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Document management applications — Specification for a digital safe

Applications en gestion des documents — Spécification pour un coffre fort numérique

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Foreword

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This document was prepared by Technical Committee ISO/TC 171, *Document management applications*, Subcommittee SC 1, *Quality, preservation and integrity of information*.

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.

Introduction

As part of their activities, public organizations and private companies increasingly use digital content, whether it is produced by these organizations or by others. Digital content includes documents, data, images and sound that can be referred to as digital objects. These can be natively electronic or result from the digitization of printed documents.

To meet legal or management requirements, organizations and companies are expected to use trusted technology to ensure the integrity over time of all types of digital content. Thus, there is a need for software that can ensure the integrity, confidentiality and availability of the digital objects over time, including office documents, PDF files, scan results, JPEG pictures, etc.

This document defines the minimum functions of a digital safe:

— maintaining the integrity, confidentiality and availability of digital objects over time;

— preserving the chain of custody;

— managing retention periods or freeze status, making it impossible to delete digital objects during a determined period;

— defining the minimum elements to allow the transfer of digital objects between two different digital safes;

— defining the minimum elements of traceability of the software operation;

— managing replication of digital objects;

— ensuring the sustainability of business operations, business continuity and disaster recovery;

— defining encryption requirements.

This document is limited to the functions of integrity, traceability, confidentiality and availability of digital objects of any kind. It does not address the sustainability of digital objects (i.e. the component does not control and convert the formats in which digital objects are stored).

In order for users to have confidence in their electronic safe, this software should have the same basic functions and maintain a common minimum of technical metadata, regardless of the software publisher. These fundamental elements are also necessary conditions to ensure interoperability between several electronic safes.

This document is intended for:

— software developers or integrators who wish to develop or integrate a digital safe;

— service providers, such as trust service providers of digital storages, who are looking for software to support their services;

— software publishers who want to have a repository to develop digital safe software;

— consultants and auditors who wish to have a reference document to build or audit an archiving system.

This document is intended to complement other ISO documents that deal with electronic archiving. Annex A provides a list of these documents and their link to this document.

Document management applications — Specification for a digital safe

1 Scope

This document specifies the minimum functional requirements of digital safe software in order to ensure the integrity, confidentiality and availability of the digital objects it stores.

This document does not address system environments for the operation of the digital safe, such as physical security (fire extinguishing system, armoured doors, presence detectors, etc.), power supply security (generators and transformers) or telecommunication lines.

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 8601-1, *Date and time — Representations for information interchange — Part 1: Basic rules*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
application programming interface
API
collection of invocation methods and associated parameters used by one piece of software to request actions from another piece of software

[SOURCE: ISO/IEC TR 13066-6:2014, 2.2]

3.2
audit trail
a record of the activity taking place in an information system over a period of time

[SOURCE: ISO/IEC TR 10032:2003, 2.7]

3.3
digital safe
DS
component of an information system consisting of software or a combination of software and hardware for the preservation of digital objects in such conditions as to ensure their long-term integrity

3.4
digital object
DO
bit stream to be preserved

Note 1 to entry: A digital object can contain a file or a group of files, that can be accompanied by metadata, electronic signatures, electronic seals, digital timestamps or other evidential records.

3.5
digital object identifier
DO_ID
identifier assigned unambiguously to a digital object in a digital safe

3.6
digital safe identifier
DS_ID
identifier of the digital safe assigned unambiguously to it by a technical administrator during the initial configuration of the digital safe

3.7
hash code
string of bits which is the output of a *hash-function* (3.8)

[SOURCE: ISO 24534-4:2010, 3.34]

3.8
hash function
function which maps strings of bits of variable (but usually upper bounded) length to fixed-length strings of bits, satisfying the following two properties:

— for a given output, it is computationally infeasible to find an input which maps to this output;

— for a given input, it is computationally infeasible to find a second input which maps to the same output

[SOURCE: ISO/IEC 11770-4:2017, 3.9, modified — Note 1 to entry was removed.]

3.9
user
USR
person or software that interacts with the digital safe

Note 1 to entry: There are three types of users: general administrator (USR-G), functional administrator (USR-F) and standard user (USR-S). Their roles are defined in 4.3.

3.10
user identifier
USR_ID
identifier assigned unambiguously to a user of the digital safe

3.11
user identifier of the digital object
DO_USR_ID
identifier assigned to a digital object by a user

4 Digital safe functional specifications

4.1 Key concepts

The functional specifications of the digital safe are bundled into:

— management of users (4.3);

— 8 functions that allow the management of digital objects (from 4.4 to 4.6);

— additional requirements (from 4.7 to 4.17).

The 8 functions on the DOs allow interoperability between digital safes.

The other requirements ensure that the digital safe has the minimum characteristics to ensure the protection of DOs, that is to say, to ensure their integrity, availability and confidentiality.

Figure 1 shows the mechanism of the invocation functions and the mechanism of retrieving results.

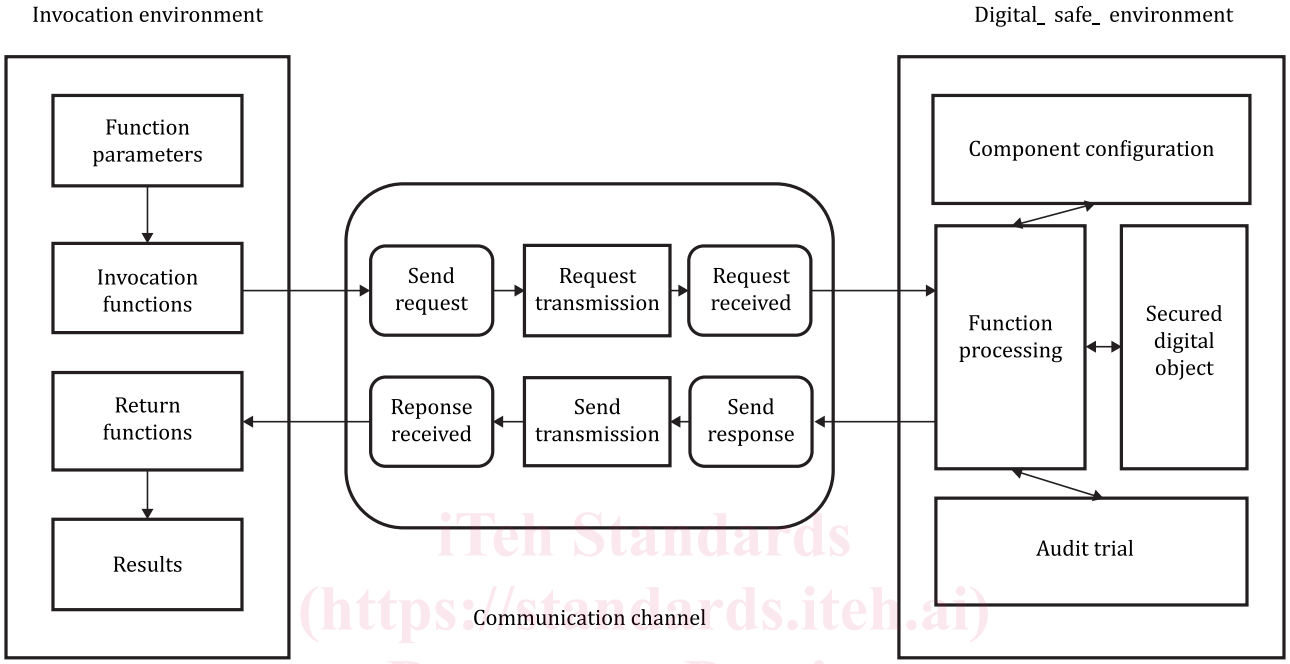

Figure 1 — Functional entities of a digital safe

4.2 Implementation functions

All functions can be implemented either with a human interface or with an application programming interface (API).

4.3 Users management

4.3.1 General

The digital safe shall be able to manage, at a minimum, the three types of users in 4.3.2, 4.3.3 and 4.3.4.

4.3.2 General administrator (USR-G)

A general administrator is authorized to create or remove functional administrators (USR-F).

A USR-G shall not be able to access DOs stored in the digital safe.

At least one USR-G shall exist when the digital safe is created.

The digital safe may contain multiple users with USR-G role.

4.3.3 Functional administrator (USR-F)

The functional administrator (USR-F) is only authorized to create, modify and remove standard users (USR-S).

A USR-F shall not be able to access DOs stored in the digital safe.

The digital safe may contain multiple users with USR-F role.

4.3.4 Standard user (USR-S)

Each USR-S shall have a profile.

A profile indicates, for each function of the digital safe linked to DOs, whether a user is allowed to perform this function.

For each function of the digital safe linked to DOs, Table 1 describes the basic profile.

Table 1 — USR-S profile

Functions	Authorization[a]
Write	Yes / No
Read	Yes / No
Delete	Yes / No
Read technical metadata	Yes / No
Verify	Yes / No
Read audit trail	Yes / No
List	Yes / No
Count	Yes / No
[a] By default, when creating a USR-S, all authorizations shall be set to "No".	

4.3.5 Management of functional administrator (USR-F)

This function is used to create, deactivate and reactivate a functional administrator (USR-F).

Only the general administrator (USR-G) shall be able to perform this function.

4.3.6 Management of standard user (USR-S)

This function is used to create, deactivate and reactivate a USR-S.

Only the functional administrator (USR-F) shall be able to perform this function.

4.3.7 Users management environment

The user management should be independent from the operating system.

4.4 Digital safe mandatory functions

At a minimum, a digital safe shall have the 8 functions listed in Table 2:

— functions 1 to 5 relate to a single DO;

— functions 6 to 8 can relate to one, more than one, or all DOs in a digital safe.