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Personal identification — European requirements for biometric products — Part 2: Interoperability tests

Einführendes Element — Haupt-Element — Ergänzendes Element

Élément introductif — Élément central — Élément complémentaire

ICS:

CCMC will prepare and attach the official title page.

Contents

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European foreword

This document (prEN XXXX:XXXX) has been prepared by Technical Committee CEN/TC XXX "Title", the secretariat of which is held by XXX.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

[NOTE to the drafter: Add information about related documents or other parts in a series as necessary. A list of all parts in a series can be found on the CEN website.]

Introduction

The use of remote services has increased significantly. This was boosted during 2020-2021, when many service providers and Administrations migrated most of their processes to online handling. We can find nowadays many online services, such as opening of a bank account, claiming expenses, paying taxes, starting legal actions, etc.

For all these services there is the need of identifying the persons claiming for that service, and doing it in a comfortable, universal, reliable and auditable way. Even though some of those services, in some countries, were deployed using PKIs (Public Key Infrastructures), as recommended by eIDAS, this approach was far away from being used by a significant part of the population.

This situation led to creating identification services using videoconferencing tools, such as using any device camera to scan a document, and capture your face for biometric recognition. This is deployed in many countries and sectors, but using ad-hoc solutions, limiting interoperability and increasing costs and risks.

In this context, service providers and Administrations have to define their own requirements, select the products and deploy the solution. On the other hand, manufacturers had to implement different solutions to different customers, in order to fulfil each of those requirement sets. Both sides would benefit from standards and regulations, on which to rely for the product definition.

Everybody will benefit from having a common way of defining those requirements, and a detailed evaluation methodology. These two items can be used by conformity assessment bodies or by business owners, to create their own certification schemes for this kind of technology/products, by following the international ISO/IEC 17000 series of standards.

This project is addressing this need for the case of Biometric Products, analysing and merging all current works, and defining a detailed set of requirements, a biometric-mode-specific evaluation methodology, and the passing criteria for different application profiles. This work will be developed in accordance with GDPR principles.

This will be written as a multipart project with the following structure:

— Parts 1-3: Defining the generic principles and methodologies, not requiring a biometric mode specific approach. In particular these parts will be:

  — Part 1: General requirements and application profile definition

  — Part 2: Interoperability tests

  — Part 3: Functionality evaluation methodology

— Parts 4-n: Defining the particularities of each biometric mode (e.g., specific tests, specific requirements), and containing, each of the parts, a set of application profiles, that will establish the test and requirements applicable for a specific application and context. Those application profiles will be written as individual annexes, following the structure provided in Part 1. The numbering of these parts, has been done trying to keep conformance with the numbering used by ISO/IEC 19794 series of standards. Therefore:

  — Part 4: Fingerprint biometrics

  — Part 5: Face biometrics

  — Etc.

This part is devoted to the definition of those tests needed to evaluate the interoperability capabilities of a biometric product. These tests should be executed prior, or in parallel, to the other tests defined in Parts 4-n, which follow the methodology defined in Part 3.

1 Scope

This TS series provide a generic framework for the establishment of requirements and their evaluation methodology for biometric products. The requirements will be established depending on the biometric mode considered, and they will be adapted to each scenario, through the definition of a variety of application profiles.

This series of standards are expected to provide the evaluation methodology, the individual tests, and the application profiles (with their particular requirements).

This document specifies:

— Tests for evaluating the interoperability of all biometric input data (received or read)

— Test for evaluating the interoperability of all biometric output data (stored or transmitted)

— Test for evaluating the interoperability of all exchange of information between the TOE and external components or devices

NOTE Additional parts are provided covering the specifics of each biometric mode. For each of these modalities, application-independent tests are defined, as well as a set of application profiles, that detail the applicable tests, the evaluation parameters, and the passing criteria.

The Technical Specifications within this series can be taken by any certification body and/or sector, to define and evaluate the requirements for their biometric products within their selected applications. This may be used in coordination with other current National initiatives. For governmental applications, the relevant Government will decide if this evaluation is applicable or not.

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 19794 (all parts), *Information technology — Biometric data interchange formats*

ISO/IEC 29794 (all parts), *Information technology — Biometric sample quality*

ISO/IEC 30107-2, *Information technology — Biometric presentation attack detection — Part 2: Data formats*

ISO/IEC 30108 (all parts), *Biometrics – Identity attributes verification service*

ISO/IEC 39794 (all parts), *Information technology — Extensible biometric data interchange formats*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the first part of this series, ISO/IEC 19794-1, ISO/IEC 39794-1 and ISO/IEC 2382-37 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 http://www.iso.org/obp

No terms and definitions are listed in this document.

4 Interoperability issues in biometric systems

When analysing the need of interoperability, the following aspects have to be considered.

Lack of interoperability may lead to serious problems in:

— the integration of biometric modules from different providers

— the auditing of the biometric system, both in terms of performance and in security

— the exchange of information between different systems

Interoperability issues may come at different levels:

— data formats

— quality of data

— intra-system information exchange (i.e., data and/or protocol when communicating internal biometric modules)

— inter-system information exchange (i.e., data and/or protocol when communicating with other external systems).

External references to achieve and check interoperability are:

— Level 1 and Level 2 data interoperability in biometric records: 19794-x and 39794-x.

— For Level 3 data interoperability there is no formal standard, due to the difficulty. The proposal is to perform this based on specific use cases in each application profile.

— Quality of biometric data: 29794-x

— For intra-module exchange of PAD information: 30107-2

— For inter-systems information exchange: 30108-x

Testing interoperability is the aim of Phase 1 within the evaluation methodology defined in Part 1 of this series of standards. These tests can be executed either before starting with Phase 2, or in parallel with Phase 2.

In order to help the drafting of the Application Profiles, the tests defined in this document will be numbered starting with the Phase number, following the structure T1.x.y, where x refers to each of the group of tests (i.e., 1 refers to clause 5, 2 to clause 6 and 3 to clause 7), and y being the test number within each clause.

The Evaluation Technical Report (ETR) shall include the information required in the reference standards (i.e., ISO/IEC 19794-1 or ISO/IEC 39794-1 for data interoperability, and the relevant standard for information exchange).

5 Input data interoperability tests

5.1 General

Input data shall be analysed in order to determine:

— if the TOE is able to receive standardized biometric data properly, in all its variations and range (as documented by the TOE)

— if the TOE is able to detect lack of input data conformance reacting against it.

NOTE The use of conformance test tools such as NIST BioCTS may ease the execution of these tests.

The applicable tests for evaluating input data interoperability are defined in the following subclauses.

Each Application Profile may define its own parameters for the input data interoperability tests, but if no definition is provided, the number of records to be used for testing in each of the tests shall be 10, generated from different test subjects.

5.2 Digital inputs interoperability tests

5.2.1 T1.1.1.1 Level 1 conformance.

This is defined in the applicable part of ISO/IEC 19794 or ISO/IEC 39794 families of standards. The workflow for this test is:

1. Create a set of records that are conformant to the applicable part of ISO/IEC 19794 or ISO/IEC 39794 families of standards, related to Level 1 conformance.

2. Apply each of those records as input to the TOE.

3. Check that the TOE accepts each of those inputs.

5.2.2 T1.1.1.2 Level 1 non-conformance

The workflow for this test is:

1. Create a set of records that are non-conformant to the applicable part of ISO/IEC 19794 or ISO/IEC 39794 families of standards, related to Level 1 conformance.

2. Apply each of those records as input to the TOE.

3. Check that the TOE rejects each of those inputs.

5.2.3 T1.1.1.3 Level 2 conformance.

This is defined in the applicable part of ISO/IEC 19794 or ISO/IEC 39794 families of standards. The workflow for this test is:

1. Create a set of records that are conformant to the applicable part of ISO/IEC 19794 or ISO/IEC 39794 families of standards, related to Level 2 conformance.

2. Apply each of those records as input to the TOE.

3. Check that the TOE accepts to each of those inputs.

5.2.4 T1.1.1.4 Level 2 non-conformance

The workflow for this test is:

1. Create a set of records that are non-conformant to the applicable part of ISO/IEC 19794 or ISO/IEC 39794 families of standards, related to Level 2 conformance.

2. Apply each of those records as input to the TOE.

3. Check that the TOE reject each of those inputs.

5.2.5 T1.1.1.5 Level 3 conformance based on particular use-cases

If considered relevant, the set of records to be used shall be detailed in the application profile. The workflow for this test is:

1. Create such set of records.

2. Apply each of those records as input to the TOE.

3. Check that the TOE accepts each of those inputs.

5.2.6 T1.1.1.6 Level 3 non-conformance based on particular use-cases

If considered relevant, the set of records to be used shall be detailed in the application profile. The workflow for this test is:

1. Create such set of records.

2. Apply each of those records as input to the TOE.

3. Check that the TOE rejects each of those inputs.

5.2.7 T1.1.1.7 Bad quality inputs

The workflow for this test is:

1. Create a set of records that are considered of having low quality, using the applicable part of ISO/IEC 29794 family of standards. The threshold to consider the input to be of low quality shall be defined at the relevant application profile.

2. Apply each of those records as input to the TOE.

3. Check that the TOE reject each of those inputs.

5.3 User presentations interoperability tests

5.3.1 T1.1.2.1 Bona-fide presentations with users that present good quality samples

The workflow for this test is:

1. Apply each of those presentations as input to the TOE.

2. Check that the TOE accepts each of those inputs.

5.3.2 T1.1.2.2 Presentations with bad quality samples

This includes either outlier test subjects, and/or manipulated samples using artifacts such as sunglasses, sanitary masks or eyes closed. The workflow for this test is:

1. Apply each of those presentations as input to the TOE.

2. Check that the TOE rejects each of those inputs.

6 Output data interoperability tests

6.1 General

The idea behind these tests is to check that any generated biometric data shall be conformant and with enough quality

Test is basically to execute multiple times the TOE, and log all generated biometric data. That generated biometric data shall be evaluated into:

a) Level 1 and Level 2 conformance, using the specifications given in the relevant part of ISO/IEC 19794 or ISO/IEC 39794.

b) Minimum quality (when applicable), using the relevant part of ISO/IEC 29794.

NOTE The use of conformance test tools such as NIST BioCTS may ease the execution of these tests.

Each Application Profile may define its own parameters for the output data interoperability tests, but if no definition is provided, the TOE shall be executed 5 times per test subject, in different conditions, as to obtain 5 different output records per test subject. Also, if the Application Profile does not define the number of test subjects to be used, the number of 10 shall be used.

With such execution of the TOE, a data set of output records is obtained, and such data set will be used for each of the individual tests for the output data, as defined in the following subclauses.

6.2 T1.2.1 Level 1 conformance of output data

For each of the output data records generated in the data set, the Level 1 conformance checks defined in ISO/IEC 19794 or ISO/IEC 39794 families of standards will be executed.

In order to pass this test, all output data records shall pass all the defined checks.

6.3 T1.2.2 Level 2 conformance of output data

For each of the output data records generated in the data set, the Level 2 conformance checks defined in ISO/IEC 19794 or ISO/IEC 39794 families of standards will be executed.

In order to pass this test, all output data records shall pass all the defined checks.

6.4 T1.2.3 Quality evaluation of output data

For each of the output data records generated in the data set, the quality checks defined in ISO/IEC 29794 family of standards will be executed.

In order to pass this test, all output data records shall pass all the defined checks, according to the quality thresholds defined by the Application Profile. If the relevant Application Profile does not define any quality threshold, the ones defined in the relevant part of ISO/IEC 29794 shall be used.

7 Interoperability of exchanged information between TOE and external devices

There are several standards that may be used for reaching interoperability in the exchange of information between biometric systems (e.g., Embedded BioAPI, BIP, IAVS, etc.). But most of them have not been widely deployed, being also most of them based on obsolete technologies.

It is expected that the standard used for exchanging information provides also the conformance tests needed. If not, the application profile shall contain those.

EXAMPLE One standard for exchanging information among biometric systems is IAVS (ISO/IEC 30108-x), although has not been deployed yet. ISO/IEC 30108-1 presents a conformance testing annex, which shall be the basis for the tests in this clause.

It is important to note that data conformance is not needed, as that has already been covered by clauses 5 and 6.

The conformance tests defined in the relevant standard will be applicable and shall be identified with the numbering T1.3.x, where x refers to the conformance test, numbered by appearance within that standard.

The number the test repeated shall be defined in the Application Profile, or, by default, in the relevant standard.