FINAL DRAFT
Technical Specification

ISO/IEC DTS 18013-7

Personal identification — ISO-compliant driving licence —

Part 7: Mobile driving licence (mDL) add-on functions

Identification des personnes — Permis de conduire conforme à l'ISO —

Partie 7: Fonctionnalités supplémentaires pour permis de conduire sur téléphone mobile

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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 or www.iec.ch/members_experts/refdocs).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and security devices for personal identification*.

This second edition cancels and replaces the first edition (ISO/IEC TS 18013-7:2024), which has been technically revised.

The main changes are as follows:

— Annex A.5, mdoc MAC authentication, was updated;

— normative Annex C, Digital credentials API retrieval, was added.

A list of all parts in the ISO/IEC 18013 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-ommittees.

Introduction

ISO/IEC 18013-5 describes interface and related requirements to facilitate ISO-compliant driving licence functionality on a mobile device, standardizing the mobile driving licence (mDL) functionality.

This document augments the capabilities of the mDL by describing the interface and related requirements for presentation to a mDL reader over the internet.

A mobile document conforming to this document primarily conveys the driving privileges associated with a person. However, the transaction and security mechanisms in this document have been designed to support other types of mobile documents, specifically including identification documents.

NOTE ISO/IEC 18013-5 places the onus on the mDL verifier to match data received (in an mdoc) to the person presenting the mdoc. This edition of this document does not change that.

Personal identification — ISO-compliant driving licence —

Part 7:
Mobile driving licence (mDL) add-on functions

1 Scope

This document augments the capabilities of the mobile driving licence (mDL) standardized in ISO/IEC 18013-5 with the following additional functionality:

— presentation of a mobile driving licence to a reader over the internet.

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 18013-5, *Personal identification — ISO-compliant driving licence — Part 5: Mobile driving licence (mDL) application*

RFC 4648, *S. Josefsson, The Base16, Base32, and Base64 Data Encodings*

RFC 5280, *D. Cooper et al., Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile*

RFC 9101, *N. Sakimura, The OAuth 2.0 Authorization Framework: JWT-Secured Authorization Request (JAR*

RFC 9112, *R. Fielding et al., HTTP/1.1*

RFC 9180, *R. Barnes et al., Hybrid Public Key Encryption*

OID4VP (OpenID for Verifiable Presentations), *O. Terbu et al., Draft 18,* April 2023

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 18013-5 and the following 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
mdoc reader
either device or service, or both, that can retrieve data from an mdoc and verify the authenticity of the data

Note 1 to entry: The mdoc reader includes, but is not limited to, the hardware and software components used.

4 Abbreviated terms

OID4VP OpenID for Verifiable Presentations

5 Conformance requirement

An mDL is in conformance with this document if it meets all the requirements specified directly or by reference herein.

An mDL reader is in conformance with this document if it meets all the requirements specified directly or referenced herein.

NOTE Conformance of an mDL or an mDL reader with ISO/IEC 18013-5 is not required for conformance with this document, except for those clauses normatively referenced in this document. An mDL or an mDL reader conforming with this document can also be in conformity with ISO/IEC 18013-5.

6 mDL overview

6.1 Standards context

ISO/IEC 18013-5 describes the interface and related requirements to specifically facilitate ISO-compliant driving licence functionality on a mobile device. This document adds functionality by building on top of ISO/IEC 18013-5.

The transaction and security mechanisms in this document have been designed to also be applicable to other types of mobile documents besides the mobile driving licence.

6.2 Interfaces

Figure 1 shows the interfaces in scope for this document. The explanation of each interface is as follows:

— Interface 1 in Figure 1 is the interface between the issuing authority (IA) infrastructure and the mDL. This interface is out of scope for this document.

— Interface 2 in Figure 1 is the interface between the mDL and the mDL reader. This interface is specified in this document. The interface can be used for connection setup and for the device retrieval method.

— Interface 3 in Figure 1 is the interface between the IA infrastructure and the mDL reader. This interface is defined in ISO/IEC 18013-5. No new requirements are added in this document.

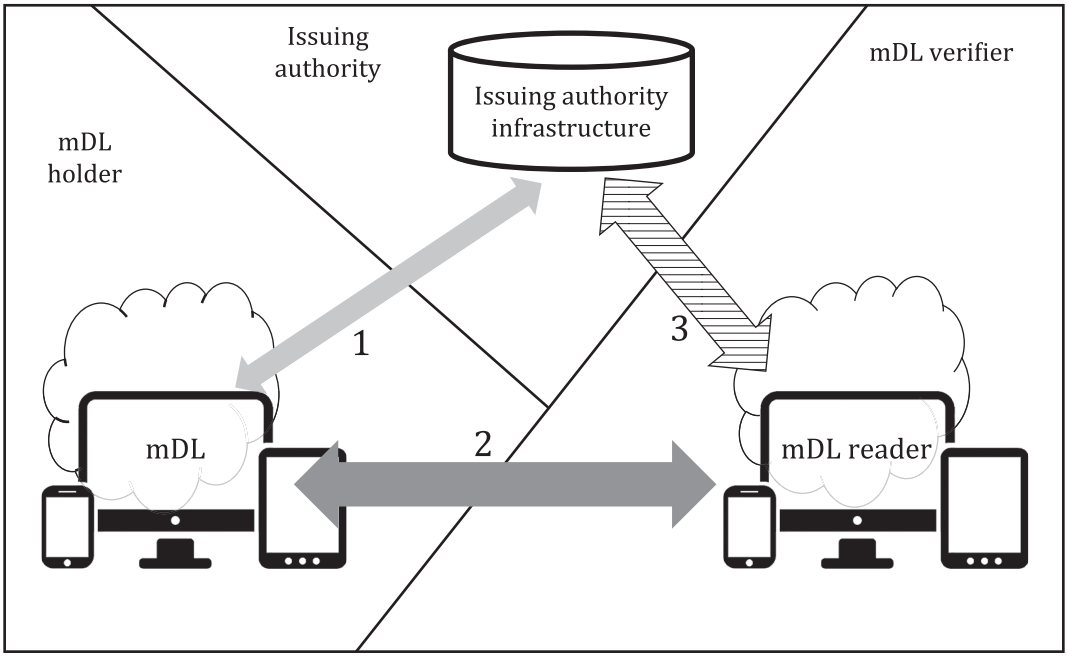

Figure 1 — mDL interfaces

6.3 Design objectives

The objectives underlying the requirements in this document include at least the following:

a) An mDL verifier together with an mDL reader is able to request and receive an mDL, and validate its integrity and authenticity.

b) An mDL verifier not associated with the IA is able to verify the integrity and authenticity of an mDL.

c) An mDL verifier is enabled to confirm the binding between the person presenting the mDL and the mDL holder.

d) The interface between the mDL and the mDL reader supports the selective release of mDL data to an mDL reader.

NOTE As in ISO/IEC 18013-5, the portrait image can be used for verifying that the person presenting the mDL is the mDL holder. Depending on the transaction details, in an unattended transaction this data element might not be able to serve the purpose of confirming that the person presenting the mDL is the mDL holder. Other methods can be used as well but are out of scope of this document. Other mechanisms are described in References [1] and [2].

6.4 Technical requirements

6.4.1 Data structures and data elements

The descriptions and requirements for Concise Binary Object Representation (CBOR), Concise Data Definition Language (CDDL), and version elements in ISO/IEC 18013-5 shall apply in this document.

Additionally, unless explicitly stated otherwise for a data structure, an mDL or mDL reader shall not give an error solely on the basis that it does not know the data structure. This requirement also applies when the CDDL definition of the data structure does not allow the presence of additional key-value pairs in the map, next to the specified ones.

6.4.2 Data model

The data model is described in Clause 7. It describes the identifier and format of the data elements.

6.4.3 Data exchange

6.4.3.1 Overview

An mDL or mDL reader shall support at least one of the following flows and may support more:

a) using the device retrieval messages structures and transmission channel as defined in 6.4.3.2;

b) using OID4VP as a transmission channel, as defined in Annex B;

c) using the device retrieval request and response structure over an API, as defined in Annex C.

The different flows are depicted in Figure 2.

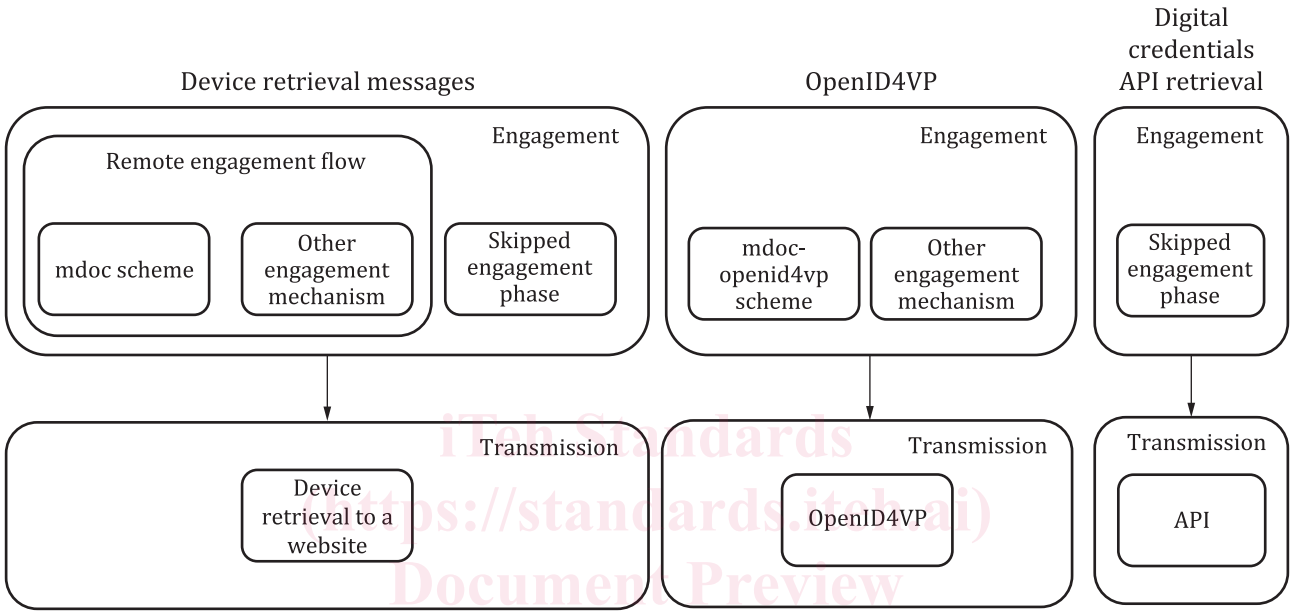

Figure 2 — Flows for unattended cases

An mDL and mDL reader shall support at least one of the data retrieval methods and may support more. Table 1 shows the requirements.

Table 1 — Data retrieval methods

Data retrieval method	Support		Reference in this document
	mDL	mDL reader	
Device retrieval	C[a]	C[a]	6.4.3.2
OID4VP	C[a]	C[a]	Annex B
Digital credentials API retrieval	C[a]	C[a]	Annex C

Key

C conditional

[a] Support for at least one of these methods is mandatory.

NOTE OpenID Foundation Digital Credential Protocols working group is working with ISO/IEC on a specification that enables presentation of mdocs over the Digital credential API using OpenID for Verifiable Presentations, called High Assurance Interoperability Profile (HAIP, see [22]) with additional features. An appendix referencing HAIP is intended to be included in the future revisions of this document. Please see the TR 25219 for further details.

6.4.3.2 Device retrieval engagement

The engagement mechanism for remote engagement can be used to exchange the information required to set up a secure data retrieval mechanism between the mDL and mDL reader. When performing this remote engagement, the following flow shall be used:

a) The mDL reader transmits the ReaderEngagement structure to the mDL.

b) The mDL sets up a data transmission channel with the mDL reader using the information from the ReaderEngagement structure.

c) The mDL sends a DeviceEngagement structure to the mDL reader using the newly setup data transmission channel.

The ReaderEngagement and DeviceEngagement structures are defined in A.1 and A.2. A possible mechanism for transmission of the ReaderEngagement structure is defined in A.4. Support for this transmission mechanism is recommended for the mDL and mDL reader, since this is the only mechanism currently provided in this document. However, other mechanisms for transmitting the ReaderEngagement structure, which are not defined in this document, can be used.

When the mDL and mDL reader have an existing two-way data transmission channel that is set up out-of-band for exchange of data, the device retrieval engagement phase can be skipped.

6.4.3.3 Device retrieval data transmission technology

The general data retrieval architecture is described in ISO/IEC 18013-5. If an mDL or mDL reader supports the device retrieval data retrieval phase, they shall use the mdoc request and mdoc response structures as specified in ISO/IEC 18013-5.

A.6.2 defines a transmission technology for device retrieval that may be supported by an mDL or an mDL reader.

NOTE ISO/IEC 18013-5 defines the server retrieval data retrieval method. This document does not specify any additional requirements for server retrieval.

6.4.4 Security mechanisms

6.4.4.1 Security architecture

The security of mDL data exchanged with an mDL reader is designed to preserve the triad of confidentiality, integrity, and availability by design and by default.

The security architecture aims to achieve the following goals:

a) Protection against forgery: Data elements are signed by the IA. The degree of protection against forgery depends on the degree to which the IA's keys are protected. Minimizing the validity period of the data limits the value of the data.

b) Protection against cloning: The mDL generates a signature or message authentication code over session data. The private key used to authenticate the session data is stored only in the mDL. The corresponding public key in turn is signed by the Issuing Authority in the mobile security object (MSO). The degree of protection against cloning depends on the degree to which the mDL authentication key is protected. In addition to protecting the DeviceKey by secure storage, an mdoc/mDL can require the user to be authenticated before this key is usable. This depends on the jurisdiction/issuing authority's policy (e.g. AAL as per eIDAS Regulation, NIST SP 800-63, ISO/IEC 29115).

c) Protection against eavesdropping: Communications between mDL and mDL readers are encrypted and authenticated. The mDL reader can detect man-in-the-middle (MITM) attacks by validating the anti-cloning signature or message authentication code, which is described in b). If mdoc reader authentication is used, the mDL can detect MITM attacks before returning any data.

d) Protection against unauthorized access: An mDL is protected from unauthorized access by an mDL reader by multiple mechanisms. When session encryption is used, the encryption key used for communications between the mDL and mDL reader is derived from an ephemeral key pair from both the mDL and mDL reader. The mDL can optionally authenticate the mDL reader by means of an mDL reader authentication certificate and a signature created by the mDL reader using the corresponding private key. The mDL reader certificate is signed by a certificate authority trusted by the mDL for this purpose.

e) Protection of the mDL holder against relayed engagement information: the mDL includes in the device engagement data, the origin information of the engagement channel or the data transmission channel for the mDL reader to confirm it. The origin is determined by the mDL independently from the information transmitted in the reader engagement structure. The transaction is cancelled by the mDL reader when the origin is different from the expected value.

Revocation of an mDL is out of scope for this document. However, the MSO includes update information and validity time frames which enable the mDL reader to check the freshness of the data. The IA shall define appropriate periods of validity that balance freshness with offline capability, considering that a shorter validity period mitigates certain security risks.

6.4.4.2 Security mechanisms support requirements

Table 2 describes the security mechanisms that can be implemented by an mDL or an mDL reader. They shall be implemented in accordance with the referenced specification except when this clause specifies differently. Issuer data authentication, and mdoc authentication shall be implemented by the mDL and mDL reader. Session encryption shall be implemented if the device retrieval to a website mechanism, specified in A.6, is used. mdoc reader authentication is optional for the mDL and mDL reader.

mdoc authentication, mdoc reader authentication and session encryption shall use the session transcript as defined in A.8, B.4.4 or C.4 instead of the session transcript defined in ISO/IEC 18013-5.

A.5 contains further requirements on the use of mdoc MAC authentication.

NOTE 1 ISO/IEC 18013-5 describes the use of the X.509 certificates when using mdoc reader authentication. Other mechanisms for providing the mDL reader public key and trust information can also be used.

The certificate and CRL profile requirements in ISO/IEC 18013-5 shall be applied for the following profiles: IACA root certificate, IACA link certificate, document signer certificate, mdoc reader authentication certificate, Online Certificate Status Protocol (OCSP) signer certificate, CRL profile.

All certificates issued by an IACA or another CA shall be validated according to ISO/IEC 18013-5.

An mDL reader needs access to the issuing authority's certificate authority (IACA) root certificate to verify issuer data authentication. An optional method to get access to these certificates is described in ISO/IEC 18013-5, namely to use verified issuer certificate authority list (VICAL) provider.

See the privacy and security recommendations in ISO/IEC 18013-5 for additional information on privacy and security.

Table 2 — Security mechanisms

Security mechanisms	Support	Reference
Session encryption	Conditional (see 6.4.4.2)	A.6
Issuer data authentication	Mandatory	ISO/IEC 18013-5
mdoc authentication	Mandatory	ISO/IEC 18013-5
mdoc reader authentication	Optional	ISO/IEC 18013-5

6.4.4.3 Additional verification requirements

If the OriginInfo as defined in A.3 contains the domain origin type as defined in A.3.2, the mDL reader shall verify whether it matches the domain of where the mDL was requested.

The behaviour of the mDL reader when it receives an empty string as value for the key "domain" in the "details" field of the domain origin OriginInfo type is out of scope of this document.

The mDL reader shall also verify any other elements in the OriginInfo that it understands and for which it can obtain the info to verify it. If the verification fails, the mDL reader shall terminate the transaction and invalidate any received data.

6.5 Protocol considerations

6.5.1 General

This clause reflects security and privacy considerations that implementers of flows and methods described in this document can consider.

6.5.2 Discovery and invocation of mdoc using a custom URI scheme

The mdoc and mdoc-openID4VP URI schemes present limitations when used to invoke the mdoc. Examples of limitations include (but are not limited to):

EXAMPLE 1 When using a custom URI scheme on iOS, the developer documentation notes that "If multiple apps register the same scheme, the app the system targets is undefined. There's no mechanism to change the app or to change the order apps appear in a Share sheet" (see Reference [20]).

EXAMPLE 2 Discussions are circulating around the possible deprecation of support for certain URI schemes that can cause implementations to break (see Reference [20]).

EXAMPLE 3 The user receives no assistance in selecting the appropriate wallet since the custom URI scheme only provides selection based on protocol. This can lead to the user making an incorrect wallet selection.

EXAMPLE 4 Custom URI schemes require apps to ensure protection from malformed input data. Further solutions that assist in executing this protection (see 6.5.3) can be helpful.

EXAMPLE 5 Custom URI schemes inhibit the capabilities of the browser to protect the user.

6.5.3 Possible attack

6.5.3.1 Attack description

A possible attack is when a victim authenticates for a session at the relying party that is under the attacker's control, or more specifically, when an attacker interacts with a relying party to generate a link to then forward that link to a victim to have the victim complete the process on behalf of the attacker.

6.5.3.2 Device retrieval to a website

For device retrieval to a website, the solution is for the user agent to provide the domain origin to the mdoc. Certain browsers have settings that can prevent the domain origin information from being provided by the user agent. In addition, some browsers do not support providing the domain origin information via schemes. In situations like this, if the presentment is performed, engagement information can be forwarded by an attacker and the mDL holder is vulnerable to the above attack.

6.5.3.3 OID4VP

For OID4VP, a solution is for the mdoc reader to maintain the binding between the user session and the nonce authorization request parameter. While a reader is required to implement a mechanism to maintain the binding, this document does not define one. In addition, absent a list of trusted readers (that are confirmed to maintain the binding, and that can be used by the mdoc to make/inform decisions about the transaction), the mdoc does not have a way to check if the binding is maintained. If the binding is not maintained and the presentment is performed, engagement information can be forwarded by an attacker and the mDL holder is vulnerable to the above attack. There are ongoing discussions in the OpenID Foundation to propose a solution (see Reference [21]).

6.5.3.4 Digital credentials API retrieval

For the digital credentials API retrieval, the solution is for the user agent to provide the origin to the mdoc. The mdoc and mdoc reader both include the origin in the session transcript, and this ensures that the origin has to match, thereby preventing the attack described in this section.

7 mDL data model

The mDL data model descriptions and requirements in ISO/IEC 18013-5 shall apply in this document with the following exception: an mDL may require mdoc reader authentication as a precondition for the release of any of the mandatory data elements.

NOTE 1 This differs from the corresponding requirement in ISO/IEC 18013-5

NOTE 2 In order for an mDL and mDL reader to use mdoc reader authentication, a trust relationship between the parties involved must exist.