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Elektronsko pobiranje pristojbin - Izmenjava informacij med ponudnikom in operaterjem cestninjenja (ISO/DIS 12855:2024)

Electronic fee collection - Information exchange between service provision and toll charging (ISO/DIS 12855:2024)

Elektronische Gebührenerhebung - Informationsaustausch zwischen Dienstleistern und Gebühreneinzugsunternehmen (ISO/DIS 12855:2024)

Perception de télépéage - Échange d'informations entre la prestation de service et la perception du péage (ISO/DIS 12855:2024)

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Electronic fee collection — Information exchange between service provision and toll charging

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prestation de service et la perception du péage*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 ISO documents 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 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 of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 12855:2022), which has been technically revised.

The main changes are as follows:

- revision of application data units (ADUs);
- the data definitions and semantics have been updated, including making reference to ISO 17573-3 as the primary source;
- removal of the remaining references to the ISO 17575 series;
- removal of the `MacKeyObject` in the `TrustobjectAdu` (see 6.7);
- adapted the ADUs to support of ANPR-based fee collection and enforcement;
- alignment of the structure of all major clauses in a consistent manner to improve readability.

This document has been prepared under a standardization request^[14] addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

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.

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Introduction

The widespread use of road tolling requires provisions for users of vehicles that circulate through many different toll domains. Users should be offered a single contract for driving a vehicle through various toll domains. Whether those vehicles require on-board equipment (OBE) or tolling is based on automatic number plate recognition (ANPR) these should be interoperable with the toll systems in the various toll domains. In Europe, for example, this need has been officially recognized and legislation on interoperability has already been adopted (see Directive 2019/520,^[7] related Commission delegated regulation 2020/2003^[9] and Commission implementing regulation 2020/204^[8]). There is both a commercial and economic justification regarding the OBE and the toll systems for International Standards supporting interoperability.

The system architecture defined in ISO 17573-1 is the basis for all International Standards that relate to tolling systems in the toll domain. With respect to ISO 17573-1, this document:

- adopts its definitions of terms and concepts and basic system functionalities and structure,
- uses its terminology, and
- specifies the interfaces identified therein.

ISO 17573-1 uses ISO/IEC 10746-3^[3] for the description of the architecture.

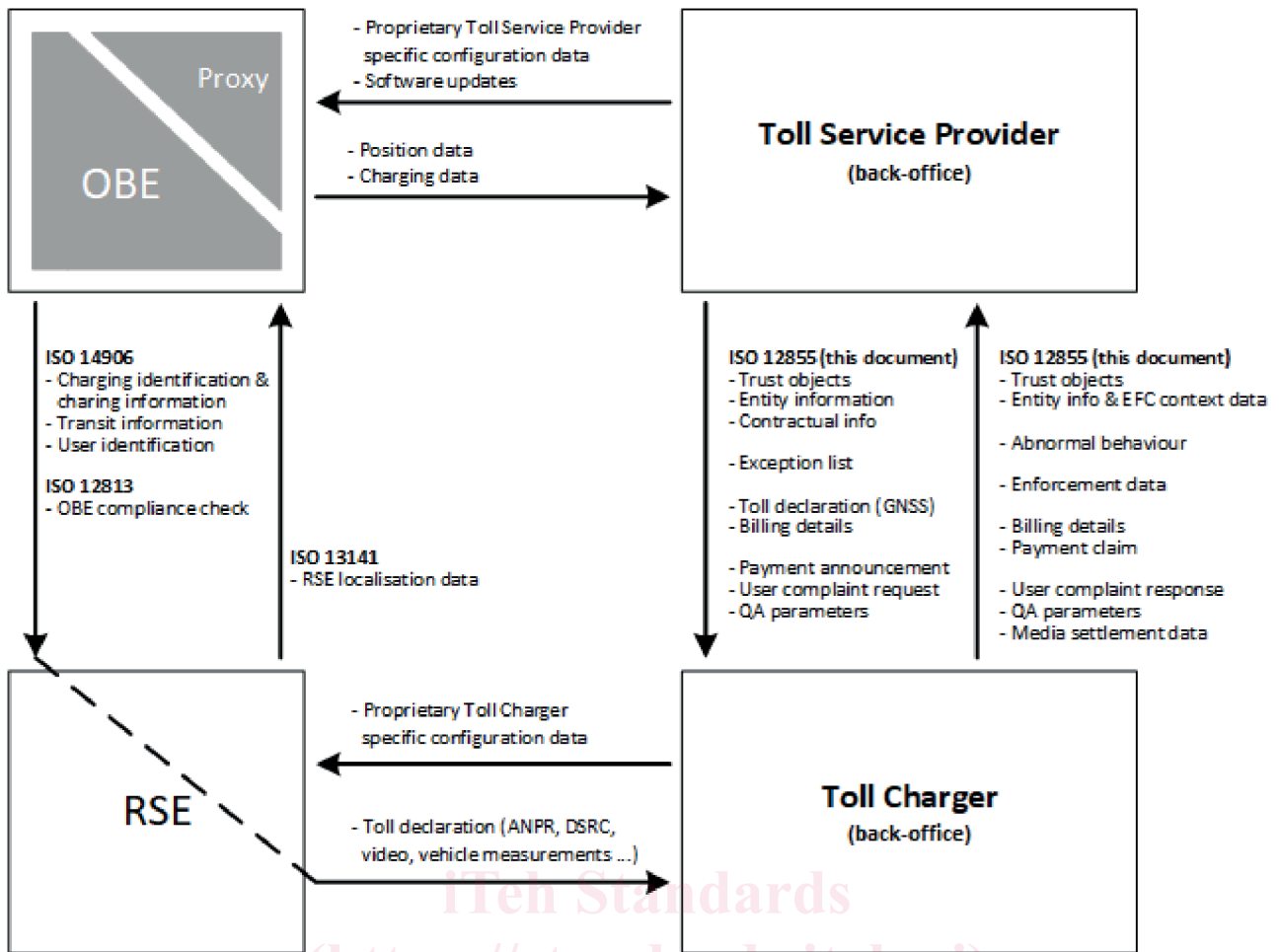
[Figure 1](#) shows the scope of the group of International Standards related to electronic fee collection (EFC) based upon the ISO 17573-1 system architecture.

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**Key**

- ANPR automatic number plate recognition
 DSRC dedicated short-range communication
 GNSS global navigation satellite system
 QA quality assurance
 OBE on-board equipment
 RSE roadside equipment

Figure 1 — Scope of EFC-related International Standards

A given transport service for a given vehicle is fully identified by one or several toll declarations made available to the toll charger (TC). It is necessary to make toll declarations available according to the rules of the toll regime of the toll domain. These toll declarations can either be acquired on the road-side equipment (RSE) of the TC or acquired by an autonomous OBE and sent to the TC by the toll service provider (TSP).

The amount due for a given transport service used by a vehicle liable to toll is finalized by the TC with the use of the acquired or received toll declarations (as described above) and calculations are made according to the rules of the toll regime (formula, tariff tables, specific situations rules, traffic conditions, etc.). This means that the TC has the authority to decide on the amount due, even if it decides to assign the task of calculating the amount due to the TSP.

The calculated amount due above, associated with a given transport service, is referred to as "billing details". For a given transport service, the billing details refer to one or several toll declarations.

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Depending on the toll regime, billing details are computed by means of the information collected either by the TC or the relevant TSP, or both. They are finalized by the TC – or by the TSP if the TC has assigned this task to the TSP – and sent to the counterparty.

The TC derives the payment claims from the billing details and makes them available to each TSP, or requires the TSP to send payment announcements, according to the bilateral agreements it has with each TSP, referring to one or several billing details. These payment claims include an amount due, considering any specific commercial conditions applicable to a vehicle, a fleet of vehicles or a given TSP, if defined for the transport service.

This document defines a set of interactions in support of technical interoperability between back-office systems of TCs and TSPs. The EFC service and the EFC system model on which this document is based are defined in ISO 17573-1.

This document does not provide a full solution for interoperability and it does not define other parts of the EFC system, other services, other technologies and non-technical elements of interoperability. It is defined as a toolbox International Standard of an application protocol data unit (APDU), which can be used for the assigned purpose. This APDU may contain different ADUs, which bear the transferred data. The detailed definitions of mandatory and optional elements in a real implementation are defined elsewhere. It does not define all communication sequences, communication stacks and timings.

The development of a common European Electronic Toll Service (EETS), as a part of the already cited European EFC Directive and related Regulation and Implementing acts, also calls for the definition of an interoperable EFC service. It should be noted that EN 16986 specifies interoperable application profiles (IAP), applicable based on this document. These profiles define a specific coherent set of transactions, triggers, timings, conditions, data elements, transfer mechanisms and supporting functions for an interoperable exchange of data between the back-office system of TCs and TSPs. EN 16986 is consistent with and is intended to provide support for the technical specification of EETS.

This document identifies and specifies the APDU and a set of ADUs exchanged between two actors in the roles of TSP and TC as defined in ISO 17573-1. To specify these interfaces, this document uses the enterprise description of the toll environment, and the interactions defined between the named classes of roles, as defined in ISO 17573-1. This supports a complete specification of the data that is transferred between those identified entities. In addition, a number of computational interfaces are identified and interactions in terms of sequences of APDUs are defined.

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Electronic fee collection — Information exchange between service provision and toll charging

1 Scope

This document specifies:

- the interfaces between electronic fee collection (EFC) back-office systems for vehicle-related transport services, e.g. road user charging, parking and access control;
- an exchange of information between the back-office system of the two roles of service provision and toll charging, e.g.:
 - charging-related data (toll declarations, billing details, payment claims, payment announcements),
 - administrative data (trust objects, EFC context data, ...), and
 - confirmation data;
- transfer mechanisms and supporting functions;
- information objects, data syntax and semantics.

This document is applicable for any vehicle-related toll service and any technology used for charging.

The data types and associated coding related to the data elements described in [Clause 6](#) are defined in [Annex A](#), using the abstract syntax notation one (ASN.1) according to ISO/IEC 8824-1.

This document specifies basic protocol mechanisms over which implementations can specify and perform complex transfers (transactions).

This document does not specify, amongst others:

- any communication between TC or TSP with any other involved party;
- any communication between elements of the TC and the TSP that is not part of the back-office communication;
- interfaces for EFC systems for public transport;
- any complex transfers (transactions), i.e. sequences of inter-related ADUs that can possibly involve several APDU exchanges;
- processes regarding payments and exchanges of fiscal, commercial or legal accounting documents; and
- definitions of service communication channels, protocols and service primitives to transfer the APDU.

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 612, *Road vehicles — Dimensions of motor vehicles and towed vehicles — Terms and definitions*

ISO 639-1, *Codes for the representation of names of languages — Part 1: Alpha-2 code*

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ISO 1176, *Road vehicles — Masses — Vocabulary and codes*

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country code*

ISO 4217, *Codes for the representation of currencies*

ISO 8583-1, *Financial transaction card originated messages — Interchange message specifications — Part 1: Messages, data elements and code values*

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1) — Part 1: Specification of basic notation*

ISO/IEC 8825-4, *Information technology — ASN.1 encoding rules — Part 4: XML Encoding Rules (XER)*

ISO/IEC 9594-8, *Information technology — Open systems interconnection — Part 8: The Directory: Public-key and attribute certificate frameworks*

ISO/IEC 9797-1:2011, *Information technology — Security techniques — Message Authentication Codes (MACs) — Part 1: Mechanisms using a block cipher*

ISO/IEC 10118-3, *IT Security techniques — Hash-functions — Part 3: Dedicated hash-functions*

ISO/IEC 11770-3, *Information security — Key management — Part 3: Mechanisms using asymmetric techniques*

ISO 13616-1, *Financial services — International bank account number (IBAN) — Part 1: Structure of the IBAN*

ISO/IEC 14888-2:2008, *Information technology — Security techniques — Digital signatures with appendix — Part 2: Integer factorization based mechanisms*

ISO 14906, *Electronic fee collection — Application interface definition for dedicated short-range communication*

ISO/TS 17573-2, *Electronic fee collection — System architecture for vehicle related tolling — Part 2: Vocabulary*

ISO 17573-3, *Electronic fee collection — System architecture for vehicle related tolling — Part 3: Data dictionary*

ISO/IEC 18033-2, *Information technology — Security techniques — Encryption algorithms — Part 2: Asymmetric ciphers*

ISO 19299, *Electronic fee collection — Security framework*

ISO 20524-1:2020, *Intelligent transport systems — Geographic Data Files (GDF) GDF5.1 — Part 1: Application independent map data shared between multiple sources*

ISO/TS 37444, *Electronic fee collection — Charging performance framework*

IETF RFC 4347, *Datagram Transport Layer Security, April 2006*

IETF RFC 5246, *The Transport Layer Security (TLS) Protocol, August 2008*

IETF RFC 5746, *Transport Layer Security (TLS) Renegotiation Indication Extension, February 2010*

IETF RFC 6040, *Tunnelling of Explicit Congestion Notification, February 2013*

W3C Recommendation *XML Signature Syntax and Processing Version 1.1*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TS 17573-2 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/>

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4 Symbols and abbreviated terms

ADU	application data unit
ANPR	automatic number plate recognition
APCI	application protocol control information
APDU	application protocol data unit
BIC	bank identifier code
CCC	compliance check communication
CRL	certificate revocation list
cXER	canonical XML encoding rules
DSRC	dedicated short-range communication
DST	daylight saving time
DTLS	datagram transport layer security
EFC	electronic fee collection
FTP	file transfer protocol
GDF	geographical data file
GNSS	global navigation satellite system
HOT	high occupancy tolling
HTTPS	hyper-text transfer protocol secure
IANA	internet assigned numbers authority
IBAN	international bank account number
ICC	integrated circuit card
IEC	International Electrotechnical Commission
ITU	International Telecommunication Union
LAC	localization augmentation communication
LPN	licence plate number
NMEA	National Marine Electronics Association
OBE	on-board equipment
OCSP	online certificate status protocol
OSI	open systems interconnection
PAN	personal account number
QA	quality assurance

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RINEX	receiver independent exchange format
RSA	Rivest, Shamir and Adleman
RSE	roadside equipment
SMTP	simple mail transfer protocol
SU	service user
TC	toll charger
TLS	transport layer security
TSP	toll service provider
UTC	coordinated universal time
VAT	value added tax
VPN	virtual private network
VRM	vehicle registration mark
XER	XML encoding rules
NOTE	RSA is an algorithm for public-key cryptography, also referred to as asymmetrical cryptographic technique.

5 Architectural concepts and information exchanges

5.1 Main roles in the toll charging environment

This document is built upon the system architecture defined in ISO 17573-1.

ISO 17573-1 specifies the four main roles shown in [Figure 2](#).

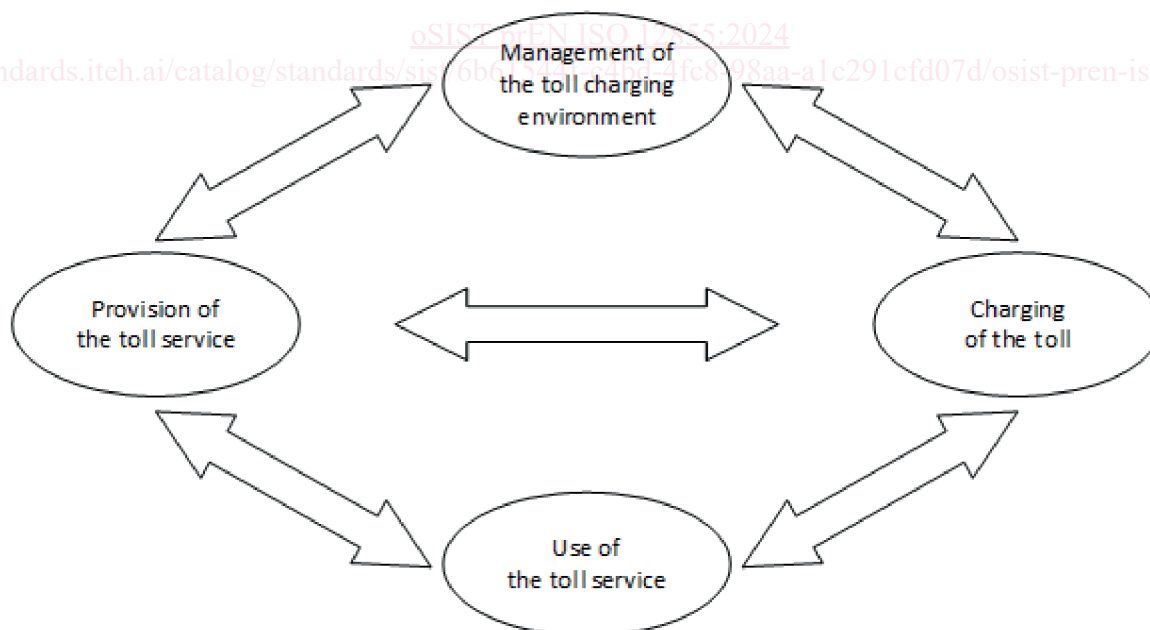


Figure 2 — Roles in the toll charging environment