: www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO/IEC TR 29196:2015), which has been technically revised.

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# Introduction

One of the most important contributions to a successful biometric-based recognition system is a consistent enrolment service that generates the biometric data required for subsequent recognition of individuals. Subsequent verifications or identifications will be compared with the biometric data collected at enrolment. If the quality of capture at enrolment is not maintained consistently, the operators of a recognition system which depends on a good enrolment are likely to experience unreliable performance. For those who are enrolled in a verification system, a poor quality enrolment will result in inconvenience should they fail to be recognized. (Readers of this document should note that quality has a specific meaning when applied to biometric systems; a high quality capture is one that results in biometric data that provides good comparison scores when compared with other high quality images from the same biometric feature.)

By analysing the requirements for a good enrolment from the perspectives of a range of stakeholders, it is possible to derive a set of principles to guide the development of a biometric enrolment policy and the deployment of a service. Where enrolment is outsourced to a third party, it is extremely important to be able to measure quality metrics rather than quantity metrics, since the technical and business objectives of the two organisations (the relying party and the Enrolment Authority as defined in this document) may, in general, not be aligned.

Although the recommendations and guidelines in this document are directed primarily to the parties responsible for the enrolment itself and for management of the enrolment service (noting that these two entities may be one and the same), they will also be of value to the designers and developers of enrolment systems.


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# Information technology — Guidance for biometric enrolment

## 1 Scope

This document consolidates information relating to successful, secure and usable implementation of biometric enrolment processes, while indicating risk factors that organisations proposing to use biometric technologies will should address during procurement, design, deployment and operation. Much of the information is generic to many types of application, e.g. from national scale commercial and government applications, to closed systems for in-house operations, and to consumer applications. However, the intended application and its purpose often have influence on the necessary enrolment data quality and are intended to be taken into account when specifying an enrolment system and process.

The document points out the differences in operation relating to specific types of application, e.g. where self-enrolment is more appropriate than attended operation. This document focuses on mandatory, attended enrolment at fixed locations. In summary, this document consolidates information relating to better practice implementation of biometric enrolment capability in various business contexts including considerations of process, function (system), and technology, as well as legal/privacy and policy aspects.

The document provides guidance on collection and storage of biometric enrolment data and the impact on dependent processes of verification and identification. This document does not include material specific to forensic and law enforcement applications.

This document does not contain any mandatory requirements. The following terms are used in this document to provide guidance.

The terms “should” and “should not” indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is discouraged but not prohibited.

The term “may” indicates a course of action permissible within the limits of the publication.

The terms “can” and “cannot” indicate a possibility and capability, whether material, physical or causal.

## 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*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 2382-37 and the following apply.

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

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

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

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**3.1**
**biometric subject**
individual seeking to be enrolled in a biometric enrolment database

**3.2**
**designers and developers**
organization or individuals responsible for the design, development, (and deployment, if applicable) of the enrolment system

**3.3**
**duty officer**
individual acting on behalf of either the Enrolment Authority or operator either present in the vicinity of one or more enrolment stations, or available on line or by telephone, trained to provide advice and guidance to an enrolment officer in case of difficulty

Note 1 to entry: The duty officer may also have a role in determining exception handling routines.

**3.4**
**Enrolment Authority**
organisation (or other entity) with legal and contractual responsibilities for the completion of enrolment processes

**3.5**
**enrolment officer**
agent of the operator responsible for the secure and effective enrolment service at one or more enrolment points

**3.6**
**Identity Provider**
entity storing and managing the biometric data obtained directly or indirectly from the biometric enrolment

**3.7**
**operator**
organization (or other entity) responsible for delivering the enrolment service on behalf of the Enrolment Authority

**3.8**
**performance manager**
person responsible for managing the enrolment service to ensure it meets its specified enrolment performance criteria

Note 1 to entry: This will typically include actions such as monitoring enrolment performance (quality as well as quantity metrics), applying corrective measures where necessary and reporting enrolment performance achievement to the Enrolment Authority.

**3.9**
**personal assistant**
individual accompanying the biometric subject at the enrolment session for one or more purposes

Note 1 to entry: Such purposes might include: translation of instructions from the enrolment officer into the native language of the subject; support for a disabled subject to enable the subject to undertake an enrolment successfully; to fulfil a legal requirement such as a parent present at the enrolment of a child.

**3.10**
**relying party**
entity operating a biometrically-enabled application for which the enrolment process provides biometric references


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**3.11**
**specialist support staff**
trained attendant(s) present at the enrolment session on behalf of the Enrolment Authority or operator to assist with the enrolment of subjects with disabilities, or to fulfil service or legal requirements in respect of gender, religious observance, or age of the subject

**3.12**
**vendor**
entity providing hardware and/or software biometric functionality

## 4 Abbreviated terms

KPI Key Performance Indicator. A metric quantifying one or more aspects of the successful operation of a process

NFIQ NIST Fingerprint Image Quality

SLA Service Level Agreement. An agreement between a service provider and a customer defining a target level of service, mutual responsibilities of service provider and customer, together with other requirements for the delivery of a service

## 5 Role of enrolment in a biometric system

Given the variety of applications and technologies, it might seem difficult to draw any generalizations about biometric systems. All such systems, however, have many elements in common. Captured biometric samples are acquired from a subject by a sensor. The sensor output is sent to a processor that extracts the distinctive but repeatable measures of the sample (the biometric features), discarding all other components. The resulting features can be stored in the biometric enrolment database as a biometric reference or (in this case) a biometric template. In other cases the sample itself (without feature extraction) may be stored as the reference. A subsequent probe biometric sample can be compared to a specific reference, to many references, or to all references already in the database to determine if there is a match. A decision regarding the biometric claim is made based upon the similarities or dissimilarities between the features of the biometric probe and those of the reference or references compared.

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