



SLOVENSKI STANDARD

SIST EN 16986:2024

01-oktober-2024

Nadomešča:

SIST-TS CEN/TS 16986:2017

SIST-TS CEN/TS 16986:2017/AC:2017

Elektronsko pobiranje pristojbin - Interoperabilni profili aplikacije za informativno izmenjavo med ponudnikom storitve in operaterjem cestninjenja

Electronic fee collection - Interoperable application profiles for information exchange between service provision and toll charging

Elektronische Gebührenerhebung - Interoperable Anwendungsprofile für den Informationsaustausch zwischen den Dienste-Versorgern und Mauterhebern

Perception de télépéage - Profils d'application d'interopérabilité pour échange d'informations entre la prestation de service et la perception du péage

SIST EN 16986:2024

<https://standards.iteh.ai/catalog/standards/sist/d48a0c56-668c-4deb-b770-895fb3b8411d/sist-en-16986-2024>

Ta slovenski standard je istoveten z: EN 16986:2024

ICS:

35.240.60 Uporabniške rešitve IT v IT applications in transport
prometu

SIST EN 16986:2024

en,fr,de

EUROPEAN STANDARD

EN 16986

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2024

ICS 35.240.60

Supersedes CEN/TS 16986:2016

English Version

Electronic fee collection - Interoperable application profiles for information exchange between service provision and toll charging

Perception de télépéage - Profils d'application d'interopérabilité pour échange d'informations entre la prestation de service et la perception du péage

Elektronische Gebührenerhebung - Interoperable Anwendungsprofile für den Informationsaustausch zwischen den Dienste-Versorgern und Mauterhebern

This European Standard was approved by CEN on 17 June 2024.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of 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, Türkiye and United Kingdom.

[SIST EN 16986:2024](https://standards.iteh.ai/catalog/standards/sist/d48a0c56-668c-4deb-b770-895fb3b8411d/sist-en-16986-2024)

<https://standards.iteh.ai/catalog/standards/sist/d48a0c56-668c-4deb-b770-895fb3b8411d/sist-en-16986-2024>



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

EUROPEAN FOREWORD	5
INTRODUCTION	6
1 SCOPE	7
2 NORMATIVE REFERENCES	8
3 TERMS AND DEFINITIONS	8
4 ABBREVIATED TERMS	13
5 CONFORMANCE	14
5.1 GENERAL.....	14
5.2 BASE STANDARD.....	14
5.3 MAIN CONTENTS OF THE IAPS IN THIS DOCUMENT.....	15
5.3.1 General requirements.....	15
5.3.2 Profiles	15
5.3.3 Interaction protocol	18
5.4 CONFORMANCE REQUIREMENTS.....	26
5.4.1 Relations between this document and the base standard	26
5.4.2 Conformance to profiles	28
5.5 CONFORMANCE STATEMENT	29
5.6 INTEROPERABILITY.....	29
6 GENERAL RESTRICTIONS	29
6.1 GENERAL.....	29
6.2 CODED VALUES AND RANGES.....	29
6.3 EXTENDED DATA TYPES.....	34
6.3.1 General	34
6.3.2 NominalVehicleParameters	34
6.3.3 UserParameterResponseDetails.....	36
6.3.4 ExternalCostsPerChargeUnit.....	38
6.4 INFOEXCHANGE APDU	38
6.4.1 Information sender and information originator	38
6.4.2 Restrictions in InfoExchangeContent data elements.....	39
6.4.3 InfoExchangeAuthenticator	40
6.5 ACKADU.....	40
6.5.1 General	40
6.5.2 Transaction protocol.....	40
6.5.3 Syntax and semantics	41
6.6 APDU TRANSFER MECHANISMS.....	41
6.6.1 ASN.1 encoding.....	41
6.6.2 Generic transfer mechanisms	41
6.6.3 Alternative transfer mechanisms for transaction type TRUSTOBJECTS	41
7 COMMON TRANSACTIONS	42
7.1 USERDETAILS - RETRIEVE AND PROVIDE USER DETAILS	42
7.1.1 Transaction sequence, triggers and timings.....	42
7.1.2 Syntax and semantics	44
7.2 LISTOFUSERS – PROVIDE A LIST OF USERS.....	46
7.2.1 Transaction sequence, triggers and timings.....	46
7.2.2 Syntax and semantics	48
7.3 EXCEPTIONLIST - MANAGING EXCEPTION LISTS	49
7.3.1 Transaction sequence, triggers and timings.....	49
7.3.2 Syntax and semantics	51
7.4 TRUSTOBJECTS - EXCHANGE TRUST OBJECTS.....	57
7.4.1 APDU transfer mechanisms	57
7.4.2 Transaction sequence, triggers and timings.....	57

7.4.3	Syntax and semantics.....	61
7.5	CONTRACTISSUERLIST – TRANSFER OBE CONTRACTUAL INFORMATION	62
7.5.1	Transaction sequence, triggers and timings.....	62
7.5.2	Syntax and semantics.....	64
7.6	EFCCONTEXTDATA – TRANSFER TOLL CONTEXT DATA INFORMATION	64
7.6.1	Transaction sequence, triggers and timings.....	64
7.6.2	Syntax and semantics.....	66
7.7	BILLINGDETAILS_TC – TRANSFER BILLING DETAILS FROM TC	66
7.7.1	Transaction sequence, triggers and timings.....	66
7.7.2	Syntax and semantics.....	68
7.8	BILLINGDETAILS_TSP.....	69
7.8.1	Transaction sequence, triggers and timings.....	69
7.8.2	Syntax and semantics.....	71
7.9	PAYMENTCLAIM – ISSUE A PAYMENT CLAIM	72
7.9.1	Transaction sequence, triggers and timings.....	72
7.9.2	Syntax and semantics.....	75
7.10	REPORTABNORMALOBE – REPORT DETECTION OF OBE MISBEHAVIOUR.....	75
7.10.1	Transaction sequence, triggers and timings	75
7.10.2	Syntax and semantics	77
7.11	USERCOMPLAINT – REPORT A USER COMPLAINT	78
7.11.1	Transaction sequence, triggers and timings	78
7.11.2	Syntax and semantics	80
7.12	QAINFO – EXCHANGE OF QUALITY RELATED INFORMATION.....	81
7.12.1	Transaction sequence, triggers and timings	81
7.12.2	Syntax and semantics	84
8	SECTIONDISCRETE PROFILE.....	85
8.1	DESCRIPTION.....	85
8.2	COMMON TRANSACTIONS USED BY THE PROFILE.....	85
8.3	ADDITIONAL PROFILE RESTRICTIONS.....	85
8.3.1	Apci restrictions	85
8.3.2	EXCEPTIONLIST restrictions.....	86
8.3.3	TRUSTOBJECTS restrictions.....	87
8.3.4	EFCCONTEXTDATA restrictions	87
8.3.5	BILLINGDETAILS_TC restrictions.....	94
8.3.6	PAYMENTCLAIM restrictions.....	97
8.4	SPECIFIC PROFILE TRANSACTIONS	98
9	SECTIONAUTONOMOUS PROFILE.....	98
9.1	DESCRIPTION.....	98
9.2	COMMON TRANSACTIONS USED BY THE PROFILE.....	98
9.3	ADDITIONAL PROFILE RESTRICTIONS.....	99
9.3.1	Apci restrictions	99
9.3.2	EXCEPTIONLIST restrictions.....	99
9.3.3	BILLINGDETAILS transactions restrictions	100
9.3.4	EFCCONTEXTDATA restrictions	101
9.4	SPECIFIC PROFILE TRANSACTIONS	101
9.4.1	General.....	101
9.4.2	TOLLDECLARATIONS_SECT.....	102
9.4.3	PAYMENTANNOUNCEMENT transaction	107
10	MESHEDDISCRETE PROFILE.....	110
10.1	DESCRIPTION.....	110
10.2	COMMON TRANSACTIONS USED BY THE PROFILE.....	110
10.3	ADDITIONAL PROFILE RESTRICTIONS.....	111
10.3.1	Apci restrictions	111
10.3.2	EXCEPTIONLIST restrictions.....	111

EN 16986:2024 (E)

10.3.3	TRUSTOBJECTS restrictions.....	112
10.3.4	EFCCONTEXTDATA restrictions.....	112
10.3.5	BILLINGDETAILS_TC restrictions.....	115
10.3.6	BILLINGDETAILS_TSP_restrictions.....	117
10.3.7	PAYMENTCLAIM restrictions.....	117
10.4	SPECIFIC PROFILE TRANSACTIONS.....	117
11	AREADISTANCEAUTONOMOUS PROFILE.....	118
11.1	DESCRIPTION.....	118
11.2	COMMON TRANSACTIONS USED BY THE PROFILE.....	118
11.3	FURTHER PROFILE RESTRICTIONS ON USED TRANSACTIONS.....	118
11.3.1	EXCEPTIONLIST restrictions.....	118
11.3.2	EFCCONTEXTDATA restrictions.....	118
11.3.3	BILLINGDETAILS_TSP restrictions.....	119
11.3.4	REPORTABNORMALOBE restrictions.....	120
11.4	SPECIFIC PROFILE TRANSACTIONS.....	121
11.4.1	TOLLDECLARATIONS_AREA.....	121
ANNEX A (NORMATIVE) FORMAL RESTRICTIONS ON DATA TYPES.....		127
ANNEX B (NORMATIVE) ICS PROFORMA.....		129
ANNEX C (NORMATIVE) INTEROPERABILITY STATEMENT PROFORMA.....		213
ANNEX D (NORMATIVE) WEB SERVICE DEFINITION (WSDL).....		222
ANNEX E (INFORMATIVE) USE OF THIS DOCUMENT FOR THE EETS.....		223
BIBLIOGRAPHY.....		224

ITeH Standards
 (<https://standards.iteh.ai>)
 Document Preview

[SIST EN 16986:2024](#)

<https://standards.iteh.ai/catalog/standards/sist/d48a0c56-668c-4deb-b770-895fb3b8411d/sist-en-16986-2024>

European foreword

This document (EN 16986:2024) has been prepared by 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 January 2025, and conflicting national standards shall be withdrawn at the latest by January 2025.

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 CEN/TS 16986:2016.

This document features the following main changes compared to CEN/TS 16986:2016:

- updated interoperability application profiles tailored according to electronic fee collection (EFC) charging policies and primary used technologies;
- updated data definitions to reflect changes made to the underlying base standard, i.e., EN ISO 12855:2022;
- addition of a second level of the version identifier (i.e. minor version) of the abstract syntax notation one (ASN.1) module to provide enhanced support to standards that import data types from this document;
- introduction of use of imported ASN.1 types with successors (i.e. including all future minor versions);
- updated terms and definitions, including reference to ISO/TS 17573-2 as the primary source;
- inserted a normative formal specification of profiles’ restrictions on data, both as ASN.1 data types, and as XSD specifications as Annex A and renumbered other annexes consequently;
- updated informative Annex E on the “Use of this document for the European electronic toll service” (EETS), so as to reflect the recast of the EETS legislation (i.e. Directive (EU) 2019/520^[16] and the corresponding Commission Implementing Regulation^[16]).

This document is intended to provide support for the technical specification of the recast of the EETS legislation as laid down in the European Directive (EU) 2019/520 and in its Commission Delegated Regulation (EU) 2020/203 and Commission Implementing Regulation (EU) 2020/204. See Annex E on the “Use of this document for the EETS legislation”.

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

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Türkiye and the United Kingdom.

EN 16986:2024 (E)

Introduction

The CEN ISO Standard on *Electronic fee collection - Information exchange between service provision and toll charging* (i.e. EN ISO 12855) is a so-called toolbox standard. That means that it provides a large number of options that can be used to support various needs of toll chargers (TCs) and toll service providers (TSPs). As such, it provides useful but not sufficient support to ensure technical interoperability.

The aim of this document is to produce a profile specification that provides technical interoperability to support the EFC information exchange between TSPs and TCs according to the following tolling policies:

- based on traversing sections of roads;
- based on travelling within areas of territory;
- based on traversing meshed networks of roads.

This document covers the definition of interoperable application profiles (IAP) applicable for the use of EN ISO 12855:2022. 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 systems of TCs and TSPs (in Europe).

This document defines profiles using the concept of “International Standardized Profiles (ISP)”, as defined in ISO/IEC TR 10000-1. The ISP concept is specifically suited for defining interoperability specifications where a set of base standards can be used in different ways. This is exactly the case for EN ISO 12855:2022, where the base standard allows for different choices that are not interoperable.

The principles of the ISP-concept can be summarized as follows:

- an ISP will make references only to base standards or other ISPs;
- the profile will restrict the choice of base standard options to the extent necessary to maximize the probability of interoperability (e.g. chosen classes, conforming subsets, options and parameter values of base standards);
- the ISP will not copy content of the base standards (in order to avoid consistency problems with the base standards);
- the profile will not specify any requirements that would contradict or cause non-conformance to the base standards;
- the profile may contain conformance requirements that are more specific and limited in scope than those of the base standards;
- conformance to a profile implies by definition conformance to a set of base standards, whereas conformance to that set of base standards does not necessarily imply conformance to the profile.

This document will be complemented by standard EN 17154 that will specify how to evaluate implementations of EN 16986 (this document).

1 Scope

This document specifies interoperable application profiles for information exchanges between toll chargers (TCs) and toll service providers (TSPs), by selecting suitable options from the base standard EN ISO 12855:2022.

This document covers:

- exchange of information between back end systems of TCs and TSPs, e.g.:
 - charging related data (toll declarations, billing details, payment claims, payment announcements);
 - administrative data (trust objects, EFC context data, contact details for enforcement, etc.);
 - user related data (exception lists, user details, abnormal OBE information, CCC event data, user complaints);
 - confirmation data.
- transfer mechanisms and supporting functions;
- semantics of data elements;
- formal definitions (Annex A) of restrictions on data types w.r.t. the ASN.1 definitions in the base standard EN ISO 12855:2022 by introducing an XML Schema Definition (XSD) for each specified profile;
- implementation conformance statement proforma (Annex B), as a basis for evaluation of implementation for conformity to this document;
- an interoperability statement proforma (Annex C), as a basis for assessment of transactional interoperability of two technical implementations;
- a web service definition (Annex D) for the use of web services as communication technology.

<https://www.itihstandards.com/standards/sist-en-16986-2024>
The implementation of the underlying back end systems and their business processes is not covered. Therefore, the following aspects are outside the scope of this document:

- details about how back end systems use the authenticator data elements of the base standard to implement security;
- how to operate compliance checking and the enforcement process;
- commercial aspects;
- definition of non-functional features such as performance indicators, acceptable fault levels, availability of interfaces of TC and TSP, and reporting requirements.

This document further explains the correspondence between the European electronic toll service (EETS) legislation and this document (Annex E).

EN 16986:2024 (E)**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.

EN ISO 12855:2022, *Electronic fee collection — Information exchange between service provision and toll charging (ISO 12855:2022)*

EN ISO 17573-3:2023, *Electronic fee collection — System architecture for vehicle related tolling — Part 3: Data dictionary (ISO 17573-3:2023)*

EN ISO 14906:2023, *Electronic fee collection — Application interface definition for dedicated short-range communication (ISO 14906:2022)*

EN ISO 12813:2024, *Electronic fee collection — Compliance check communication for autonomous systems (ISO 12813:2024)*

EN ISO 13141:2024, *Electronic fee collection — Localization augmentation communication for autonomous systems (ISO 13141:2024)*

IETF RC 959, *File Transfer Protocol [Oct 1985]*

IETF RFC 4217, *Securing FTP with TLS [Oct 2015]*

WSDL 1.1, *Web Services Description Language (WSDL) 1.1*¹

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 attribute

addressable package of data consisting of a single *data element* (3.13) or structured sequences of data elements

[SOURCE: ISO/TS 17575-2:2020, 3.2]

3.2 authentication

security mechanism allowing verification of the provided identity

[SOURCE: ISO/TS 17573-2:2020, 3.15]

¹ <http://www.w3.org/TR/2001/NOTE-wsdl-20010315> [15.03.2001]

3.3

authenticator

data, possibly encrypted, that is used for *authentication* (3.2)

[SOURCE: ISO/TS 17573-2:2020, 3.16]

3.4

availability

property of being accessible and useable upon demand by an authorized entity

[SOURCE: ISO/TS 17575-2:2020, 3.20]

3.5

base standard

approved international standard, technical specification or ITU-T Recommendation

[SOURCE: ISO/TS 17573-2:2020, 3.23]

3.6

billing detail

information needed to determine or verify the amount due for the usage of a given service

[SOURCE: ISO/TS 17573-2:2020, 3.25]

3.7

channel

information transfer path

[SOURCE: ISO 7498-2:1989, 3.3.13]

3.8

charge object

geographic or road related object for the use of which a charge is applied

[SOURCE: ISO/TS 17573-2:2020, 3.31]

3.9

charge report

information containing road usage and related information originated at the front end

[SOURCE: ISO/TS 17573-2:2020, 3.35]

3.10

charging data

relevant data on the usage of a certain service

[SOURCE: ISO/TS 17573-2:2020, 3.36]

3.11

conformance testing

assessment to determine whether an implementation complies with the requirements

[SOURCE: ISO/TS 17573-2:2020, 3.45]

EN 16986:2024 (E)**3.12****context data**

information defined by the responsible toll charger necessary to establish the toll due for using a vehicle on a particular toll context and to conclude the toll transaction

3.13**data element**

coded information, which might itself consist of lower level information structures

[SOURCE: ISO/TS 17573-2:2020, 3.54]

3.14**electronic fee collection**

fee collection by electronic means

[SOURCE: ISO/TS 17573-2:2020, 3.70]

3.15**enforcement**

measures or actions performed to achieve compliance with laws, regulations or rules

[SOURCE: ISO/TS 17573-2:2020, 3.73]

3.16**evaluation**

systematic process of determining how individuals, procedures, systems or programs have met formally agreed objectives and requirements

[SOURCE: ISO/TS 17573-2:2020, 3.75]

3.17**front end**

part of an EFC system which consists of on-board equipment and possibly of a proxy where road tolling information and usage data are collected and processed for delivery to the back end

[SOURCE: ISO/TS 17573-2:2020, 3.85]

3.18**implementation conformance statement**

statement of capabilities and options that have been implemented defining to what extent the implementation is compliant with a given specification

[SOURCE: ISO/TS 17573-2:2020, 3.90]

3.19**implementation under test**

implementation of one or more open systems interconnection (OSI) protocols in an adjacent user/provider relationship, being part of a real system, which is to be studied by testing

[SOURCE: ISO/TS 17573-2:2020, 3.94]

3.20**international standardized profile**

internationally agreed-to, harmonized document which describes one or more profiles

[SOURCE: ISO/TS 17573-2:2020, 3.102]

3.21**interoperability**

ability of systems to exchange information and to make mutual use of the information that has been exchanged

[SOURCE: ISO/TS 17573-2:2020, 3.103]

3.22**issuer**

entity responsible for issuing the payment means to the user

[SOURCE: ISO/TS 16785:2014, 3.9]

3.23**on-board equipment**

all required equipment on-board a vehicle for performing required EFC functions and communication services

[SOURCE: ISO/TS 17573-2:2020, 3.126]

3.24**payment claim**

statement made available to the payer by the payee to justify the amount due

[SOURCE: ISO/TS 17573-2:2020, 3.133]

3.25**profile**

set of requirements and selected options from base standards or international standardized profiles used to provide a specific functionality

[SOURCE: ISO/TS 17573-2:2020, 3.146]

3.26**role**

set of responsibilities

[SOURCE: ISO/TS 17573-2:2020, 3.163]

3.27**system under test**

real system in which the implementation under test resides

[SOURCE: ISO/TS 17573-2:2020, 3.178]

<https://standards.iteh.ai/catalog/standards/sist/d48a0c56-668c-4deb-b770-895fb3b8411d/sist-en-16986-2024>

EN 16986:2024 (E)**3.28****test**

procedure designed to measure characteristics of a component or system in specified conditions

[SOURCE: ISO/TS 17573-2:2020, 3.182]

3.29**toll**

charge, tax or duty levied in connection to using a vehicle in a toll domain

[SOURCE: ISO 17573-2:2020, 3.193]

3.30**toll charger**

entity which levies toll for the use of vehicles in a toll domain

[SOURCE: ISO/TS 17573-2:2020, 3.194]

3.31**toll context**

logical view as defined by attributes and functions of the basic elements of a toll scheme consisting of a single basic tolling principle, a spatial distribution of the charge objects and a single behaviour of the related front end

[SOURCE: ISO/TS 17573-2:2020, 3.196]

3.32**toll declaration**

statement to declare the usage of a given toll service to a toll charger

[SOURCE: ISO/TS 17573-2:2020, 3.199]

3.33**toll domain**

area or a part of a road network where a certain toll regime is applied

[SOURCE: ISO 17573-2:2020, 3.201]

3.34**toll regime**

set of rules, including enforcement rules, governing the collection of toll in a toll domain

[SOURCE: ISO/TS 17573-2:2020, 3.203]

3.35**toll scheme**

organizational view of a toll regime, including the actors and their relationships

[SOURCE: ISO/TS 17573-2:2020, 3.204]

3.36**toll service provider**

entity providing toll services in one or more toll domains

[SOURCE: ISO/TS 17573-2:2020, 3.206]