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Elektronsko pobiranje pristojbin - Zahteve za predplačilne sisteme

Electronic fee collection - Requirements for pre-payment systems

Elektronische Gebührenerfassung - Anforderungen für Systeme zur Vorauszahlung

Perception de télépéage - Exigences sur les systèmes de pré-paiement

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Electronic fee collection - Requirements for pre-payment systems

Perception de télépéage - Exigences relatives aux systèmes de pré-paiement

Elektronische Gebührenerfassung - Anforderungen für Systeme zur Vorauszahlung

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Foreword

This document (CEN/TR 16092:2011) has been prepared by Technical Committee CEN/TC 278 “Road Transport and Traffic Telematics”, the secretariat of which is held by NEN.

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Introduction

The discussion on payment-modes within the environment of electronic fee collection at present is based on the existence of a post-payment contract between the Toll Service Provider (TSP) and the Service User (SU).

Pre-conditions of such a contractual agreement are

— sufficient creditworthiness of the SU, and

— existence of a bank account with the SU.

Questions arise in the context of the access to an EFC system for

— SUs not being able to meet the aforementioned pre-conditions;

— SUs with occasional needs to use an EFC system (mainly from the private sector)

  — not willing to open a bank account;

  — not able to open a bank account (by reasons what so ever) and therefore not allowed to participate;

  — from countries with limited access to the card market to participate in an interoperable EFC system, which may otherwise not be open to them.

To meet the requirements of this clientele, one or more suitable ways of pre-payments have to be established for EFC to grant interoperability:

— stored value on an electronic medium;

— stored value in a central account.

As far as private users are concerned legislation could ask for anonymous payment modes as nobody can be forced to open or communicate a bank account. On the other hand such payment modes help Toll Service Providers to offer an interoperable EFC service to customers with a limited monetary risk.

Before defining necessary standards in that field the requirements of a universal Pre-Payment system able to communicate with the OBE have to be evaluated, especially with regard to validity and feasibility for private users.

1 Scope

This technical report (TR) analyses requirements for a universal Pre-Pay account system for EFC including the following issues:

— relations to other existing standards in this domain;

— the core requirements and functionality that must be provided.

This technical report will show an analysis of the requirements for a universal prepay system and categorise possible different types of pre-pay solutions, in terms of functionality, technical and legal considerations. As far as legal requirements are concerned it will be clarified whether the pre-payment means fall within the scope of European Directive 2000/46/EC on the taking up, pursuit of and prudential supervision of the business of electronic money institutions and whether the medium-issuing organisation has to act as a financial institution and falls within the scope of the Payment Service Directive 2007/64/EC. The latter applying exactly to payment activities undertaken by entities but do not require a full bank license.

The technical report will describe the current state-of-affairs of EFC pre-payment systems, including the demand for standards and inventory of provisions provided by standards. It will identify and prioritize gaps in terms of standards or other enablers needed in order for the market to provide viable pre-payment solutions in a European context.

There are two general approaches to represent the content of the TR:

a) allocate each requirement under each pre-pay solution;

b) allocate each pre-pay solution under each requirement.

To achieve a better understanding and readability alternative a) has been decided (this refers to Clause 8 and Clause 9 only).

The TR does not give any decision on how or whether one of the pre-payment solutions described is commercially feasible to be considered as an implementable offer to the Service User. The return for invest for any TSP regarding the system architecture requirements and other obligations (refunding of SU) is questionable.

This TR just gives a summary of the requirements of possible pre-pay solutions. It is up to decision makers to evaluate the alternatives in the light of their individual preconditions of their tolling regime and of market acceptance.

2 Normative references

The following referenced documents are indispensable for the application 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 15509, *Road transport and traffic telematics — Electronic fee collection — Interoperability application profile for DSRC*

prEN ISO 12855, *Electronic fee collection — Information exchange between service provision and toll charging (ISO/DIS 12855:2009)*

EN ISO 14906, *Road transport and traffic telematics — Electronic fee collection — Application interface definition for dedicated short-range communication (ISO 14906:2004)*

prEN ISO 17573, *Electronic fee collection — System architecture for vehicle related tolling (ISO/DIS 17573:2009)*

CEN ISO/TS 25110, *Electronic fee collection — Interface definition for on-board account using integrated circuit card (ICC) (ISO/TS 25110:2008)*

ISO 4217, *Codes for the representation of currencies and funds*

ISO/IEC 7810, *Identification cards — Physical characteristics*

ISO/IEC 7816-1, *Identification cards — Integrated circuit(s) cards with contacts — Part 1: Physical characteristics*

ISO/IEC 7816-2, *Identification cards — Integrated circuit cards — Part 2: Cards with contacts — Dimensions and location of the contacts*

ISO/IEC 7816-3, *Identification cards — Integrated circuit cards — Part 3: Cards with contacts — Electrical interface and transmission protocols*

ISO/IEC 7816-4, *Identification cards — Integrated circuit cards — Part 4: Organization, security and commands for interchange*

ISO/IEC 7816-6, *Identification cards — Integrated circuit cards — Part 6: Inter-industry data elements for interchange*

ISO/IEC 7816-8, *Identification cards — Integrated circuit cards — Part 8: Commands for security operations*

ISO/IEC 14443-1, *Identification cards — Contactless integrated circuit cards — Proximity cards —- Part 1: Physical characteristics*

ISO/IEC 14443-2, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 2: Radio frequency power and signal interface*

ISO/IEC 14443-3, *Identification cards — Contactless integrated circuit(s) cards — Proximity cards — Part 3: Initialization and anticollision*

ISO/IEC 14443-4, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 4: Transmission protocol*

ISO/IEC 15693-1, *Identification cards — Contactless integrated circuit cards — Vicinity cards — Part 1: Physical characteristics*

ISO/IEC 15693-2, *Identification cards — Contactless integrated circuit cards — Vicinity cards — Part 2: Air interface and initialization*

ISO/IEC 15693-3, *Identification cards — Contactless integrated circuit cards — Vicinity cards — Part 3: Anticollision and transmission protocol*

ISO/IEC 18092, *Information technology — Telecommunications and information exchange between systems — Near Field Communication — Interface and Protocol (NFCIP-1)*

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1
Electronic Fee Collection (EFC)
toll charging by electronic means via a wireless interface

3.2
enforcement
process of compelling observance of a law, regulation, etc.

3.3
Interoperability
ability of systems to provide services to and accept services from other systems and to use the services so exchanged to enable them to operate effectively together

EXAMPLE For tolling interoperability aims at enabling a vehicle to drive through various toll domains while having only one OBE operating under one contract with a toll service provider.

3.4
Onboard equipment (OBE)
equipment fitted within or on the outside of a vehicle and used for toll purposes

3.5
tariff Scheme
set of rules to determine the fee due for a vehicle in a toll domain for a EFC object at a certain day and time

3.6
toll
charge, a tax, a fee, or a duty in connection with using a vehicle within a toll domain

3.7
toll charger
legal entity charging toll for vehicles in a toll domain

3.8
toll declaration (from OBE)
statement (from the OBE of a vehicle) to a toll charger, not necessarily transmitted via a direct communication channel, that confirms the presence of a vehicle in a toll domain in a format agreed between the toll service provider and the toll charger

3.9
toll domain
area or part of a road network where a EFC regime is applied

3.10
EFC point
location within a toll domain where the OBE has to issue a toll declaration

3.11
EFC regime
set of rules, including enforcement rules, governing the collection of toll in a toll domain

3.12
toll schema
generic term used for EFC regime and/or toll domain and/or toll system depending on the context

3.13
toll service
service enabling users having only one contract and one set of OBE to use a vehicle in one or more toll domains

3.14
toll service provider
legal entity providing to his customers toll services on one or more toll domains for one or more classes of vehicles

3.15
toll system
off board equipment and possible other provisions used by a toll charger for the collection of toll for vehicles

3.16
EFC object
distinguished part of a toll domain for which one or more tariff schema applies

EXAMPLE An EFC object may be e.g. an area, all public roads within an area, a bridge, a zone, or a stretch of a road (network).

3.17
service user
generic term used for the customer of a toll service provider, one liable for toll, the owner of the vehicle, a fleet operator, a driver etc. depending on the context

3.18
value units bearing device (VBD)
device in the hand of the Service user that contains value units

4 Abbreviations

For the purpose of this document, the following abbreviations apply throughout the document unless otherwise specified.

CAD	Card Accepting Device
DSRC	Dedicated Short Range Communication
EETS	European Electronic Toll Service
EFC	Electronic fee collection
EMD	e-Money Directive
GNSS	Global Navigation Satellite System
GSM	Global System for Mobile communications
IC	Integrated Circuit
ID	Identification
IPR	Intellectual Property Rights
IRPA	International Radiation Protection Authority
NFC	Near Field Communication
OBE	On Board Equipment
PDA	Personal Digital Assistant
PMD	Payment Services Directive
POS	Point Of Sale
PSP	Payment Service Provider
RSE	Road Side Equipment
SAM	Secure Access Module

SP	see TSP
SU	Service User
TC	Toll Charger
TR	Technical Report
TS	Technical Specification
TSP	Toll Service Provider = Service Provider
VAT	Value Added Tax
VBD	Value Units Bearing Device

5 Interoperability Issues

5.1 Interoperability based on EFC Roles Model

Any universal Pre-Pay system needs to comply with the EFC Roles model defined in prEN ISO 17573. This standard defines the four main roles shown in Figure 1.

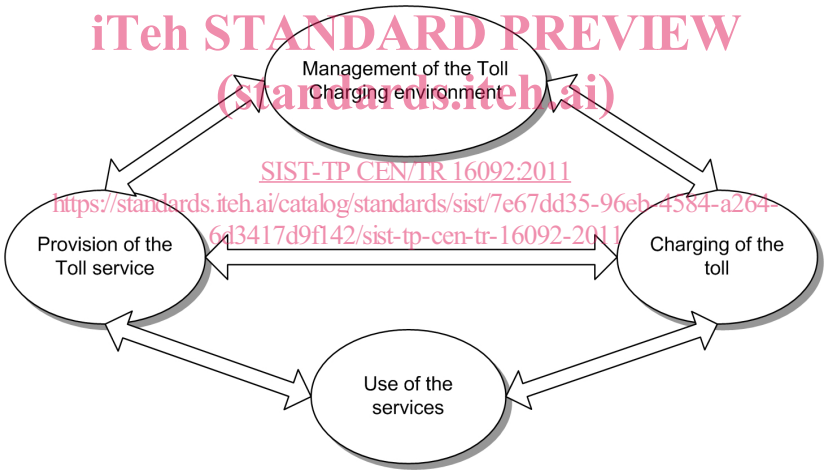

Figure 1 — Roles in the Toll Charging environment

Provision of the Toll Service

The role related to the provision of the Toll service is responsible for providing the basic artefacts, mechanisms, organization structures, and information transfer tools needed to run an EFC system. Provision of the OBE and the EFC contract with the Service User are two of the most important responsibilities of the role. An actor covering all responsibilities of the role is often called a Toll Service Provider or Service Provider.

Use of the services

In this standard a transport service is related to the use of or the presence of a vehicle in an Toll domain. The Toll domain may be a road network, a specific section of a road (e.g. a bridge, a tunnel or a ferry connection) or a specific area offering a service (e.g. a country, a region, a parking lot or access to a protected area in a city). This role is thus identified that it covers all aspects of using the Toll system and the transport service. Implementations of Toll systems in various domains identify actors in this role that are commonly referred to as, e.g. Driver, Service User (vehicle) or Customer.

Charging of the toll

The role related to the charging of the toll covers all actors who define the Toll domain, operate the toll system and may provide transport services. The role includes the related charging infrastructures and who defines the toll and operates the toll system. Enforcement operators are also part of this role.

Management of the Toll Charging environment

There is also a need for an overall management of the Toll Charging environment defining and organising the policy that enables the daily operation of the Toll Charging equipment involving several different actors. A specific role is identified to manage the Toll Charging environment, i.e. defining and maintaining a Set of Rules that, taken together, defines the policy of a given regime or of the overall Toll Charging environment.

Extension for the purpose of this document

The four roles represent a logical model. This does not prejudice any physical organisation. When coming to real organisations sub-actors can take over parts of the responsibilities of a role. With respect to pre-payment it is necessary to introduce the Payment Service Provider (PSP) as sub-actor of the Toll Service Provider.

5.2 Interoperability and Payment

One part of the SU's contract with the TSP is the definition of the payment mode under which the SU pays the toll consumed. If the TSP offers different payment modes, the SU has to decide which payment mode he wants to choose

— central account Post-Pay mode or;

— central account Pre-Pay mode or;

— OBE based Pre-Pay mode.

This can be agreed independently from the toll charger (TC), who has no right to decide on this contractual issue between TSP and SU.

But, a TC may limit the use of his toll domain to the use of OBEs operated through a central account. This limits the interoperable use of an OBE based pre-pay mode and has to be clearly communicated to the SU.

6 Classification of Pre-Pay solutions

6.1 Pre-Pay Account held in Central System

The OBE is equipped with a reference to an anonymous account held in the central system of a TSP which contains a certain amount of value units. This account may be linked to a specific SU, or may be anonymous in the sense that the stored value units have no link to the person or entity who loaded it into this account.

This account can be credited with value units by the SU in the form of:

— cash paid to a bank account of the TSP;

— cash paid at a point of sale;

— automatic direct debit against the SU's bank account.

The toll amount due for the usage of a Toll domain is transmitted from the TC to the TSP and there deducted from the centrally held account. The TSP in turn pays the amount due to the TC.