SLOVENSKI STANDARD
oSIST prEN ISO 12855:2021

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Elektronsko pobiranje pristojbin - Izmenjava informacij med ponudnikom in operaterjem cestninjenja (ISO/DIS 12855:2020)

Electronic fee collection - Information exchange between service provision and toll charging (ISO/DIS 12855:2020)

Elektronische Gebührenerhebung - Informationsaustausch zwischen Dienstleistern und Gebühreneinzugsunternehmen (ISO/DIS 12855:2020)

Perception du télépéage - Échange d'informations entre la prestation de service et la perception du péage (ISO/DIS 12855:2020)

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

Perception du télépéage — Échange d'informations entre la 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).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems.*

This third edition cancels and replaces the second edition (ISO 12855:2015), which has been technically revised. The following major changes have been made:

- adding new Application Data Units (ADUs) due to comments received from National Bodies;
- aligning the ASN.1 data definitions with the current versions of EN ISO 14906, and ISO 17575 (all parts);
- removing all imported ASN.1 data types from ISO 17575 and creating corresponding definitions;
- splitting the ASN.1 module in two modules: one that contains 12855 specific definitions, and a second one that contains data type definitions that are common to other standards in the EFC domain.;
- move the common data types module into part 3 of ISO 17573;
- clarifying the semantics of parameters in ADUs;
- aligning the structure of all major clauses in a consistent manner to improve readability.

Introduction

The widespread use of 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 a form of 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 and related Commission delegated regulation 2020/2003 and Commission implementing regulation 2020/204 in the Bibliography). There is both a commercial and economic justification in respect to the OBE and the toll systems for standards enabling interoperability.

The system architecture defined in ISO 17573-1 is the basis for all 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 therein identified.

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

Figure 1 shows the scope of the group of electronic fee collection (EFC) related standards based upon the architecture standard.

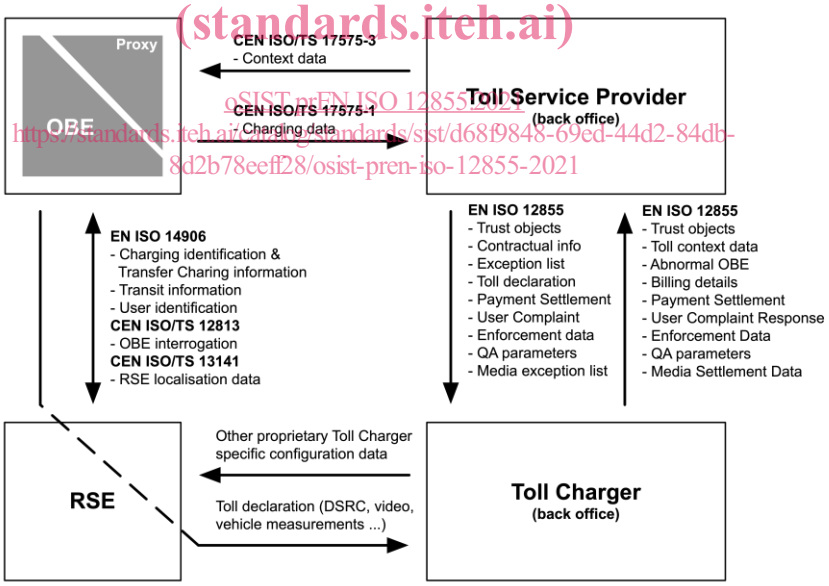

Figure 1 — Scope of EFC related standards

A given transport service for a given vehicle is fully identified by one or several toll declarations made available to the toll charger (TC). Toll declarations have to be made 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.). That 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 to calculate the amount due.

The information above, associated with a given transport service, is named billing details; for a given transport service, the billing details are referring to one or several toll declarations.

Depending on the toll regime, billing details are elaborated with information collected by the TC and/or the relevant TSP; they are finalized by the TC.

The TC elaborates and makes the payment claims (or toll payment claims) available to each TSP, 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 is 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.

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 CEN/TS 16986 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 central equipment 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 Application Protocol Data Units exchanged between two actors in the roles of toll service provider and toll charger 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 allows for 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) systems for vehicle related transport services, e.g. road user charging, parking and access control; it does not cover interfaces for EFC systems for public transport; an EFC system can include any EFC system, e.g. including systems that automatically read licence plate numbers of vehicles passing a toll point,
- an exchange of information between the central equipment 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,
- examples of data interchanges (see Annex B and Annex C), and
- an example of toll rounding (see Annex D).

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

It is defined as a toolbox standard of transactions and 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 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 is not applicable, among others, to

- 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,
- 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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

4. ISO/IEC 9594-8:2014, *Information technology — Open Systems Interconnection — The Directory — Part 8: Public-key and attribute certificate frameworks*

5. ISO/IEC 9646-7, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 7: Implementation Conformance Statements*

6. ISO/IEC 9797-2:2011, *Information technology — Security techniques — Message Authentication Codes (MACs) — Part 2: Mechanisms using a dedicated hash-function*

7. ISO/IEC 10118-3, *Information technology — Security techniques — Hash-functions — Part 3: Dedicated hash-functions*

8. ISO/IEC 11770-3, *Information technology — Security techniques — Key management —Part 3: Mechanisms using asymmetric techniques*

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

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

11. ISO 14906:2011/Amd1:2015, *Electronic fee collection — Application interface definition for dedicated short-range communication*

12. ISO 17573-1, *Electronic fee collection — Systems architecture for vehicle-related tolling*

13. ISO 17575-1:—[1], *Electronic fee collection — Application interface definition for autonomous systems — Part 1: Charging*

14. ISO 17575-3:—[1)], *Electronic fee collection — Application interface definition for autonomous systems — Part 3: Context data*

15. ISO/IEC 18033-2:2006, *Information technology — Security techniques — Encryption algorithms — Part 2: Asymmetric ciphers*

16. ISO 19299:2020, *Electronic fee collection — Security framework*

17. ISO/IEC 9834-8:2005, *Information technology – Procedures for the operation of object identifier registration authorities: Generation of universally unique identifiers and their use in object identifiers*

18. ISO/IEC 21320-1:2015, *Information Technology - Document Container File - Part 1: Core*

19. IETF RFC 2634, *Enhanced Security Services for S/MIME, June 1999*

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

21. IETF RFC 5035, *Enhanced Security Services (ESS) Update: Adding CertID Algorithm Agility, August 2007*

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

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

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

25. IETF RFC 2048, *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types*, November 1996

26. ISO 4217:2015, *Codes for the representation of currencies*

27. ISO/TS 17444-1:2017, *Electronic fee collection — Charging performance — Part 1: Metrics*

3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

In addition, the purpose of this document, the definitions in ISO/TS 17573-2 apply.

4 Symbols and abbreviated terms

ADU	Application data unit
ANPR	Automatic Number Plate Reading
APCI	Application Protocol Control Information
APDU	Application Protocol Data Unit
CCC	Compliance Check Communication
CRL	Certificate revocation list
DSRC	Dedicated short-range communication
EFC	Electronic Fee Collection
GDF	Geographical Data Files

GNSS	Global Navigation Satellite System
HTTPS	Hyper-Text Transfer Protocol Secure
ICC	Integrated Circuit Card
IEC	International Electrotechnical Commission
ITU	International Telecommunication Union
LAC	Location Augmentation Communication
LPN	Licence Plate Number
OBE	On-Board Equipment
OBU	On-Board Unit
OCSP	Online Certificate Status Protocol
OSI	Open Systems Interconnection
PAN	Personal Account Number
QA	Quality Assurance
RSA	Rivest, Shamir and Adleman
RSE	Roadside Equipment
SLA	Service Level Agreement
SU	Service User
TC	Toll Charger
TLS	Transport Layer Security
TSP	Toll Service Provider
VRM	Vehicle Registration Mark

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 ISO 17573-1.

ISO 17573-1 defines the four main roles shown in Figure 2.

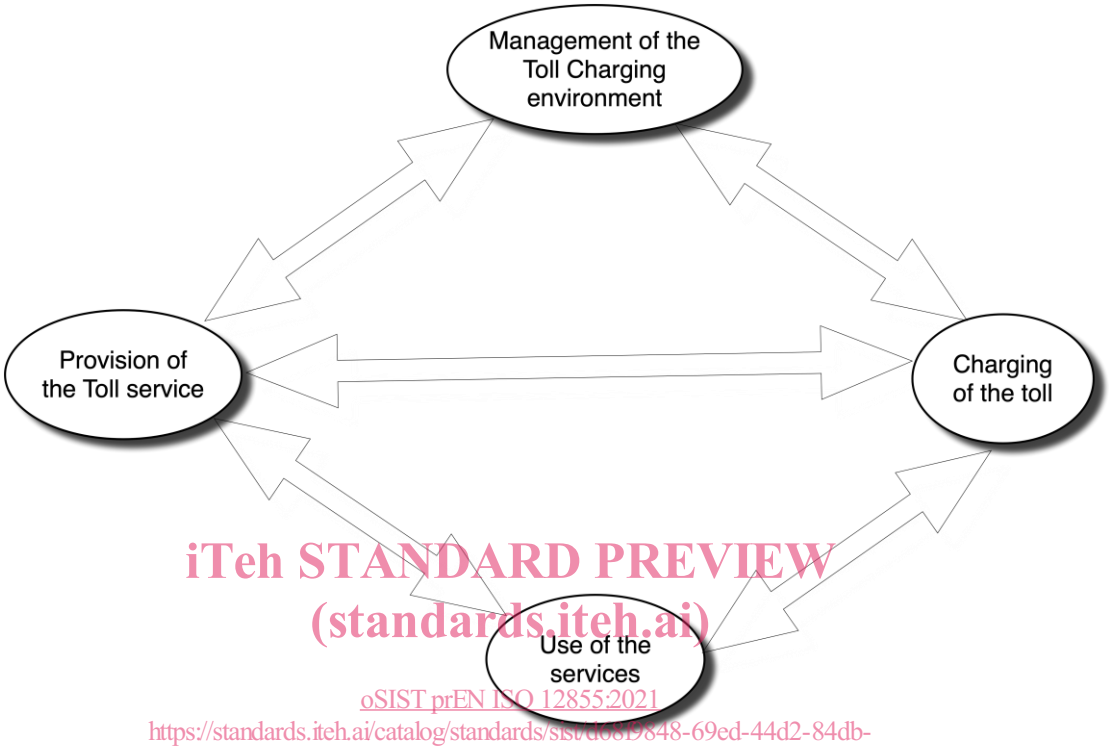

Figure 2 — Roles in the toll charging environment

Information exchanges are agreed upon between toll charger and toll service provider, taking into account privacy regulations. The information exchanges needed by the toll charger and the toll service provider to perform their roles are described in this clause.

5.2 Information exchange between toll charging and provision

5.2.1 General

The information exchange between the service provision and the toll charging roles supports the provision of functionalities that are based on the EFC system service definitions in ISO 17573-1. The following Figure 3 gives a general picture of the provided functionalities.