Electronic fee collection - Information exchange between service provision and toll charging (ISO 12855:2022)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 12855:2022 sisaldab Euroopa standardi EN ISO 12855:2022 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 12855:2022 consists of the English text of the European standard EN ISO 12855:2022.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 04.05.2022.	Date of Availability of the European standard is 04.05.2022.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 03.220.20, 35.240.60

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 12855

May 2022

ICS 03.220.20; 35.240.60

Supersedes EN ISO 12855:2015

English Version

Electronic fee collection - Information exchange between service provision and toll charging (ISO 12855:2022)

Perception du télépéage - Échange d'informations entre la prestation de service et la perception du péage (ISO 12855:2022)

Elektronische Gebührenerhebung - Informationsaustausch zwischen Dienstleistern und Gebühreneinzugsunternehmen (ISO 12855:2022)

This European Standard was approved by CEN on 22 February 2022.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 12855:2022 E

European foreword

This document (EN ISO 12855:2022) has been prepared by Technical Committee ISO/TC 204 "Intelligent transport systems" in collaboration with Technical Committee CEN/TC 278 “Intelligent transport systems” the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2022, and conflicting national standards shall be withdrawn at the latest by November 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 12855:2015.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 12855:2022 has been approved by CEN as EN ISO 12855:2022 without any modification.

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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 third edition cancels and replaces the second edition (ISO 12855:2015), which has been technically revised.

The main changes are as follows:

— addition of new application data units (ADUs);

— alignment of the ASN.1 data definitions with the current edition of ISO 14906;

— removal of all dependencies on the ISO 17575 series ASN.1 data types and creation of corresponding definitions;

— re-classification of the electronic fee collection (EFC) context types by tolling and geographical characteristics and removal of the previous distinction based on tolling technology;

— splitting of the ASN.1 module into two modules: one containing ISO 12855-specific definitions, and another containing data-type definitions that are common to other standards in the EFC domain. This common data types module has then been moved to ISO/TS 17573-3;

— clarification of the semantics of all parameters in ADUs;

— alignment of the structure of all major clauses in a consistent manner to improve readability.

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

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. Where those vehicles require on-board equipment (OBE) this 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[8], related Commission delegated regulation 2020/2003[10] and Commission implementing regulation 2020/204[9]). 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:

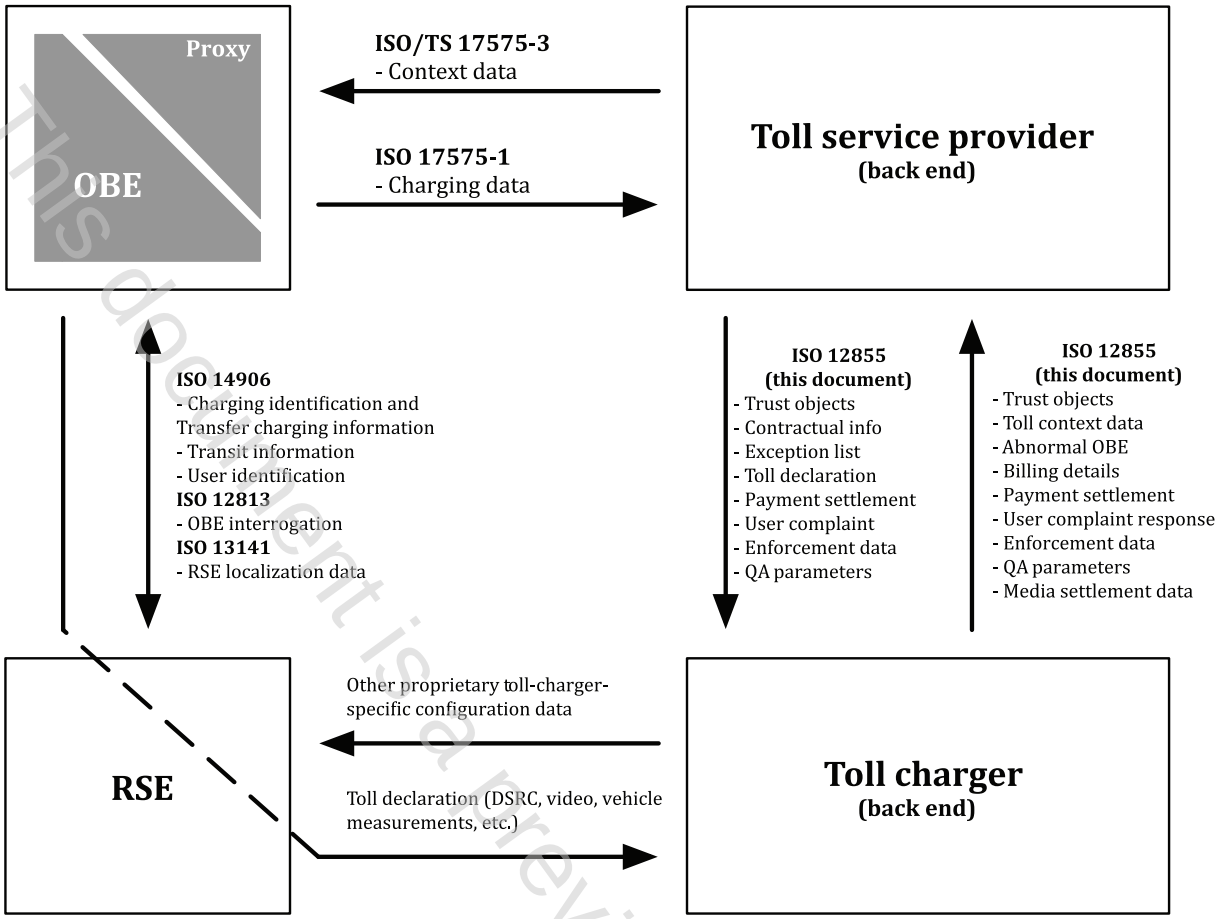
— adopts its definitions of terms and concepts and basic system functionalities and structure,

— uses its terminology, and

— specifies the interfaces identified therein.

ISO 17573-1 uses ISO/IEC 10746-3 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.



Key

DSRC dedicated short-range communication

QA quality assurance

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.

The amount due for a given transport service used by a vehicle liable to toll is finalized by the TC with the use of 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 toll service provider (TSP) the task of calculating the amount due.

The information 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.

Depending on the toll regime, billing details are computed by means of the information collected by the TC and/or the relevant TSP; they are finalized by the TC or by the TSP if the TC has assigned this task to the TSP.

The TC settles the payment claims (or toll payment claims) 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 billing details. These payment claims include an amount due, taking into account any specific commercial conditions applicable to a vehicle, a fleet of vehicles or a given TSP.

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 application protocol data units (APDUs), which can be used for the assigned purpose. 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 CEN/TS 16986 (to be revised and converted into a European Standard) specifies interoperable application profiles (IAP), applicable based on this document. These profiles define a specific coherent set of transactions, triggers, conditions, data elements, transfer mechanisms and supporting functions for an interoperable exchange of data between the back end system of TCs and TSPs. CEN/TS 16986 is consistent with and is intended to provide support for the technical specification of the EETS.

This document identifies and specifies the set of APDUs 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 application protocol data units are defined.

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 end system of the two roles of service provision and toll charging, e.g.:

  — charging-related data (toll declarations, billing details),

  — administrative 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 toll charger (TC) or toll service provider (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 application data units (ADUs) that can possibly involve several application protocol data unit (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 APDUs.

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*

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 17444-1, *Electronic fee collection — Charging performance — Part 1: Metrics*

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

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*

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.