



BSI Standards Publication

# **Electronic Fee Collection — Interoperable application profiles for information exchange between Service Provision and Toll Charging**

**National foreword**

This Published Document is the UK implementation of CEN/TS 16986:2016.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2016.

Published by BSI Standards Limited 2016

ISBN 978 0 580 93168 0

ICS 35.240.60

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 October 2016.

**Amendments/corrigenda issued since publication**

| Date | Text affected |
|------|---------------|
|------|---------------|

---

TECHNICAL SPECIFICATION

**CEN/TS 16986**

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

October 2016

ICS 35.240.60

English Version

## Electronic Fee Collection - Interoperable application profiles for information exchange between Service Provision and Toll Charging

Perception de télépéage - Profil d'application  
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 Technical Specification (CEN/TS) was approved by CEN on 13 July 2016 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

| <b>Contents</b>                                                                      | <b>Page</b> |
|--------------------------------------------------------------------------------------|-------------|
| European foreword.....                                                               | 6           |
| Introduction .....                                                                   | 7           |
| 1 Scope.....                                                                         | 8           |
| 2 Normative references.....                                                          | 8           |
| 3 Terms and definitions .....                                                        | 9           |
| 4 Abbreviations .....                                                                | 13          |
| 5 Conformance.....                                                                   | 14          |
| 5.1 General.....                                                                     | 14          |
| 5.2 Base standard .....                                                              | 14          |
| 5.3 Main contents of an 12855-IAP .....                                              | 14          |
| 5.4 Conformance requirements .....                                                   | 15          |
| 5.4.1 General requirements .....                                                     | 15          |
| 5.4.2 Transaction requirements.....                                                  | 15          |
| 5.4.3 Data requirements.....                                                         | 16          |
| 5.4.4 Transaction requirements.....                                                  | 17          |
| 5.5 Conformation notification .....                                                  | 20          |
| 5.6 Interoperability .....                                                           | 21          |
| 6 Requirements on common transactions.....                                           | 21          |
| 6.1 General.....                                                                     | 21          |
| 6.2 InfoExchange.....                                                                | 21          |
| 6.2.1 InfoExchangeContent.....                                                       | 21          |
| 6.2.2 InfoExchangeAuthenticator .....                                                | 23          |
| 6.3 AckADU .....                                                                     | 23          |
| 6.3.1 General.....                                                                   | 23          |
| 6.3.2 Syntax and semantics.....                                                      | 23          |
| 6.4 USERDETAILS - Exchange Enforcement Data - Retrieve and Provide User Details..... | 26          |
| 6.4.1 Transaction sequence, triggers and timings .....                               | 26          |
| 6.4.2 Syntax and semantics.....                                                      | 28          |
| 6.5 LISTOFUSERS - List of Users .....                                                | 30          |
| 6.5.1 Transaction sequence, triggers and timings .....                               | 30          |
| 6.5.2 Syntax and semantics.....                                                      | 31          |
| 6.6 EXCEPTIONLIST - Managing Exception Lists .....                                   | 32          |
| 6.6.1 Transaction sequence, triggers and timings .....                               | 32          |
| 6.6.2 Syntax and semantics.....                                                      | 33          |
| 6.7 TRUSTOBJECTS - Exchange trust objects .....                                      | 37          |
| 6.7.1 APDU transfer mechanisms.....                                                  | 37          |
| 6.7.2 Transaction sequence, triggers and timings .....                               | 37          |
| 6.7.3 Syntax and semantics.....                                                      | 38          |
| 6.8 PAYMENTCLAIM - Payment Claim .....                                               | 40          |
| 6.8.1 Transaction sequence, triggers and timings .....                               | 40          |
| 6.8.2 Syntax and semantics.....                                                      | 42          |
| 7 DSRC profile specific transactions .....                                           | 44          |
| 7.1 DSRC.CONTRACTISSUERLIST – ContractIssuerList .....                               | 44          |
| 7.1.1 Transaction sequence, triggers and timings .....                               | 44          |
| 7.1.2 Syntax and semantics - ContractIssuerListADU .....                             | 45          |

|         |                                                                                                      |    |
|---------|------------------------------------------------------------------------------------------------------|----|
| 7.2     | DSRC.EFCCONTEXTDATA - Provide and Request EFC Context Data .....                                     | 45 |
| 7.2.1   | Transaction sequence, triggers and timings.....                                                      | 45 |
| 7.2.2   | Syntax and semantics - EfcContextDataADU .....                                                       | 47 |
| 7.3     | DSRC.BILLINGDETAILS - Report billing details.....                                                    | 48 |
| 7.3.1   | Transaction sequence, triggers and timings.....                                                      | 48 |
| 7.3.2   | Syntax and semantics .....                                                                           | 50 |
| 7.4     | DSRC.REPORTABNORMALLOBE.....                                                                         | 62 |
| 7.4.1   | Transaction sequence, triggers and timings.....                                                      | 62 |
| 7.4.2   | Syntax and semantics - ReportAbnormalLOBEADU .....                                                   | 64 |
| 8       | GNSS profile specific transactions .....                                                             | 64 |
| 8.1     | GNSS.TOLLDECLARATIONS - Report toll declarations.....                                                | 64 |
| 8.1.1   | Transaction sequence, triggers and timings.....                                                      | 64 |
| 8.1.2   | Syntax and semantics - TollDeclarationADU .....                                                      | 66 |
| 8.2     | Report billing details.....                                                                          | 73 |
| 8.2.1   | General .....                                                                                        | 73 |
| 8.2.2   | GNSS.BILLINGDETAILS.TSP - Transaction sequence, triggers and timings .....                           | 73 |
| 8.2.3   | GNSS.BILLINGDETAILS.TC - Transaction sequence, triggers and timing.....                              | 75 |
| 8.2.4   | Syntax and semantics of GNSS.BILLINGDETAILS.TSP and GNSS.BILLINGDETAILS.TC - BillingDetailsADU ..... | 76 |
| 8.3     | GNSS.PAYMENTANNOUNCEMENT .....                                                                       | 80 |
| 8.3.1   | Transaction sequence, triggers and timings.....                                                      | 80 |
| 8.3.2   | Syntax and semantics - PaymentAnnouncementADU .....                                                  | 81 |
| 9       | APDU Transfer mechanisms .....                                                                       | 83 |
| 9.1     | ASN.1 encoding.....                                                                                  | 83 |
| 9.2     | Generic transfer mechanisms .....                                                                    | 83 |
| 9.3     | Alternative transfer mechanisms for transaction type TRUSTOBJECTS .....                              | 83 |
| Annex A | (normative) ICS Proforma .....                                                                       | 84 |
| A.1     | Guidance for completing the PICS proforma .....                                                      | 84 |
| A.1.1   | Purposes and structure .....                                                                         | 84 |
| A.1.2   | Abbreviations and conventions.....                                                                   | 84 |
| A.1.3   | Instructions for completing the PICS proforma.....                                                   | 86 |
| A.2     | Identification of the implementation .....                                                           | 86 |
| A.2.1   | General .....                                                                                        | 86 |
| A.2.2   | Date of the statement .....                                                                          | 86 |
| A.2.3   | Implementation Under Test (IUT) identification.....                                                  | 86 |
| A.2.4   | System Under Test (SUT) identification .....                                                         | 86 |
| A.2.5   | Product supplier .....                                                                               | 87 |
| A.2.6   | Applicant (if different from product supplier) .....                                                 | 87 |
| A.2.7   | PICS contact person .....                                                                            | 87 |
| A.3     | Identification of the protocol .....                                                                 | 88 |
| A.4     | Global statement of conformance .....                                                                | 88 |
| A.5     | Roles .....                                                                                          | 88 |
| A.6     | Profiles.....                                                                                        | 88 |
| A.7     | InfoExchange .....                                                                                   | 89 |

|                            |                                                                                          |            |
|----------------------------|------------------------------------------------------------------------------------------|------------|
| <b>A.7.1</b>               | <b>InfoExchange protocol procedures.....</b>                                             | <b>89</b>  |
| <b>A.7.2</b>               | <b>InfoExchange parameters .....</b>                                                     | <b>89</b>  |
| <b>A.8</b>                 | <b>Common AckADU support.....</b>                                                        | <b>90</b>  |
| <b>A.8.1</b>               | <b>AckADU fields .....</b>                                                               | <b>90</b>  |
| <b>A.9</b>                 | <b>Common Transactions support.....</b>                                                  | <b>90</b>  |
| <b>A.9.1</b>               | <b>General.....</b>                                                                      | <b>90</b>  |
| <b>A.9.2</b>               | <b>USERDETAILS support.....</b>                                                          | <b>91</b>  |
| <b>A.9.3</b>               | <b>LISTOFUSERS support .....</b>                                                         | <b>92</b>  |
| <b>A.9.4</b>               | <b>EXCEPTIONLIST support.....</b>                                                        | <b>94</b>  |
| <b>A.9.5</b>               | <b>TRUSTOBJECTS support.....</b>                                                         | <b>96</b>  |
| <b>A.9.6</b>               | <b>PAYMENTCLAIM support.....</b>                                                         | <b>97</b>  |
| <b>A.10</b>                | <b>DSRC Specific Transactions Support .....</b>                                          | <b>99</b>  |
| <b>A.10.1</b>              | <b>Prerequisites .....</b>                                                               | <b>99</b>  |
| <b>A.10.2</b>              | <b>DSRC transactions support .....</b>                                                   | <b>99</b>  |
| <b>A.10.3</b>              | <b>DSRC.CONTRACTISSUERLIST support .....</b>                                             | <b>99</b>  |
| <b>A.10.4</b>              | <b>DSRC.EFCCONTEXTDATA support.....</b>                                                  | <b>100</b> |
| <b>A.10.5</b>              | <b>DSRC.BILLINGDETAILS support .....</b>                                                 | <b>102</b> |
| <b>A.10.6</b>              | <b>DSRC.REPORTABNORMALLOBE support .....</b>                                             | <b>108</b> |
| <b>A.11</b>                | <b>GNSS Specific Transactions Support.....</b>                                           | <b>109</b> |
| <b>A.11.1</b>              | <b>General.....</b>                                                                      | <b>109</b> |
| <b>A.11.2</b>              | <b>Common GNSS.BILLINGDETAILS support.....</b>                                           | <b>110</b> |
| <b>A.11.3</b>              | <b>GNSS.BILLINGDETAILS.TSP support.....</b>                                              | <b>113</b> |
| <b>A.11.4</b>              | <b>GNSS.BILLINGDETAILS.TC support .....</b>                                              | <b>114</b> |
| <b>A.11.5</b>              | <b>GNSS.TOLLDECLARATION support .....</b>                                                | <b>115</b> |
| <b>A.11.6</b>              | <b>GNSS.PAYMENTANNOUNCEMENT support.....</b>                                             | <b>118</b> |
| <b>A.12</b>                | <b>Transfer mechanisms .....</b>                                                         | <b>119</b> |
| <b>Annex B (normative)</b> | <b>Interoperability Statement Proforma.....</b>                                          | <b>120</b> |
| <b>B.1</b>                 | <b>Guidance for completing the Interoperability Statement proforma .....</b>             | <b>120</b> |
| <b>B.2</b>                 | <b>Interoperability Statement for transaction support .....</b>                          | <b>120</b> |
| <b>B.3</b>                 | <b>Interoperability Statement for the USERDETAILS transaction type.....</b>              | <b>121</b> |
| <b>B.4</b>                 | <b>Interoperability Statement for the LISTOFUSERS transaction type .....</b>             | <b>121</b> |
| <b>B.5</b>                 | <b>Interoperability Statement for the EXCEPTIONLIST transaction type .....</b>           | <b>122</b> |
| <b>B.6</b>                 | <b>Interoperability Statement for the TRUSTOBJECTS transaction type .....</b>            | <b>123</b> |
| <b>B.7</b>                 | <b>Interoperability Statement for the PAYMENTCLAIM transaction type .....</b>            | <b>124</b> |
| <b>B.8</b>                 | <b>Interoperability Statement for the DSRC.CONTRACTISSUERLIST transaction type .....</b> | <b>124</b> |
| <b>B.9</b>                 | <b>Interoperability Statement for the DSRC.EFCCONTEXTDATA transaction type.....</b>      | <b>124</b> |
| <b>B.10</b>                | <b>Interoperability Statement for the DSRC.BILLINGDETAILS transaction type .....</b>     | <b>125</b> |

|             |                                                                                                   |            |
|-------------|---------------------------------------------------------------------------------------------------|------------|
| <b>B.11</b> | <b>Interoperability Statement for the DSRC.REPORTABNORMALLOBE transaction type.....</b>           | <b>125</b> |
| <b>B.12</b> | <b>Interoperability Statement for the GNSS.TOLLDECLARATIONS transaction type.....</b>             | <b>125</b> |
| <b>B.13</b> | <b>Interoperability Statement for the GNSS.BILLINGDETAILS.TSP transaction type .....</b>          | <b>126</b> |
| <b>B.14</b> | <b>Interoperability Statement for the GNSS.BILLINGDETAILS.TC transaction type.....</b>            | <b>126</b> |
| <b>B.15</b> | <b>Interoperability Statement for the GNSS.PAYMENTANNOUNCEMENT transaction type.</b>              | <b>127</b> |
|             | <b>Annex C (normative) Web service definition (WSDL) .....</b>                                    | <b>128</b> |
|             | <b>Annex D (informative) Use of this Technical Specification for the EETS .....</b>               | <b>129</b> |
| <b>D.1</b>  | <b>General .....</b>                                                                              | <b>129</b> |
| <b>D.2</b>  | <b>Overall relationship between European standardization and the EETS .....</b>                   | <b>129</b> |
| <b>D.3</b>  | <b>European standardization work supporting the EETS .....</b>                                    | <b>129</b> |
| <b>D.4</b>  | <b>Correspondence between this Technical Specification and the EETS .....</b>                     | <b>130</b> |
|             | <b>Annex E (informative) How to read UML class diagrams in this Technical Specification .....</b> | <b>131</b> |
| <b>E.1</b>  | <b>General .....</b>                                                                              | <b>131</b> |
| <b>E.2</b>  | <b>Relation of ASN.1 code and UML class diagrams .....</b>                                        | <b>131</b> |
| <b>E.3</b>  | <b>Relation of UML class diagrams for the base standard and the profile.....</b>                  | <b>133</b> |
|             | <b>Bibliography .....</b>                                                                         | <b>135</b> |

## **European foreword**

This document (CEN/TS 16986:2016) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

The Standard on information exchange between service provision and toll charging (i.e. EN ISO 12855:2015) 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 and toll service providers. As such, it provides useful but not sufficient support to ensure technical interoperability.

The aim of this Technical Specification is to produce a profile specification that provides technical interoperability to support the EFC information exchange between toll service providers (TSPs) and toll chargers (TCs):

- based on DSRC;
- based on GNSS/CN – autonomous systems.

This Technical Specification covers the definition of interoperable application profiles (IAP) applicable for the use of EN ISO 12855:2015. 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 (in Europe).

This IAP defines profiles using the concept of “International Standardised 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 12855:2015, 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 Technical Specification is consistent with and is intended to provide support for the technical specification of the EETS laid down in the European Directive 2004/52/EC and in the subsequent European Commission Decision 2009/750/EC.

A suite of test specifications is currently being developed to support assessment of an implementation for compliance with this Technical Specification.

## 1 Scope

This Technical Specification defines an application interface definition by selecting suitable options from the base standard EN ISO 12855:2015. Furthermore, it defines transfer mechanisms and supporting functions to ensure the interoperability between TCs and TSPs.

This Technical Specification covers:

- exchange of information between the central equipment associated with the two roles service provision and toll charging, e.g.:
  - charging related data (exception lists, toll declarations, billing details, payment claims);
  - administrative data (trust objects, EFC context data, contact details for enforcement, etc.);
  - confirmation data.
- transfer mechanisms and supporting functions;
- semantics of data elements;
- implementation conformance statement proforma (Annex A), as a basis for assessment of conformity to this Technical Specification;
- an Interoperability statement proforma (Annex B), as a basis for assessment of transactional intereoperability of two technical implementations;
- a web service definition (Annex C) for the use of web services as communication technology.

The implementation of the underlying back office systems and their business processes is not covered. Therefore, outside of the scope is in particular:

- details on how to achieve security using the authenticator data elements of the base standards;
- how to operate compliance checking and the enforcement process;
- commercial aspects;
- definition of non-functional features such as performance indicators like accuracy, availability and reporting requirements.

This Technical Specification further provides an assessment of support of the EETS (Annex D) and an explanation how to read the unified modelling language (UML) diagrams (Annex E) that are used in this document.

## 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.

EN ISO 12855:2015, *Electronic fee collection — Information exchange between service provision and toll charging*

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*<sup>1)</sup>

---

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