

Third edition  
2022-04

---

---

## **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*



Reference number  
ISO 12855:2022(E)

© ISO 2022



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Published in Switzerland

This is a preview of ISO 12855:2022. [Click here to purchase the full version from the ANSI store.](#)

## Contents

	Page
Foreword.....	v
Introduction.....	vi
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>2</b>
<b>4 Symbols and abbreviated terms.....</b>	<b>3</b>
<b>5 Architectural concepts and information exchanges.....</b>	<b>4</b>
5.1 Main roles in the toll charging environment.....	4
5.2 Information exchange between toll charging and provision.....	5
5.2.1 General.....	5
5.2.2 Basic protocol mechanisms.....	7
5.2.3 Exchange trust objects functionality.....	8
5.2.4 Originating and providing EFC context data functionality.....	8
5.2.5 Provide contract issuer information functionality.....	9
5.2.6 Manage exception list functionality.....	9
5.2.7 Report toll declarations functionality.....	10
5.2.8 Report billing details functionality.....	10
5.2.9 Payment settlement functionality.....	11
5.2.10 Exchange enforcement data functionality.....	12
5.2.11 Process user complaints functionality.....	13
5.2.12 Exchange quality assurance parameters functionality.....	13
5.2.13 Provide media settlement data functionality.....	14
<b>6 Computational specification.....</b>	<b>14</b>
6.1 Overview.....	14
6.2 Application protocol data units.....	17
6.2.1 General.....	17
6.2.2 Application protocol control information (APCI).....	19
6.2.3 Application data units.....	20
6.2.4 ADU identification.....	20
6.2.5 ADU action code.....	21
6.2.6 User identification.....	21
6.3 RequestAdu data structure.....	22
6.4 AckAdu data structure.....	25
6.5 StatusAdu data structure.....	32
6.6 TrustObjectAdu data structure.....	32
6.7 EfcContextDataAdu data structure.....	39
6.7.1 General.....	39
6.7.2 GeneralContextData type.....	40
6.7.3 MeshedContextData type.....	57
6.7.4 Common data structures.....	66
6.8 ContractIssuerListAdu data structure.....	88
6.9 ExceptionListAdu data structure.....	90
6.10 ReportAbnormalObeAdu data structure.....	94
6.11 TollDeclarationAdu data structure.....	95
6.12 BillingDetailsAdu data structure.....	99
6.12.1 General.....	99
6.12.2 UsageList data type.....	101
6.12.3 AssociatedEventData data type.....	111
6.13 PaymentClaimAdu data structure.....	117
6.14 PaymentAnnouncement Adu data structure.....	119
6.15 ProvideUserDetailsAdu data structure.....	121
6.16 ReportCccEventAdu data structure.....	125

This is a preview of ISO 12855:2022. [Click here to purchase the full version from the ANSI store.](#)

6.17	ProvideUserIdListAdu data structure.....	126
6.18	Report QA data structure.....	127
6.19	User complaint data structure.....	128
6.20	User complaint response data structure.....	129
6.21	Media settlement data structure.....	131
<b>7</b>	<b>Transfer mechanisms and supporting functions.....</b>	<b>132</b>
7.1	Transfer mechanisms.....	132
7.2	Secure communication channel.....	133
7.3	Supporting functions.....	133
7.3.1	Communication services.....	133
7.3.2	Authenticators.....	133
7.3.3	Signature and hash algorithms.....	135
7.3.4	Keys encryption.....	135
	<b>Annex A (normative) Data type specifications.....</b>	<b>136</b>
	<b>Annex B (informative) Example enforcement process applying standardized APDU exchanges.....</b>	<b>137</b>
	<b>Annex C (informative) Example of data flows in a toll domain.....</b>	<b>142</b>
	<b>Annex D (informative) Example of rounding differences.....</b>	<b>145</b>
	<b>Annex E (informative) Example of fee calculation using EFC context data.....</b>	<b>149</b>
	<b>Bibliography.....</b>	<b>153</b>

This is a preview of ISO 12855:2022. [Click here to purchase the full version from the ANSI store.](#)

## 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](http://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](http://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](http://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](http://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<sup>[8]</sup>, related Commission delegated regulation 2020/2003<sup>[10]</sup> and Commission implementing regulation 2020/204<sup>[9]</sup>). There is both a commercial and economic justification regarding the OBE and the toll systems for International Standards supporting interoperability.

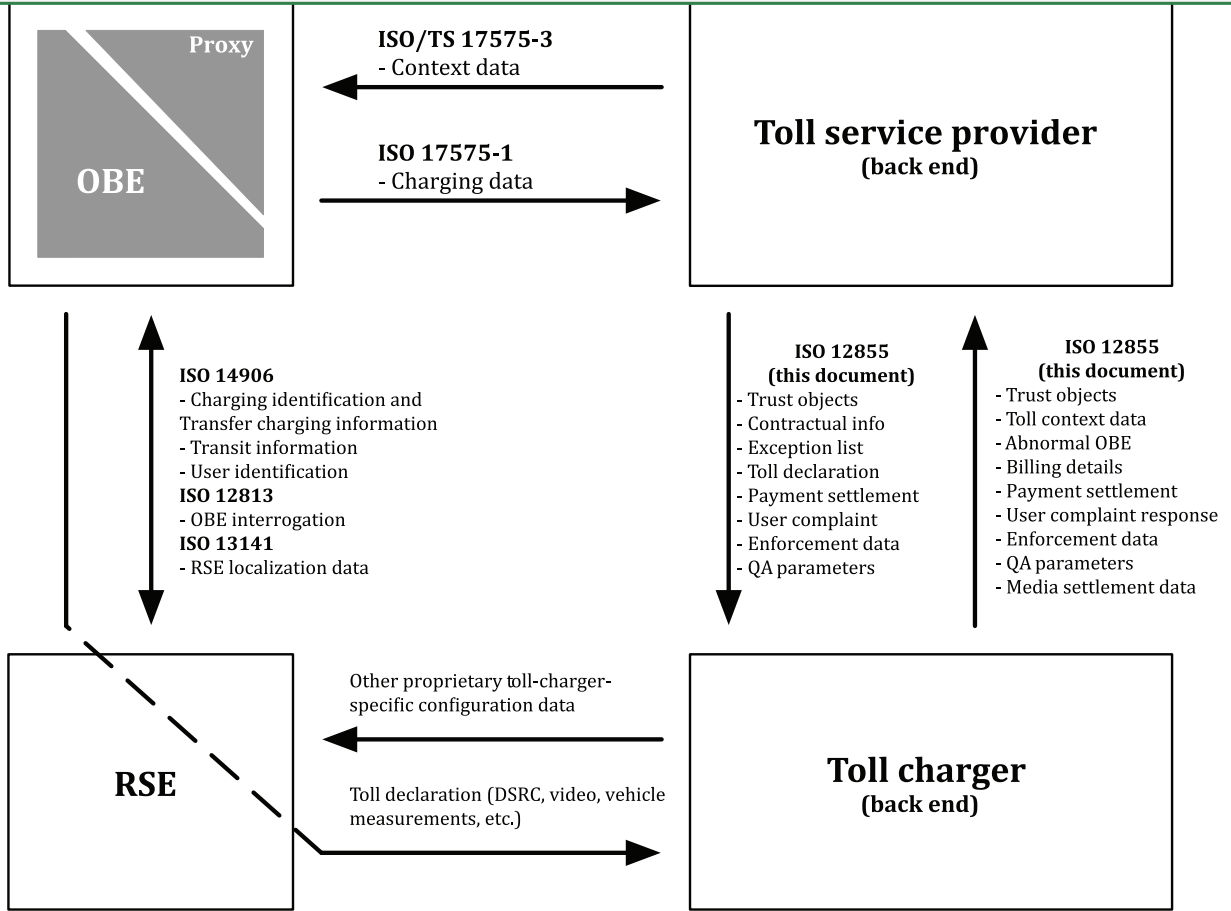
The system architecture defined in ISO 17573-1 is the basis for all International Standards that relate to tolling systems in the toll domain. With respect to ISO 17573-1, this document:

- 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.

This is a preview of ISO 12855:2022. Click here to purchase the full version from the ANSI store.



**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 is a preview of ISO 12855:2022. [Click here to purchase the full version from the ANSI store.](#)

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.